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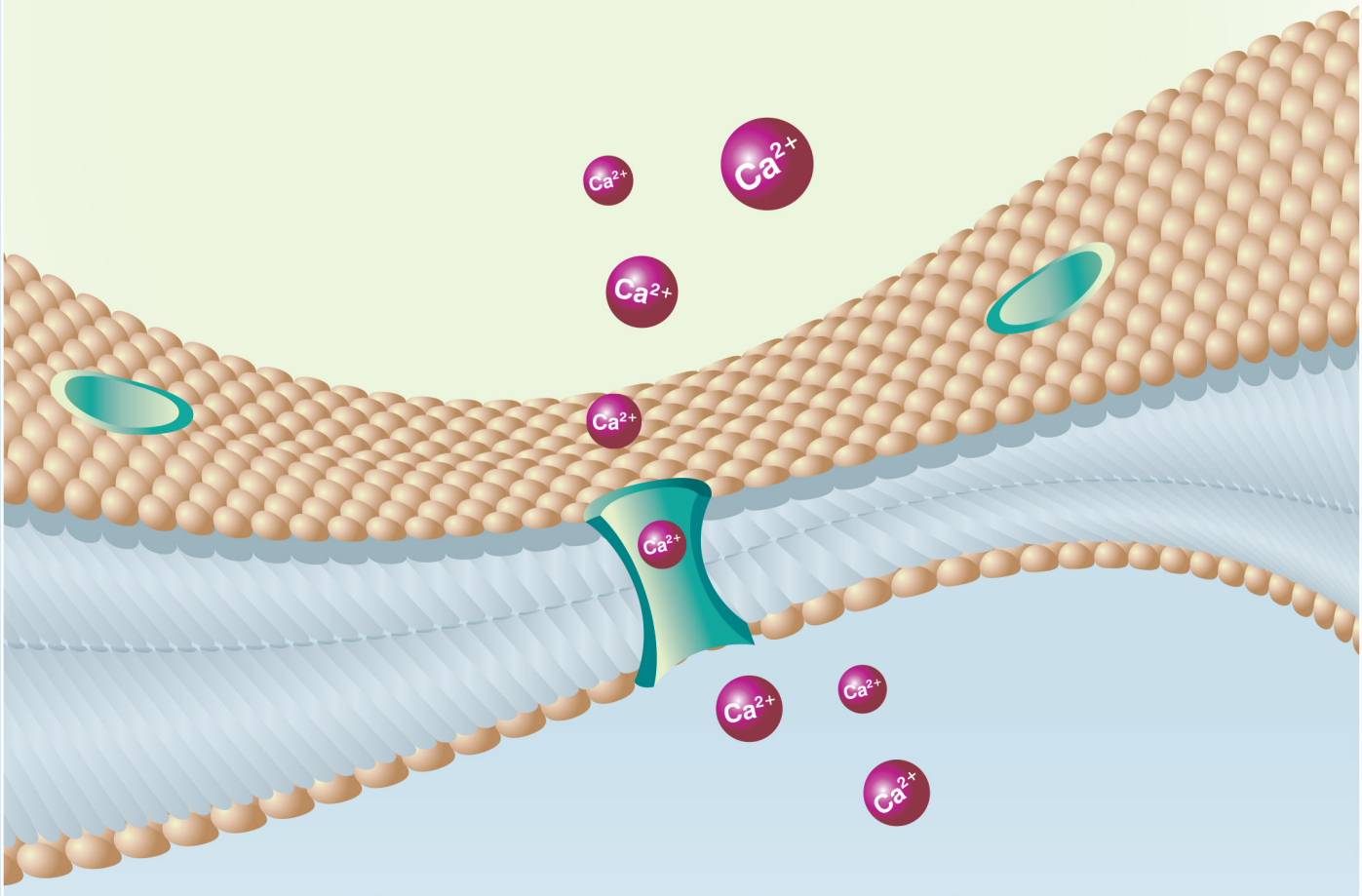

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5th International Congress on Cell Membranes and Oxidative Stress: Focus on Calcium Signaling and TRP Channels

9- 12 September 2014 Isparta, TURKEY
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5th International Congress on Cell Membranes and Oxidative Stress: Focus on Calcium Signaling and TRP Channels

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AIM AND SCOPES

Cell Membranes and Free Radical Research is a print and online journal that publishes original research articles, reviews and short reviews on the molecular basis of biophysical, physiological and pharmacological processes that regulate cellular function, and the control or alteration of these processes by the action of receptors, neurotransmitters, second messengers, cation, anions, drugs or disease.

Areas of particular interest are four topics. They are;

A- Ion Channels (Na^+ - K^+ Channels, Cl^- channels, Ca^{2+} channels, ADP-Ribose and metabolism of NAD^+, Patch-Clamp applications)

B- Oxidative Stress (Antioxidant vitamins, antioxidant enzymes, metabolism of nitric oxide, oxidative stress, biophysics, biochemistry and physiology of free oxygen radicals

C- Interaction Between Oxidative Stress and Ion Channels
(Effects of the oxidative stress on the activation of the voltage sensitive cation channels, effect of ADP-Ribose and NAD^+ on activation of the cation channels which are sensitive to voltage, effect of the oxidative stress on activation of the TRP channels)

D- Gene and Oxidative Stress (Gene abnormalities. Interaction between gene and free radicals. Gene anomalies and iron. Role of radiation and cancer on gene polymorphism)

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Keywords
Ion channels, cell biochemistry, biophysics, calcium signaling, cellular function, cellular physiology, metabolism, apoptosis, lipid peroxidation, nitric oxide synthase, ageing, antioxidants, neuropathy.

TÜBİTAK

The abstract of the congress is published in this issue.

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Abstract Book

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5th International Congress on Cell Membranes and Oxidative Stress: Focus on Calcium Signaling and TRP Channels *9-12 September 2014 Isparta, Turkey*

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[CONTENTS]

Conference

Oral Presentations

Poster Presentations

CONFERENCE

Conference No. 1

Store-operated calcium channels

James W. Putney, Jeremy T. Smyth, Takuro Numaga-Tomita, Miyako Fukushima, Felicity M. Davis, Gary S. Bird

Laboratory of Signal Transduction, National Institute of Environmental Health Sciences, Research.

Activation of phospholipase C results in release of intracellular Ca^{2+} and *activation of capacitative calcium entry* or store-operated calcium entry (SOCE). The major molecules underlying SOCE are a Ca^{2+} sensor protein, STIM1, and a channel subunit, Orai1. STIM1 is organized within the endoplasmic reticulum through interactions with a microtubular +end binding protein, EB1. However, during mitosis, STIM1 dissociates from microtubules and moves to the cell periphery, while microtubules form the mitotic spindle. The dissociation of STIM1 from microtubules occurs because of multiple phosphorylations in the vicinity of the EB1 interacting site. In the absence of these phorphorylations, STIM1 fails to dissociate, and STIM1 and much of the endoplasmic reticulum is carried along microtubules during cytokinesis. The SOCE channel subunit, Orai1, occurs in two forms in mammalian cells, Orai1α and Orai1ß, due to alternative translation initiation. Proteins formed from the second start site (Orai1ß) lack a number of previously described regulatory domains, including PKC phosphorylation sites, a PIP_2 binding site, a caveolin interacting site, and a binding site for Ca^{2+}-stimulatable adenylyl cyclase 8. The loss of one or all of these interacting domains in Orai1ß results in significantly enhanced plasma membrane mobility, as evidenced by rates of fluorescence recovery after photobleaching. Our laboratory has also been investigating the functions of store-operated Ca^{2+} entry (SOCE) in various physiological contexts by a combined strategy employing cell lines together with genetically modified mouse models. We disclosed significant roles for store-operated channels in the development and function of bone cells, both osteoclasts and osteoblasts; in lacrimal gland function; in differentiation of keratinocytes as well as in their role in wound healing; in neutrophil chemotaxis; in lactation; and in spermatogenesis. Thus SOCE plays a major role in diverse physiological pathways and its modification may provide a useful strategy for the understanding and treatment of a variety of debilitating diseases.

Conference No. 2

Asymmetry, oxidation and signaling "elimination" by two anionic phospholipids: cardiolipin and phosphatidylserine

Valerian E. Kagan

University of Pittsburgh, USA.

An ancient anionic phospholipid, cardiolipin, ubiquitously present in prokaryotic and eukaryotic membranes, is essential for several structural and functional purposes. Among the latter, the emerging role of cardiolipins in signaling has become the focus of many studies. In this presentation, I will describe two major signaling pathways through which cardiolipins may fulfill their signaling roles via utilization of their: i) asymmetric distribution across membranes, and ii) ability to undergo oxidation reactions to yield the signature products recognizable by the executionary machinery of cells. I will also present a concept that cardiolipins and their oxidation/hydrolysis products constitute a rich communication language utilized by mitochondria of eukaryotic cells for diversified regulation of cell physiology and metabolism as well as for inter-cellular interactions.

Conference No. 3

EBSA Supported Conference

Intracellular Ca^{2+} handling and free radicals in illness-induced skeletal muscle weakness

Arthur Cheng[1*], Niklas Ivarsson[1*], Sara Mijwel[1*], Helene Rundqvist[1#], Dilson Rassier[2], Johanna T Lanner[1*]

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Severe illnesses, including rheumatoid arthritis (RA) and cancer, are associated with secondary muscle complications, such as skeletal muscle weakness. Reduced muscle strength and contractility has traditionally been associated with a loss of muscle mass. However, here we show that impaired skeletal muscle contractility due to intracellular factors plays a major role. We

investigate the mechanisms behind illness-induced skeletal muscle weakness with special focus on intracellular Ca^{2+} handling, free radicals and specific force production (i.e. force per cross-sectional area) in muscles from mice with mammary gland tumors (MMTV-PyMT+) or RA (collagen-induced arthritis, CIA). Specific force was decreased by ~ 50% in slow-twitch MMTV-PyMT+ muscles compared with wild-type (WT) muscles (48±6 vs 98±10 kN/m^2, n=14, p<0.001). In fast-twitch muscles from CIA mice force was decreased by ~ 30% compared to WT (258±14 vs 380±19 kN/m^2, n=10, p<0.001).

Muscles from CIA mice demonstrate increased neuronal nitric oxide synthase associated with the ryanodine receptor type 1 and this was accompanied by a substantial increase in intracellular free tetanic [Ca^{2+}] ([Ca^{2+}]$_i$). No alteration in tetanic [Ca^{2+}]$_i$ was observed in MMTV-PyMT+ muscle fibers. However, both groups show increased levels of free radical stress on the contractile proteins (actin and myosin), which may explain the decreased force production. Interestingly, 3-nitrotyrosine (3-NT) a marker of peroxynitrite was observed on actin in muscles from CIA mice, whereas myosin appears to be the target for oxidation in MMTV-PyMT+ muscles. Thus, altered intrinsic redox handling appears central in illness-induced muscle weakness, but the origin of the free radical species seems to differ.

Conference No. 4

Mechanosensitive IP3-Mediated Ca^{2+} release In the absence of a mechanoreceptor in the vascular endothelium

Calum Wilson[1], Christopher Saunter[2], John M. Girkin[2], John G. McCarron[1]

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The vascular endothelium lines blood vessels and detects, interprets and responds to messages derived from haemodynamic forces and blood-borne signalling molecules. The haemodynamic forces which act on the endothelium are complex and determined by the physiological three dimensional organisation of the cells in the blood vessel. However, studying the endothelium is in a physiological configuration (i.e. in intact pressurized arteries) has been problematic and, as a result, the signal processing mechanisms involved in mechanotransduction and the response to bioactive molecules are poorly understood. We developed a miniature optical probe to fit inside arteries and study a large area of endothelium (0.5 mm in diameter; 200 endothelial cells simultaneously) at normal physiological pressures and when the arteries structural integrity is maintained. The endothelium responded to bioactive molecules (acetylcholine) with propagating IP3-mediated Ca^{2+} waves which transmitted among cells with linear, expanding arc and spiral patterns. The amplitude of Ca^{2+} signal in each endothelial cell, and the number of cells responding, increased with acetylcholine concentration. Increased transmural pressure distended the artery and decreased the amplitude of the IP_3-evoked Ca^{2+} waves. The decreased IP_3-evoked Ca^{2+} response may be explained by increased spacing (and so decreased communication) among IP_3 receptors. Mechanical, haemodynamic forces in the endothelium of an intact artery may be detected by altered endothelial IP_3-evoked Ca^{2+} signalling and does not require a mechanoreceptor. The vascular endothelium lines acts as an interconnected signal processing center that combines digital and analogue control systems to determine endothelial function.

Conference No. 5

TRP channels in redox biology

Yasuo Mori

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Environmental and endogenous reactive species such as reactive oxygen species (ROS), reactive nitrogen species (RNS) and other electrophiles are known to exert toxic effects on organisms, but are also emerging as molecules which mediate cell signaling responses. Ca^{2+}-permeable cation channels encoded by the transient receptor potential (trp) gene superfamily are characterized by a wide variety of activation triggers that act from outside and inside the cell. Understanding the physiological significance and activation mechanisms of TRP channel regulation by the above reactive species has revealed importance of TRP channels as pharmacological targets, and modulators of these channels may offer therapeutic options for previously untreatable diseases. In fact, multiple TRP channels sense reactive species and induce diverse physiological and pathological responses, such as cell death, chemokine production, and pain transduction. TRP channels sense reactive species either indirectly through second messengers or directly via oxidative modification of cysteine residues. In this session, I describe the activation

mechanisms and biological roles of redox-sensitive TRP channels. Especially, I will focus on TRPA1 channels and discuss its unique and high sensitivity to molecular oxygen. Also, I will mention on a new series of compounds, that selectively activate TRPA1 through a trans-nitrosylation mechanism supported by molecular recognition of chemical skeleton by TRPA1 proteins.

Conference No. 6

TRPC6 and ischemic brain damage in rats

Yizheng Wang

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Brain injury after focal cerebral ischemia develops from a series of pathological processes. However, the results of clinical trials to prevent ischemic brain damage by blocking the detrimental effects are disappointing. We report that suppression of proteolytic degradation of transient receptor potential canonical (TRPC) 6 prevented ischemic neuronal cell death. The TRPC6 protein level in neurons was reduced in ischemia via N-methyl-D-aspartate (NMDA) receptor-dependent calpain proteolysis of N-terminal domain of TRPC6 at Lys[16]. A fusion peptide derived from the calpain cleavage site in TRPC6 inhibited its degradation, reduced infarct size and improved behavior outcome of ischemic rats. Thus, suppression of TRPC6 degradation prevented ischemic brain damage.

Conference No. 7

Ca^{2+} signaling in the mid-range can be supported by functional coupling between SOCE, SERCA and IP_3R

Raphaël Courjaret and Khaled Machaca

Department of Physiology and Biophysics, Weill Cornell Medical College in Qatar, Education City, Qatar Foundation, Doha 24144, Qatar.

Ca^{2+} signaling is ubiquitous and plays important roles in diverse cell biological processes from contraction to fertilization. Ca^{2+} signaling versatility is encoded in part by its large range in both the time and space dimensions. Spatially Ca^{2+} signaling is well studied in the microdomain scale, close to a Ca^{2+} channel; and the global scale, at the whole cell level. However little is known about how Ca^{2+} signals between those two extremes, in the midrange. Here using Ca^{2+}-activated Cl- channels as a Ca^{2+} effector, we show that an intricate molecular coupling between the IP_3 receptor, SERCA pump and store-operated Ca^{2+} entry allows for efficient Ca^{2+} signaling in the mid-range. These finding have significant implications on our understanding of Ca^{2+} signaling versatility.

Conference No. 8

Regulation of neurogenesis by store operated CRAC channels

Murali Prakriya

Northwestern University Feinberg School of Medicine Chicago,USA

Calcium signals regulate many critical processes during vertebrate brain development, including proliferation and differentiation of neural stem and progenitor cells (NSC/NPCs), neurotransmitter specification, and axonal outgrowth. Yet the identity of the ion channels mediating Ca^{2+} signaling in NSC/NPCs is unclear. Here, we report that embryonic and adult mouse NPCs exhibit store-operated calcium entry (SOCE) mediated by Ca^{2+}+ release-activated Ca^{2+} (CRAC) channels. SOCE in NPCs was blocked by CRAC channel inhibitors such as La3+, BTP2, and 2-APB, and Western blot analysis revealed expression of the canonical CRAC channel proteins, STIM1 and Orai1. Knock down of STIM1 or Orai1 significantly diminished SOCE in NPCs, and SOCE was lost in NPCs from transgenic mice lacking Orai1 or STIM1. Thus, STIM1 and Orai1 make essential contributions to SOCE in NPCs. SOCE in NPCs was activated by the mitogens and neurotransmitters including epidermal growth factor and acetylcholine, the latter occurring through muscarinic receptors. Activation of SOCE resulted in gene transcription through calcineurin/NFAT signaling. In addition, suppression or deletion of STIM1 and Orai1 expression significantly attenuated proliferation of both embryonic and adult NPCs, both in NSCs cultured as neurospheres and *in vivo,* in the sub-ventricular zone of adult mice. These findings indicate that CRAC channels serve as a major route of Ca^{2+} entry in NPCs and regulate key effector functions including gene-expression and proliferation, portending several ways in which this Ca^{2+} entry mechanism could contribute to vertebrate brain development.

Conference No. 9

Specific functional contributions of TRPC1 and Orai1 channels in polarized secretory epithelial cells

Indu Ambudkar

Molecular Physiology and Therapeutics Branch, NIDCR, NIH, Bethesda MD 20892.

Fluid secretion in salivary gland acinar cells is regulated by agonist-stimulated Ca^{2+} entry. Earlier studies have shown that basolateraly localized TRPC1 is a major determinant of Ca^{2+} entry in acinar cells and thus required for sustained saliva flow. While Orai1 is localized near the apical region of the cell, its contribution to salivary gland function is not known. Here we have determined the individual contributions of TRPC1 and Orai1 in Ca^{2+}-dependent activation of Kca channels, basolateral NKCC1, and apical TMEM16A, all of which are critical for fluid secretion. We report that report TRPC1 provides necessary $[Ca^{2+}]_i$ in both apical and basolateral region of the cell to regulate these mechanisms while Orai1 has minimal direct contributions to regulation fluid secretion. Consistent with its basolateral localization, CCh-stimulated upregulation of NKCC1 was decreased >80% in acini from TRPC1$^{-/-}$ mice. Importantly, $[Ca^{2+}]$ required for sustained activation of apically localized TMEM16A was also dependent on TRPC1-mediated Ca^{2+} entry. We have previously reported that Orai1 is critical for fluid secretion since it is required for recruitment of TRPC1 to the plasma membrane and its activation by STIM1. Knockout of Orai1 within salivary glands of Oraifl/fl or TRPC1$^{-/-}$/Orai1$^{fl/fl}$ mice by delivery of adCRE induced loss of fluid secretion and CCh-stimulated Ca^{2+} entry in acini to the same extent as in TRPC1$^{-/-}$ mice. Furthermore, overexpression of Orai1 and STIM1 *in vivo* in salivary glands of TRPC1$^{-/-}$ mice resulted in basolateral expression of Orai1 in acinar cells together with recovery of fluid secretion and Ca^{2+} entry. Thus the location, and possibly the expression level, of Orai1 in acinar cells determines its contribution to saliva flow. Together these findings suggest that TRPC1-mediated Ca^{2+} entry via the basolateral region is key to regulation of both apical and basal mechanisms involved in fluid secretion. We have now identified the underlying recycling endosomal pathway that regulates surface expreesion of TRPC1 in salivary gland cell line. Further studies will be required to determine how Orai1-regulates trafficking of TRPC1 in acinar cells.

Conference No. 10

Functions of oxidative stress-induced ion channels, TRPM2 and ATP-sensitive K^+ channels, in octopus neurons of mice cochlear nucleus

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The aim of the present study was to examine function of TRPM2 and ATP-sensitive K^+ (KATP) channels in the octopus neurons of cochlear nuclus. TRPM2 is a Ca^{2+}-permeable non-selective cation channels that are stimulated by reactive oxygen/nitrogen species and ADP-ribose (ADPR). Activation of TRPM2 is associated with cell death through apoptosis. Whereas, ATP-sensitive K^+ (KATP) channels is also activated by reactive oxygen/nitrogen species.
Expression of mRNAs for TRPM2 and KATP channels were demonstrated using quantitative real-time reverse transcription-polymerase chain reaction (qRT-PCR), and channel proteins were shown by western blotting and immunohistochemical staining technique in the neurons of ventral cochlear nucleus (Bal et al. 2014;Bal et al. 2014). Coronal slices of the ventral cochlear nucleus (VCN) were prepared from mice (ICR strain) of between 16 and 19 postnatal days. The animals were decapitated and the head was immersed in normal physiological saline. Following the removal of the brain from the skull, slices of 180 µm thickness were cut using an oscillating tissue slicer. Recordings were taken under current and voltage clamp condition.

KATP agonists including cromacalim (50 µM), diazoxide (0.2 mM), 3-Amino-1,2,4-triazole (ATZ) (1 mM), induced marked hyperpolarization in octupus cells, which were blocked by KATP antagonists, , glybenclamide (0.2 mM), tolbutamide (0.1 mM). Whereas, TRPM2 agonist, ADP-ribose (ADPR), causes membrane potential to shift to depolarization direction, which were blocked by TRPM2 antagonists, flufenamik asit (100 µM), N-(p-amylcinnamoyl)anthranilic acid (50 µM) and 8-Bomo-cADP ribose (50 µM). In TRPM2 knockout mice, ADPR did not cause depolarization shift of the membrane potential
In conclusion, KATP and TRPM2 channels are both activated by reactive oxygen/nitrogen species, but KATP induce neuroproptective effects by hyperpolarization, suppressing excitability, TRPM2 induce apoptosis by depolarization. Under normal condition, KATP channels are dominating effect over TRPM2 in response to oxidative stress conditions.

This work was supported by a grant from TUBITAK (SBAG-110S397).

Conference No. 11

Vascular control by ion channel trafficking

Jonathan H. Jaggar

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Ion channels comprised of pore-forming and auxiliary subunits control physiological functions in virtually all cell types. A traditional view is that ion channels couple with their auxiliary subunits prior to plasma membrane trafficking of the complex. Whether the multi-subunit composition of surface channels is fixed following protein synthesis or regulated to control cellular excitability is unclear. Large-conductance Ca^{2+}-activated (BK) potassium channels are expressed in many different cell types, including arterial smooth muscle cells (myocytes) where they are composed of pore-forming α and auxiliary β1 subunits. I will present evidence that although ~95 % of BK α is plasma membrane-localized, only ~10 % of total β1 subunits are located at the cell surface in human and rat arterial myocytes. Immuno-FRET microscopy demonstrated that intracellular β1 subunits are located within Rab11A-positive, but not Rab11B-positive, recycling endosomes. Carbachol, a muscarinic receptor agonist, nitric oxide (NO), acting via cGMP-dependent protein kinase (PKG), and cAMP-dependent pathways stimulated rapid (≤1 min) anterograde trafficking of β1 subunit-containing recycling endosomes, increasing surface β1 ~ 3-fold. Trafficked β1 subunits associated with surface BKα, leading to an increase in channel Ca^{2+}-sensitivity and activity. Data also demonstrate that NO activates myocyte BK channels to induce vasodilation primarily by stimulating β1 subunit anterograde trafficking. To summarize, our data indicate that rapid β1 subunit surface trafficking controls functional BK channel activity in arterial myocytes and vascular contractility. Regulated auxiliary subunit trafficking may control the functional activity of many different ion channels in a wide variety of cell types.

Conference No. 12

Investigation of calcium signaling pathways and related microRNAs affected by changes in TRPC1 expression levels in human primary aortic cells

Metiner Tosun

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We previously observed that transient receptor potential canonical 1 (TRPC1) and TRPC6 expression levels were altered reciprocally in aging rat aorta. Downregulation of TRPC1 gene appeared to be causative as TRPC6 was upregulated likewise in TRPC1-silenced A7r5 rat aortic smooth muscle cell line. Therefore, we investigated whether this interaction is also operational in primary human aortic smooth muscle (HASM) cells. For this purpose, TRPC1 shRNA- and TRPC1 overexpression (OE) vector-transfected HASM cells were used in expressional and functional analyses. Based on qRT-PCR analyses, TRPC1 mRNA levels were decreased by 46% at 48 hours after shTRPC1 transfection while mRNA levels of TRPC1-OE cells were increased by two thousand-fold. Transcriptome analysis of TRPC1-OE cells showed at least 1.5-fold-change in 155 transcripts involved in different signaling pathways. Furthermore, at least twenty candidate miRNAs were detected for HASMCs via next generation sequencing. In fura-2-loaded and TRPC1-knocked-down cells, store-operated Ca^{2+} entry (SOCE) was elevated two fold. Real time cellular analysis showed antiproliferative and proliferative effects of TRPC1-silencing and overexpression, respectively. In summary TRPC1 might be a regulatory channel subunit of SOCE in HASMCs as we previously observed in Huh7 hepatocellular carcinoma and A7r5 rat aortic cell lines. This study was supported by The Scientific and Technological Research Council of Turkey (TUBITAK, 110S096 to MT) and in part by Ege University (EBİLTEM 11BİL004 to MT).

References

1. Erac Y, Selli C, Kosova B, Akcali KC and Tosun M. Expression levels of TRPC1 and TRPC6 ion channels are reciprocally altered in aging rat aorta: implications for age-related vasospastic disorders. *AGE,* 32(2):223-230, 2010.
2. Selli C, Erac Y, Kosova B and Tosun M. Post-transcriptional silencing of TRPC1 ion channel gene by RNA interference upregulates TRPC6 expression and store-operated Ca^{2+} entry in A7r5 vascular smooth muscle cells. *Vascul Pharmacol,* 51: 96-100, 2009.

Conference No. 13

Endothelial KATP channels in Ca^{2+}-mediated signaling with altered shear stress

Aron B. Fisher and Shampa Chatterjee

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Endothelial cells are subjected normally to shear stress associated with blood flow. Abrupt cessation of flow is sensed by endothelial cells resulting in a signaling cascade to compensate for the change in blood supply. We have investigated the endothelial cell mechanotransduction pathway associated with a loss of shear using the intact isolated perfused lung preparation and an artificial capillary system for cultured endothelial cells; these preparations have the advantage that cellular oxygenation can be maintained during ischemia (loss of perfusion), thereby avoiding cellular anoxia. An early response to acute loss of shear is endothelial cell membrane depolarization due to deactivation of endothelial cell membrane KATP channels; these channels are maintained in the normally open configuration by shear stress. Depolarization results in activation of cell membrane localized NADPH oxidase and the generation of reactive oxygen species (ROS). ROS in turn signal for a variety of cell functions; in this instance, a major response is endothelial cell proliferation leading to angiogenesis. Another response to endothelial cell membrane depolarization is the opening of T-type voltage gated calcium channels in the endothelial cell membrane. These channels have been demonstrated in endothelial cells by identification of their α1-G subunit. Channel opening results in Ca^{2+} influx leading to activation of endothelial NO synthase (eNOS) and generation of NO. Thus, cell signaling initiated by loss of shear stress results in release of a vasodilator (NO) and an angiogenic stimulus (ROS). These responses in the mechanotransduction pathway represent a homeostatic response to the loss of blood perfusion.

Conference No. 14

Mitochondria as signaling organelles

Navdeep S. Chandel

Northwestern University.

Mitochondria are popularly known as the “powerhouse” of the cell, as they typically generate the bulk of ATP used to maintain homeostasis and survival of mammalian cells. Additionally, mitochondria play an essential, albeit underappreciated, role in biosynthesis of macromolecules such as lipids and heme and iron-sulfur clusters that has been studied for decades. These two major roles of mitochondria – the production of energy and support of biosynthesis – make them central to diverse biological outcomes including proliferation, differentiation, and adaptation to stress. Yet the classical conception of cellular actions is that they are driven by commands from the nucleus, and changes in mitochondrial metabolism occur simply as a consequence of these commands. Mitochondria are rarely considered to dictate commands or provide signals themselves to change biological outcomes. However, should the cell commit to a process like proliferation or differentiation without adequate functioning mitochondria, then it would likely undergo a metabolic crisis resulting in cell death or senescence. For optimal cell function, there exists health status feedback from mitochondria to act as a checkpoint prior to cellular action. This feedback is analogous to the fuel gauge on your car, which predicts the distance you may drive. My laboratory has provided evidence that release of reactive oxygen species is a mode of communication between the mitochondrion and rest of the cell. I will present our recent data on mitochondrial ROS signaling regulating adaptive immunity.

Conference No. 15

Post-Translational modification of calcium channels in colonic inflammation

Hamid I. Akbarali

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Decreased colonic motility is a hallmark of idiopathic inflammatory bowel disease. Reduced muscle contraction occurs in both patients with ulcerative colitis and in animal models of colonic inflammation. Contraction of gastrointestinal smooth muscle is principally mediated by Ca^{2+} influx through voltage-gated L-type Ca^{2+} channels (VGCC). We have previously demonstrated that Ca^{2+} currents in smooth muscle are markedly attenuated following inflammation in several models of colitis. On the basis of whole cell current recordings and isometric tension experiments, the decrease in calcium influx has been attributed to impaired c-src kinase dependent regulation of Cav1.2b. This is due to inflammation-induced nitration of tyrosine residues in the c-terminus of the channel. The regulation by c-src kinase and inflammation was determined by single channel analysis of Ca^{2+} currents. An increased number of null sweeps were recorded from inflamed cells compared to controls suggesting decrease in channel availability. PP2, a src kinase inhibitor, and peroxynitrite, also reduced channel availability. Mutation of residues, Y1837 and Y2134 within Cav1.2b or overexpression of dominant-negative Src kinase also resulted in decreased channel availability. We hypothesize that the smooth muscle calcium channel undergoes transition from normal open state (O1) to a second open state (O2) upon positive conditioning depolarizations. The conversion to the second open state is tyrosine kinase dependent and is abrogated during colonic inflammation. Nitration also reduced calcium-dependent transcription. Thus, post-translational modification of the smooth muscle L-type calcium channel affects excitation-contraction and excitation-transcription coupling by altering channel kinetics.

Supported by NIH DK046367

Conference No. 16

Redox-control of the Alarmin, Interleukin-1 α

J. Andres Melendez

State University of New York, College of Nanoscale Science & Engineering, Albany, NY.

Through its ability to evoke responses from cells in a paracrine fashion, the senescence associated secretory phenotype (SASP) has been linked to numerous age associated disease pathologies including tumor invasion, cardiovascular dysfunction, neuroinflammation and osteoarthritis. In all cases the aberrant secretory phenotype is accompanied by elevations in cytokine, chemokines, growth factors and MMPs which all serve to propagate the local inflammatory microenvironment. ROS are intimately linked with aging process and have emerged as critical signaling intermediates in regulating inflammation. We have revealed a novel redox-based mechanism that converges synergistically to exacerbate both the secretory and inflammatory potential of senescent cells. ROS control both the transcriptional activity and the functional processing of IL-1α which can exacerbate its intracrine, extracrine and paracrine activity and plays a key role in SASP regulation. Moreover, we have identified Ca^{2+} as the novel connector between ROS and the secretory phenotype. This work provides a potential avenue for the development anti-senescence based therapeutics (senolytic drugs) that restrict SASP without interfering with the beneficial anti-oncogenic effects of senescence.

Conference No. 17

Calcium signaling in B iymphocytes

Tomohiro Kurosaki, Masanori Matsumoto, and Yoshihiro Baba

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A chief Ca^{2+} entry pathway in immune cells is store-operated Ca^{2+} (SOC) influx, which is triggered by depletion of Ca^{2+} from the endoplasmic reticulum (ER). The molecular natures of the SOC influx processes have been revealed; the induction of SOC influx critically requires the ER Ca^{2+} sensor, STIM1, and the SOC channel Orai1. Despite such

progress, the physiological role of calcium signaling in immune cells still remains unclear. To address this question, we have established mice deficient in both STIM1 and STIM2 in a B cell-dependent manner. Overall B cell development and antibody responses were unaffected. Remarkably, B cells lacking both STIM proteins failed to produce the anti-inflammatory cytokine IL-10, because of defective activation of NFAT after BCR stimulation. This resulted in exacerbation of experimental autoimmune encephalomyelitis (EAE), a mouse model of multiple sclerosis. Thus, our data establish STIM-dependent calcium signaling as a key signal for B cell regulatory function required to limit autoimmunity. We are currently analyzing when and where B cells produce IL-10, and how the resulting IL-10 suppresses inflammation.

Conference No. 18

Oxidative stress and cell death in cancer

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Malignant diseases (e.g. cancer) seems to increases with age. The permenant attacks of free radicals (reactive oxygen species, ROS) during life span is thought to be the main reason for this increase.In fact, The average rate of DNA oxidative products generation is about 1 in 105 DNA bases and a cell's DNA is believed to be damaged by oxidative stress 10.000 times in a day. The oxidative stress results in the accumulation of oxidative damage of the crucial biomolecules such as DNA, lipids and proteins. Aside from DNA-damaging function, ROS can act as second messengers and control various signaling cascades and diverse cellular activities (cell cycle, senescence, cell death, survival etc) in both normal cells and cancer cells. Interestingly, many tumor cells contain high levels of ROS that make them distinctively different from normal cells. Mitochondria is the central organelle producing ROS. It is also known that mitochondria play central roles in diverse physiological and pathological conditions associated with cell survival and death. For example, mitochondiria is the central executioner in apoptosis that is also known as cell suicide or cell deletion, or sometimes as programmed cell death. Apoptosis is induced by many anticancer compounds (e.g. our palladium-based terpyridine compound) through ROS production. Therefore, there is a strong link between ROS generation and cell death in cancer. The intensity of ROS production may result in different cell death modalities.

Conference No. 19

Modification in calcium signaling of neuroblastoma cells upon acute exposure to cisplatin and topotecan

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Neuroblastoma is a common cancer in children which is often resistant to chemotherapy. Several drugs are in clinical use e.g. platinum complexes (cisplatin, carboplatin), alkylating agents or topoisomerase I inhibitors (e.g. topotecan). Also drug combinations are used to overcome drug resistance. In cultured SH-SY5Y cells we investigated the changes in expression and function of $[Ca^{2+}]i$ regulating proteins (e.g. calcium channels, calcium binding proteins and calcium activated proteins) upon exposure to cisplatin (CDDP) and topotecan (TOPO). We employed cytotoxicity and apoptosis tests, live cell calcium imaging, gene expression analysis and epigenetic tests.

Changes of the intracellular calcium ($[Ca^{2+}]_i$) concentration were recorded using Fluo-4. Application of either CDDP or TOPO (1nM-1μM) for 3h to 4h increased $[Ca^{2+}]_i$ over time. The effects observed on $[Ca^{2+}]_i$ were concentration dependent.

The elevation of $[Ca^{2+}]$I was linked to an increase of cytotoxicity. Cytotoxicity testing of CDDP and TOPO revealed that with increasing concentrations of CDDP the amount of viable cells was reduced (24-72h exposure; 10nM-1μM). The strongest effect was observed with the treatment with 1μM CDDP for 72h (40% cell viability). TOPO has a stronger effect compared to CDDP since after 72h of exposure the concentration range tested 10nM-1μM showed only 40% cell viability for all concentration range tested. Thus, it seems that lower concentrations of TOPO are able to trigger cell death on neuroblastoma cells than CDDP. Furthermore, the assessment of apoptosis revealed a concentration and time-dependent increased apoptosis and necrosis upon application of CDDP and TOPO to SH-SY5Y neuroblastoma cells.

In addition the mRNA expression of selected $[Ca^{2+}]_i$ regulating genes was modified upon 12h, 24h, 48h and 72h of exposure. Upon those were the calcium binding protein S100A6, and the calcium receptors ITPR1, ITPR3, RYR1, RYR3. However the

analysis of the global DNA methylation marker LINE1 revealed that treatment of CDDP or TOPO for 72h is not associated to global DNA hypo- or hyper-methylation. Not at last, pyrosequencing of S100A6 gene in CDDP or TOPO treated SH-SY5Y cells showed no change in the level of methylation thus of the increase in mRNA expression of this gene is not directly related to DNA methylation.

Overall the regulation of $[Ca^{2+}]_i$ (as a key ion to trigger apoptosis) is a crucial factor in cancer, cancer treatment and to overcome anti-cancer drug resistance.

Conference No. 20

TRP channels in irradiated glioblastoma cells

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Infiltration of the brain by glioblastoma cells requires highly efficient cell volume changes which enable the cells to squeeze between very narrow interstitial spaces. Importantly, ionizing radiation (IR) as applied in standard fractionated radiation therapy stimulates hypermigration of glioblastoma cells. This hypermigration might contribute to therapy resistance by promoting evasion of the glioma cells from the radiation target volume. Alternatively, hypermigration might foster the "homing" of glioblastoma "stem cell-like" cells to radioprotective microenvironments (e.g., stem cell niches). Here, we show that radiogenic hypermigration of glioblastoma cells is triggered by Ca^{2+} signaling which involves cellular release of the stromal cell-derived factor-1, chemokine receptor CXCR4, Ca^{2+} release from the stores, as well as activation of the Ca^{2+} activated tyrosine kinase Pyk-2, of Ca^{2+}-activated BK K^+ channels, and of the Ca^{2+}/calmodulin-dependent kinase-II. In addition, glioblastoma cell migration employs Ca^{2+} entry pathways since the Ca^{2+}- and nonselective cation channel inhibitor 2-APB blocks transwell-migration. TRPM8 is a candidate for such a Ca^{2+}-entry pathway. Five out of five tested human glioblastoma cell lines expressed TRPM8 on mRNA level. These channels are functional since TRPM8 activators menthol or icilin induced an increase in intracellular free Ca^{2+}-concentration as recorded by fura-2 Ca^{2+}-Imaging. In addition, icilin, stimulated transfilter chemotaxis of glioblastoma cells in a 2-APB-sensitive manner. Moreover, in patch-clamp experiments, acute application of icilin resulted in activation of voltage and Ca^{2+}-regulated BK K^+ channels at physiological membrane potential mimicking the effect of ionizing radiation on BK channel activity. Combined, these data suggests a function of TRPM8 in (hyper) migration and brain infiltration of (irradiated) glioblastoma cells.

Conference No. 21

Voltage-gated sodium channel activity and oxidative stress in cancer

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Clinical management of cancer, in particular metastatic disease, remains a major problem, as cancer incidence worldwide continues to rise. Whilst conventional hormone therapy works for some cancers and chemotherapy and biological therapies can also be applied, most suffer from serious side effects and limited periods of effectiveness. In a novel approach to these problems, we have used electrophysiology, coupled with molecular cell biology, to show that metastatic carcinoma cells and tissues express *de novo* voltage-gated sodium channels (VGSCs), expression / activity being regulated by steroid hormones and growth factors [1]. Where studied, the VGSC upregulation has been found to be accompanied by downregulation of voltage-activated outward (mainly potassium) currents [2]. From the ensuing 'cellular excitability', we have put forward the CELEX hypothesis which states that it is the membrane excitability that is responsible, at least partially, for cancer cells' aggressiveness and metastatic potential [3]. Accordingly, use of tetrodotoxin, siRNA or antibody to selectively block VGSC expression / activity suppresses the cells' invasiveness in vitro and in vivo [3,4]. This raises the possibility that clinical VGSC blockers may be used as anti-metastatic drugs. To this end, we exploited the hypoxic nature of growing tumours and have repurposed ranolazine ("Ranexa") as a potential anti-metastatic drug [5]. Ranolazine is used routinely in cardiology against angina, another pathophysiological condition associated with ischaemia. Application of ranolazine at clinial doses (up to 5 microM) to strongly metastatic breast and colon human cancer cells indeed suppressed Matrigel invasiveness, particularly under hypoxic conditions. As regards mechanism, we propose that it is the persistent current (INaP) component of the VGSC that is central. The INaP-induced accumulation

of sodium in the cells is likley to have two major consequences. First, pericellular space would acidify (via increased sodium-hydrogen exchange) thereby promoting proteolysis and hence the invasiveness. Second, intracellular Ca^{2+} would rise (via slowing or reversal of sodium-calcium exchange). Indeed, strongly metastatic cancer cells generate Ca^{2+} oscillations that are suppressed by TTX. Whilst the pathophysiological consequences of the Ca^{2+} oscillations remain to be elucidated, recent evidence suggests that VGSC/INaP activity gives strongly metastatic cells protection against oxidative stress. Since upregulation of VGSC expression / activity has been reported for several other carcinomas (including non-small-cell and small-cell lung cancer, mesothelioma, prostate cancer, cervical cancer and ovarian cancer), VGSC / INaP blockers may serve as novel, non-toxic drugs against metastatic disease.

References

1. Fraser SP et al. Philos Trans B 2014; 369 (1638):20130105 .
2. Fraser SP et al. Clin Cancer Res 2005; 11: 5381-5389.
3. Djamgoz MBA. J Clin Exptl Oncol 2014; 2014, S1 (http://dx.doi.org/10.4172/2324-9110.S1-005).
4. Yildirim S et al. Cancer Lett 2012; 323: 58-61.
5. Djamgoz MBA, Onkal R. Recent Patents Antican Drug Disc 2013; 8: 66-84.

Conference No. 22

Antioxidants and cancer: Is concurrent use during therapy safe?

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Aim

Antioxidants are candidate protective agents against toxicity of chemotherapy. A candidate protective agent should be non-toxic, not interfere with anti tumor activities of chemotherapoetics and not increase tumor cell viability. We analysed effects of Acetyl-L-carnitine (ALC), Korean Red Ginseng (KRG), resveratrol (RSV) against chemotherapy toxicities, on tumor growth and interference with antitumor effect of chemotherapoetics.

Materials and Methods: We studied in vitro cell culture, in vivo animal models nude mice tumor models with ALC, KRG, RSV alone and in combination with chemotherapoetic agents on various cancer cell lines and on normal cells such as cochlear cells questioning protective effects from ototoxicity, nephrotoxicity, neurotoxicity, cardiotoxicity.

Results

The non tumor proliferating dose of ALC is found to have parcial protective effect on chemotherapoetic toxicities. RSV increased cell cytotoxicity in a dose dependent manner in some tumor cells and did not change cisplatin induced cell cytotoxicty. RSV protected from sisplatin induced cell cytotoxicty in normal cells.KRG increased cell viability of cochlear cells. But it is found to proliferate some cancer cells in a dose dependent manner. KRG also interfered with the cytotoxic effect of cisplatin.

Discussion

The application of KRG and cisplatin at the same time is not appropriate and safe. Non tumor proliferating dose of RSV and ALC seems to be safer than KRG but these doses have parcial protective effect. Our results indicate that antioxidant supplementation during cancer therapy needs to be very careful since they might proliferate tumor cells and interfere with chemotherapy effect in a dose dependent manner.

Conference No. 23

TRP channels in intracellular organelles

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The 28 or so members of Transient Receptor Potential (TRP) superfamily of cation channels play diverse functions in different cells and organ systems. Ever since the beginning of their discoveries, there has been recognition that some of the TRP channels are intracellularly localized and exert functions specific to the organelles in which they reside. Among them, TRPML channels (mucolipins) represent a unique group that resides primarily in the acidic organelles, including endosomes and lysosomes, and is implicated in providing the Ca^{2+} signals for organelle trafficking and lysosome biogenesis. These functions appear to be critical for vesicle fusion and macromolecule degradation associated with endocytosis and autophagy. In addition, TRPML channels cycle between plasma membrane and endolysosomal vesicles, of which the mechanism and physiological significance remain to be elucidated. Besides TRPMLs, growing evidence has now revealed the existence of several other TRP members, conventionally thought to be primarily plasma membrane channels, in intracellular organelles, including endolysosomes and mitochondria. Although questions remain whether the intracellular localization of these channels represent novel functions distinct from

those carried by the plasma membrane counterparts or intermediate stops along their synthesis, recycling, or degradation, new data have emerged supporting the unique cellular functions of several intracellularly localized TRP channels despite the prominent presence of the same channel types on the plasma membrane. Therefore, intracellular TRP channels mediate new and underappreciated functions of the TRP superfamily with important physiological and pathological implications.

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Conference No. 24

Calcium signalling mechanisms in pancreatitis and pancreatic cancer

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In my lecture I will discuss the mechanisms of Ca^{2+} signalling in pancreatic acinar cells and the contribution of these mechanisms to Ca^{2+} toxicity, which determines damage and death of pancreatic acinar cells in the models of acute pancreatitis. Particular emphasis will be on the store-operated Ca^{2+} entry and the structural platforms for this process - junctions between the ER and the plasma membrane (ER-PM junctions). Downstream effects of Ca^{2+} signals on pancreatic mitochondria and on bioenergetics of the pancreas will also be considered. In the second part of my talk I will describe the preferential localization and dynamics of the ER-PM junctions at the leading edge of migrating pancreatic cancer cells (PANC-1 cells) and discuss the putative role of these structures in the migration and invasion of the cancer cells. Finally, I will briefly present recent results from my group on the interaction between Ca^{2+} and cAMP signalling cascades.

Bibliography

Dingsdale H, Okeke E, Awais M, Haynes LP, Criddle DN, Sutton R and Tepikin AV. Saltatory formation, sliding and dissolution of ER-PM junctions in migrating cancer cells. Biochem J. 2013, 451 (part 1): 25-32.

Burdyga A, Conant A, Haynes L, Zhang J, Jalink K, Sutton R, Neoptolemos J, Costello E, Tepikin A. cAMP inhibits migration, ruffling and paxillin accumulation in focal adhesions of pancreatic ductal adenocarcinoma cells: Effects of PKA and EPAC. Biochim Biophys Acta. 2013 Dec;1833(12):2664-72.

Gyorgy Lur, Lee P. Haynes, Ian A. Prior, Oleg V. Gerasimenko, Stefan Feske, Ole H. Petersen, Robert D. Burgoyne and Alexei V. Tepikin. Ribosome-free terminals of rough ER allow formation of STIM1 puncta and segregation of STIM1 from IP3 receptors. Current Biology, 2009, 19(19):1648-53

Conference No. 25

The role of TRP channels for fertility and cardiac remodeling

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ATRP proteins form cation channels activated by, among others, temperature, receptor stimulation,chemical agonists, or possibly mechanical forces. In this way, they can contribute directly to transplasmalemmal Ca^{2+} influx and/or influence intracellular Ca^{2+} concentration ($[Ca^{2+}]$ i) indirectly by setting the membrane potential or regulating Ca^{2+} release from intracellular organelles. In my talk i present our work in TRP-deficient mice and cell/organs derived thereof that demonstrates that TRP channels are constituents of Ca^{2+} entry pathways that contribute to Ca^{2+} absorption across epithelial membranes determining male fertility and cardiac remodeling, respectively. In a knock-in mouse model, in which the channel pore of TRPV6 is mutated (D541A), fertility is drastically reduced in males due to defective motility and viability of sperm. Notably, TRPV6 was not detectable in sperm or germinal epithelium but was found to be expressed specifically in epithelial cells of the epididymis. Inactivation of TRPV6 abolished Ca^{2+} absorption from the epididymal fluid leading to excessively high Ca^{2+} concentrations and reduction of sperm viability. Obviously, this tight regulation of intraluminal Ca^{2+} concentration in epididymal fluid of distal epididymal segments is of paramount importance for acquisition of the fertilization capacity of sperm (1). Corresponding experiments in mouse line with deletion of the complete carboxy terminus of TRPV6 including the pore region indicate that the pore mutation (D541A) leads to a complete inhibition of TRPV6 function (2). In the heart, neuroendrocrine stimuli like catecholamines and Angiotensin II lead to activation of Gprotein-dependent signaling pathways that evoke Ca^{2+} entry and Ca^{2+}-dependent processes via TRP channels,

e.g. contractility (3) and activation of Calcineurin/NFAT and CaM-Kinase leading to the development of myocyte growth and cardiac hypertrophy. Although neurohumoral stimulation represents an adaptive response preserving cardiac function initially, the persistent activation of this pathway during long-term cardiac stress may lead to cardiac failure in many cardiovascular disease entities. A specific pharmacology is still lacking for native TRPC-containing channels (4). Therefore, we aim to unravel the roles of TRPCs for cardiac remodeling using TRPC-single and TRPC compound knockout mice.

References

1. Weissgerber, P. et al. Male fertility depends on $Ca^{(2)+}$ absorption by TRPV6 in epididymal epithelia. Sci Signal 4, ra27, (2011).!
2. Weissgerber, P. et al. Excision of Trpv6 Gene Leads to Severe Defects in Epididymal Ca^{2+} Absorption and Male Fertility Much Like Single D541A Pore Mutation. J Biol Chem 287, 17930-17941 (2012).!
3. Uhl, S., Mathar, I., Vennekens, R. & Freichel, M. Adenylyl cyclase-mediated effects contribute to increased Isoprenaline-induced cardiac contractility in TRPM4-deficient mice. J Mol Cell Cardiol, doi:10.1016/j.yjmcc.2014.06.007 (2014).!
4. Freichel, M., Tsvilovskyy, V. & Camacho-Londono, J. E. TRPC4- and TRPC4containing channels. Handb Exp Pharmacol 222, 85-128 (2014).!

Conference No. 26

The role of Paraoxonase-2 in redox and calcium homeostasis

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The already difficult therapy of cystic fibrosis (CF) is complicated by infections with opportunistic, nosocomial pathogens such as Pseudomonas aeruginosa (P.a.), which is frequently found in CF patients. Like many other bacteria, P.a. regulates its virulence through a communication system termed quorum sensing. It contains secreted molecules that also damage cells of the infected host predominantly via redox and calcium signaling. Thus, inactivation of virulence factors is a novel, antibiotic-adjuvant strategy. The mammalian enzyme paraoxonase-2 (PON_2) is a natural system mediating the inactivation of two critical virulence factors, the redox-active pyocyanin and the N-(3-oxo-dodecanoyl)-L-homoserine lactone $3OC_{12}$. Pyocyanin induces oxidative in human cells through different mechanisms with one of them being mitochondrial superoxide formation. This is diminished by PON_2, as PON_2 counteracts O_2-generation. Further, because $3OC_{12}$ is vital to both P.a. virulence and immunomodulation of host cells, there is substantial interest in identifying its receptor and acute mechanisms facilitating its bio-effects. However, we hypothesize a receptor-independent pathway. Beyond anti-oxidative effects, PON_2 has lactonase activity and a dominant function in $3OC_{12}$ hydrolysis. We found that PON_2 rapidly hydrolyzes $3OC_{12}$ to an acid, which accumulates in cells, acidifies mitochondria and cytoplasm, causes Ca^{2+} liberation, p38 / eIF2a phosphorylation and impacts on IL-8 release. Our results indicate a novel, PON_2-dependent intracellular acidification mechanism that impacts on calcium and redox control, by which $3OC_{12}$ can mediate its biological effects. We thus identified a selective system of how key responses in host cells are triggered by specific bacteria that threaten CF patient health.

Conference No. 27

ROS induced lipid peroxidation is essential for phospholipase C activity and IP3 related calcium signal

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Reactive oxygen species (ROS) are produced in cells enzymatic and non-enzymatic reactions in the cells and have important roles in cell signalling but overproduction of ROS can lead to oxidative stress. Oxidative stress was implicated in a number of neurological diseases; however, antioxidant therapies targeting brain diseases have been unsuccessful. Such failure may be related to number of problems but also can be due to inhibition of ROS induced signalling in the brain. Using direct kinetic measures of lipid peroxidation in astrocytes and measurements of lipid peroxidation product in brain tissue, we here show that phospholipase C (PLC) preferentially cleaves oxidised lipids. As a result an increase in the rate of lipid peroxidation leads to increased Ca^{2+} release from ER-stores in response to physiological activation of purinoreceptors with ATP. Vitamin E, potent ROS scavengers is able to suppress PLC activity therefore dampening intracellular Ca^{2+} signalling. We also found that this pathway is essential for astrocitic signalling in response to dopamine or hypoxia. This implies that antioxidants may compromise intracellular Ca^{2+} signalling via inhibition of PLC and that PLC plays a dual role - signalling and antioxidant defence.

Conference No. 28

The role of nutrition in health and behavior

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It is well known that a good health is dependent on low stress, optimism, physical activity and also healthy nutrition. A balanced diet has a positive influence on our quality of life and also on our life expectancy. We are living in a fast and competitive world, which also affects our eating habits. Fast food has become very popular with the main disadvantage of this diet being its high energy density. In combination with increasing portion sizes ("XXL portion for XS price"), and especially low physical activity the development of overweight and obesity is somehow inevitable. Fast food and our Western style diets are also unfavourable due to their relatively high amounts of dietary salt (1), and lower amounts of essential nutrients including Omega-3 fatty acids, especially DHA and EPA. All in all, unhealthy eating patterns can lead to the development of the metabolic syndrome and low grade inflammation, the latter possibly also being associated with an increased risk for depressive disorders (2). On the other hand a healthy diet especially including fruit, vegetables and whole grains is beneficial for our health. A recent systematic review, for example, provided evidence that increasing the consumption of vegetables and fruit can convincingly reduce the risk for hypertension, coronary heart disease, and stroke. For cancer reduction probable evidence was concluded from the studies available.
This lecture will summarize the negative effects of fast food, unhealthy eating patterns and too much salt on our health and will also briefly focus on the link between diet, inflammation and behavior.

References

1. Ekmekcioglu C, Blasche G, Dorner TE.2013. Too much salt and how we can get rid of it. Forsch Komplementmed. 20:454-60.
2. Ekmekcioglu C. 2012. Are proinflammatory cytokines involved in an increased risk for depression by unhealthy diets? Med Hypotheses.78:337-40.
3. Boeing H, et al..2012. Critical review: vegetables and fruit in the prevention of chronic diseases. Eur J Nutr. 51:637-663.

Conference No. 29

TRPA1-induced endothelial calcium signals and vasodilation

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Cerebral blood flow is regulation highly sensitive to reactive oxygen species (ROS), but the underlying mechanisms remain incompletely understood. We found that Ca^{2+}-permeable TRPA1 channels were present and co-localized with NADPH Oxidase 2 (NOX2), a major source of ROS, in the endothelium of rodent and human cerebral arteries but not in other vascular bed. Elementary Ca^{2+} signals representing Ca^{2+} influx through single TRPA1 channels ("TRPA1 sparklets") were recorded and characterized to investigate the regulation of TRPA1 channels by ROS. TRPA1 sparklets activity was low under basal conditions but was stimulated by ROS generated by NOX. Ca^{2+} entry generated during a single TRPA1 sparklet was ~2x that of a TRPV4 sparklet and ~200x that of an L-type Ca^{2+} channel sparklet. TRPA1 sparklets displayed binary coupled gating in endothelial cells but not in an HEK293 cell expression system. NOX-induced TRPA1 sparklets promoted dilation of cerebral arteries that was independent of nitric oxide and prostacyclin production but was inhibited by block of intermediate-conductance Ca^{2+} sensitive K^+ channels and was associated with smooth muscle cell membrane hyperpolarization. NOX-dependent activation of TRPA1 sparklet and vasodilation required generation of H_2O_2 and OH• intermediates. A compound generated during peroxidation of membrane lipids by OH•, 4-hydroxy-nonenal, also increased TRPA1 sparklet frequency and dilated cerebral arteries. These data suggest that lipid peroxidation metabolites activate Ca^{2+} influx through TRPA1 channels in the endothelium of cerebral arteries to cause dilation.

Conference No. 30

Emerging role of ORAI3 Ca^{2+} selective channels in vascular disease

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Ca^{2+} signaling has an established role in vascular smooth muscle cell (VSMC) remodeling. We have shown that Orai1-mediated store-operated Ca^{2+} entry and Ca^{2+} release-activated Ca^{2+} (CRAC) currents are important players in VSMC remodeling in vivo. However, the role of the exclusively mammalian Orai3 protein in native VSMC signaling pathways and its potential involvement in VSMC remodeling, and neointimal hyperplasia remain unknown. Here, we will discuss recent studies from our laboratory showing that Orai3 through heteromultimeric association with Orai1 contributes to a novel store-independent Ca^{2+} entry pathway, distinct from the CRAC pathway. This novel Orai1/Orai3 channel is activated by cytosolic leukotrieneC4 produced downstream receptor stimulation through the catalytic activity of leukotrieneC4 synthase. We also show that Orai3 is upregulated in an animal model of VSMC neointimal remodeling, and that in vivo Orai3 knockdown inhibits neointimal hyperplasia. We will also discuss the promise and limitations of future use of Orai3 or Orai3-containing channels as targets for control of VSMC remodeling during vascular occlusive disease.

Conference No. 31

Ion channels and pain

Peter McNaughton

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Pain is traditionally regarded as three distinct entities. Acute pain, caused by direct excitation of nociceptive (pain-sensitive) nerve endings, performs the vital function of warning a human or animal of actual or impending damage. Inflammatory pain occurs when inflammatory mediators released by injury enhance the sensitivity of nociceptive nerve terminals, causing a sensation of pain even to normally innocuous stimuli. Inflammatory pain has a protective function but can also be debilitating when prolonged in chronic conditions such as arthritis. Neuropathic pain is caused by nerve damage and has no obvious protective function. Analgesics such as the NSAIDs family are effective against inflammatory pain, albeit with significant side effects, but neuropathic pain is often poorly treated with current analgesics.

Ion channels initiate action potentials in nociceptive afferent nerve fibres. They are therefore logical targets for novel pharmaceuticals in the control of pain. The trick will be to block channels important in inflammatory and neuropathic pain, without interfering with the ion channel function which underlies normal acute pain sensation. What are the ion channels important in inflammatory and neuropathic pain, and are these different from ion channels sensing normal acute pain?

In a recent study we found that genetically deleting HCN2 pacemaker ion channel in nociceptive neurons abolished the effects of inflammatory mediators such as PGE2 in enhancing neuronal excitability. In vivo we found that inflammatory heat hyperalgesia and neuropathic pain were both abolished. Similar results were obtained with an HCN ion channel blocker. Critically, there was no effect of the deletion or the block on acute pain thresholds. We conclude that HCN2 may be an interesting novel target for the development of analgesics effective in both inflammatory and neuropathic pain.

Conference No. 32

Glioma-derived glutamate toxicity: Selenium in the limelight

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Recent studies revealed that primary brain tumors, i.e. malignat gliomas and glioblastomas (GBM) induce neuronal cell damage and contribute to neurodegeneration. Malignant brain tumors are hallmarked by the induction of brain edema, neurodegeneration and pathological vasculature(1). In particular tumor-induced neuronal cell death is a consequence of glutamate-associated excitotoxicity(2). Interference with the glutamate transporter xCT alleviates tumor-associated brain edema and reduces neuronal cell death2. In parallel it has been shown that patients suffering from malignant gliomas show low selenium blood levels. Hence, selenium is considered reducing glutamate-induced neuronal damage(3). However, the interrelation of tumor-induced neurodegeneration and selenium status has yet to be unraveled. Here

we show that tumor progression depends on the selenium levels of the tumor microenvironment. Furthermore, selenium is highly effective in inducing glioma cell death sparing neurons unaffected. In this talk I will present current data on glutamate signalling in malignant brain tumors and the neurobiology of selenium in the context of neuro-oncology.

Reference

1. Eyüpoglu IY, Buchfelder M, Savaskan NE. Surgical resection of malignant gliomas-role in optimizing patient outcome. Nat Rev Neurol. 2013 Mar;9(3):141-51.
2. Savaskan NE, Heckel A, Hahnen E, Engelhorn T, Doerfler A, Ganslandt O, Nimsky C, Buchfelder M, Eyüpoglu IY. Small interfering RNA-mediated xCT silencing in gliomas inhibits neurodegeneration and alleviates brain edema. Nat Med. 2008 Jun;14(6):629-32.
3. Savaskan NE, Bräuer AU, Kuhlbecher M, Eyüpoglu IY, Kyriakopoulos A, Ninnemann O, Behne D, Nitsch R. Selenium deficiency increases susceptibility to glutamate-induced excitotoxicity. FASEB J. 2003 Jan;17(1):112-4.

Conference No. 33

Involvement of calcium accumulation through TRPM2 and TRPV1 channels in epilepsy

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Epilepsy is a common neurological disorder affecting approximately 50 million (>1%) of the population worldwide and acute transient complex neurobehavioral disorders resulting from increased excitability of neurons in various brain regions. To date, cannot be cured although antiepileptic drugs provide partially control of seizures. It's well known that elevated intracellular Ca^{2+} leads to biochemical cascades which trigger acute neuronal cell death after epilepsy. One member of the ion channels is transient receptor potential (TRP) channels. Oxidative stress has important role on neurobiology of epilepsy and TRPV1 and TRPM2 channels are activated by oxidative stress and they are involved in Ca^{2+} homeostasis disruption in neuronal cells. TRPV1 is a gated by noxious heat, oxidative stress and the pungent ingredients of hot chili peppers (capsaicin, CAP) and it is inhibited by capsazepine (CPZ) and 5′-iodoresiniferatoxin (IRTX). Nonspecific strong TRPM2 channel blockers are 2-Aminoethoxydiphenyl borate (2-APB) and anthranilic acid (ACA). Subtype of TRPM2 and TRPV1 cation channels is widely expressed in peripheral and brain neurons such as dorsal root ganglion (DRG) and hippocampus. However, there is scarce report on role of the channels in epilepsy. In the current presentation, I aimed to review molecular roles of TRPM2 and TRPV1 cation channels on Ca^{2+} signaling in pathophysiology of epilepsy.

There are scarce studies on role of Ca^{2+} entry through TRPM2 channels in epileptic neurons. Recent studies tested the effects of TRPV1-specific antagonists, CPZ and IRTX, in the modulation of calcium accumulation, apoptosis and anticonvulsant properties in hippocampus of DRG and hippocampus of pentylentetrazol (PTZ) and CAP administrated rats. Results of recent studies indicated recently that cytosolic calcium elevation through TRPV1 and TRPM2 channel causes apoptosis in epileptic neurons. Results of recent studies indicated also that latency time was extended by application CPZ and IRTX although CAP with/without PTZ produced acceleration of epileptic seizures.

In conclusion, current own and literature results indicated that decrease of calcium accumulation and oxidative stress through inhibition of TRPV1 and TRPM2 channel plays neuronal protective role against epilepsy-induced Ca^{2+} entry in the hippocampal and DRG neurons. This interaction may play an important role in epilepsy and peripheral pain diseases associated with activation of TRPV1 and TRPM2 channels.

Keywords

Apoptosis; Calcium ion; Epilepsy; TRPM2; TRPV1 channels; Seizures.

Conference No. 34

A novel method measuring plasma thiol –disulfide redox status

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Thiol is an organosulfur compound that contain a carbon-bonded sulfhydryl (–C–SH or R–SH) group. The –SH functional group itself is referred to as either a thiol group or a sulfhydryl group. Thiols are oxidized to disulfide structures under oxidative conditions. The formed disulfide bonds can be reduced to again to the functional –SH groups. Thus, thiol – disulfide redox status, which has important biological and physiological roles, is maintained. In this study, determination of plasma thiol – disulfide redox status has been aimed. Disulfide bonds were reduced to sulfhydryl groups then native thiol plus acquired thiols were measured as totally. On the other vessel native thiol levels were measured, separately. Half of the difference between total thiol and native thiol gives disulfide bond amount.

Assay can be performed by spectrophotometer or automated analyzer. Various disease spectrums showed interesting patterns. Inflammatory diseases have high plasma disulfide levels and neoplastic diseases have low plasma disulfide levels. The described method can be used to determine plasma thiol-disulfide redox status.

Oral Presentations

Oral Presentation No. 1

TRP channels are functionally expressed in mouse eggs

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Calcium influx is required for oocyte maturation and for complete egg activation. The molecular identity of the calcium-permeant channel(s) that underlie the acquisition of meiotic competence and calcium oscillations in mammals is not established. Cationic nonselective TRP channels are widely expressed and are modulated by a variety of stimuli and ligands, including G-protein coupled receptors. Recently, a member of the TRP channel family, TRPV3, was reported as a mediator of calcium and strontium influx in mouse eggs. Selective activation of TRPV3 channels provokes egg activation by mediating massive calcium entry. Strontium is widely used to artificially activate eggs and, in combination with somatic cell nuclear transfer, to yield live offspring. Using TrpV3-/- mice was demonstrated the TRPV3 channel is required for strontium-induced egg activation (Carvacho et al, Cell Reports, Dec. 2013). Here, using molecular biology tools (RT-PCR), and electrophysiological recordings of Meiosis (MII) stage mouse eggs, we identified a cationic non selective channel, activated by high concentrations of 2-APB and blocked by divalent ions. Our results suggest functional expression of a second member of the TRP channel family mediating calcium influx during oocyte maturation. The activity of this channel could be important for the maintenance of calcium oscillations during the egg activation and could mediate calcium influx during early stages of embryo development.

References

1. Carvacho I, Lee HC, Fissore RA, Clapham DE. 2013. "TRPV3 channels mediate strontium-induced mouse egg activation". Cell Reports. Dec. 12; 5(5): 1375-1386.

Oral Presentation No. 2

New insights into the regulation of the mitochondrial calcium uniporter

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The Mitochondrial Calcium Uniporter (MCU) is the protein of the inner mitochondrial membrane responsible for Ca^{2+} uptake into the organelle matrix, which represents a critical event for the control of cellular signaling, aerobic metabolism and apoptosis. Despite its recent identification, the list of the MCU modulators is rapidly growing, and now includes MCUb, the MICU family (that includes MICU1, MICU2 and MICU3), MCUR1, EMRE and SLC25A23, thus revealing a unique complexity that highlights the pleiotropic role of mitochondrial calcium signaling. Recent evidences suggest that these different components are intimately related one to the other and each one participates in conferring specific features to MCU-mediated Ca^{2+} channeling properties. As an example, I will show that the MICU family can form homo and/or heterodimers that are responsible for the sigmoidal relationship between MCU opening and extramitochondrial calcium. Indeed, in the proposed model, at low [Ca^{2+}], the dominant effect of MICU2 largely shuts down MCU activity; at higher [Ca^{2+}], the stimulatory effect of MICU1 allows the prompt response of mitochondria to Ca^{2+} signals generated in the cytoplasm. Moreover, new data on the role of MICU3, EMRE, MCUR1 and new regulators will be presented.

Oral Presentation No. 3

Identification of a novel gene required for TRPL translocation in the eye of *Drosophila*

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In the photoreceptors of *Drosophila,* phospholipase C ß-mediated opening of the ion channels transient receptor potential (TRP) and TRP-like (TRPL) generates the depolarizing receptor potential. While TRP is constantly anchored to the photosensitive rhabdomeric membrane via the INAD-complex, TRPL is shuttled between

the rhabdomeric membrane in the dark and an intracellular storage compartment after illumination, thereby mediating long-term adaptation. Here, we identified the gene mutated in *trpl-translocation defective 14 (ttd14),* which encodes the putative transport protein TTD14 required for TRPL trafficking between the rhabdomere and cell body. TTD14 is conserved in invertebrates but not in vertebrates and contains a predicted P-loop containing nucleoside triphosphate hydrolase domain and a CYTH domain. The *ttd14* mutation alters a highly conserved proline residue (P75) in the P-loop domain. Using immunocytochemistry and subcellular fractionation, we demonstrated that TTD14 is a soluble cytoplasmic protein. In contrast to TRPL, rhabdomeric localization of the membrane proteins rhodopsin and TRP is not affected by the *ttd14* mutation and electroretinogram recordings revealed a wild-type photoresponse. Previous publications identified chaperons (Rosenbaum et al. 2011, Neuron p. 602-15) and specific Rab proteins (Satoh et al. 2005, Development p. 1487-97) that mediate rhodopsin and TRP, but not TRPL transport to the rhabdomere. Therefore, we propose different trafficking routes to the rhabdomere for rhodopsin/TRP on the one hand and TRPL on the other hand.

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Oral Presentation No. 4

Melatonin, nitric oxide and mitochondrial energy production

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Melatonin is involved in many cell functions, including the circadian regulation of enzymes involved in cell redox homeostasis. Melatonin was recently proved to activate the nNOS expression of keratinocytes cells (HaCat) in culture [1], with a circadian compatible timing and important effects on mitochondrial bioenergetics [2].

The melatonin-induced mitochondrial changes have been assigned to the transient production of nitric oxide (NO) by the neuronal NO synthase, modulating cell respiration at the level of Complex I and Complex IV, Cytochrome c oxidase (CcOx) [3]. The reaction of CcOx with NO, particularly, is controlling the cell enzymatic O_2 reductase activity by two alternative reaction pathways. These are populated depending on the bio-availability of CcOX substrates (e-, O_2) and are likely responsible for physiological or pathological effects [4].

A mild, significant, decrease of the oxidative phosphorylation (OXPHOS) efficiency has been observed, with a depression of mitochondrial membrane potential, both fully balanced by a glycolytic compensation [1,2].

In conclusion, at nanomolar (or less) melatonin concentration, and within a time window of a few hours incubation, HaCat cells mitochondria change their activity compatibly with a melatonin-dependent NO inhibition of CcOX.

References

1. Marzia Arese, Maria Chiara Magnifico…Paolo Sarti *et al.* (2012). Nanomolar melatonin enhances nNOS expression and controls HaCaT-cells bioenergetics. *IUBMB LIFE*. 64, 251-258.
2. Sarti, P., Maria Chiara Magnifico…Marzia Arese, et al. (2013). New evidence for cross talk between melatonin and mitochondria mediated by a circadian-compatible interaction with Nitric Oxide *Int. J. Mol. Sci.* 2013, 14, 11259-11276; doi:10.3390/ijms140611259.
3. Brown, G. C. and Cooper, C. E. (1994) Nanomolar concentrations of nitric oxide reversibly inhibit synaptosomal respiration by competing with oxygen at cytochrome oxidase. *FEBS Lett.* 356, 295–298.
4. Sarti, P., Forte, E., Mastronicola, D., Giuffrè, A. and Arese, M. (2012) Cytochrome c oxidase and nitric oxide in action: Molecular mechanisms and pathophysiological implications. *Biochim Biophys Acta.* 1817(4):610-9.

Oral Presentation No. 5

The sodium-glucose co-transporter 2 inhibitor empagliflozin improves diabetes-induced vascular dysfunction in the streptozotocin T1DM model by interfering with oxidative stress and glucotoxicity

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Background and Purpose

In diabetes, vascular dysfunction is characterized by impaired endothelial function due to increased oxidative stress. Empagliflozin, as a selective sodium-glucose co-transporter 2 inhibitor (SGLT2i), offers a novel approach for the treatment of type 2 diabetes by enhancing urinary glucose excretion.

The aim of the present study was to test whether treatment with empagliflozin improves endothelial dysfunction in type I diabetic rats via reduction of glucotoxicity and associated vascular oxidative stress.

Experimental Approach

Type I diabetes in Wistar rats was induced by an intravenous injection of streptozotocin (60 mg/kg). One week after injection empagliflozin was administered via drinking water for 7 weeks.

Key Results

Treatment with empagliflozin (10 and 30 mg/kg/d) reduced blood glucose levels, normalized endothelial function (aortic rings) and reduced oxidative stress in aortic vessels (dihydroethidine staining) and in blood (phorbol ester/zymosan A-stimulated chemiluminescence) of diabetic rats. Additionally, the pro-inflammatory phenotype and glucotoxicity (AGE/RAGE signaling) in diabetic animals was reversed by SGLT2i therapy.

Conclusion and Implications

Empagliflozin improves hyperglycemia and prevents the development of endothelial dysfunction, reduces oxidative stress and improves the metabolic situation in type 1 diabetic rats. These preclinical observations illustrate the therapeutic potential of this new class of antidiabetic compounds.

Oral Presentation No. 6

Thermo-TRPs in respiratory health and disease

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Many physical and chemical environmental hazards affect the respiratory system. While the adverse effects of various environmental insults have long been considered to be rather nonspecific, following the discovery of the superfamily of Transient Receptor Potential (TRP) channels the focus has shifted towards identification of the specific roles of these channels in the physiology and pathology of the respiratory system. These channels play key roles in sensing diverse environmental factors, as well as in signal transduction in different cell types [1]. There is growing evidence for their involvement in many disease states [2], including respiratory diseases such as asthma, chronic obstructive pulmonary disease and chronic cough [3-5]. However, TRP receptors in the human respiratory epithelium remain poorly characterised.

We aimed to investigate the expression and functional roles of several TRP channels in epithelial cells of the human respiratory system, while primarily focusing on those sensitive to temperature changes and pungent chemicals receptors (TRPA1, TRPM8 and TRPV1). TRPV1 is heat-sensitive receptor, which is also activated by a number of known respiratory irritants, in particular acidic gases and particulates contained in air pollution. Chemicals including capsaicin cause a burning sensation via activation of TRPV1 and readily induce cough. In contrast, TRPM8 and TRPA1 are primarily detectors of cold, which also selectively respond to "cooling" compounds of plant origin such as menthol, eucalyptol and cinnamaldehyde.

These thermo-TRPs were examined in cultured human nasal epithelial cells (HNEC) obtained by nasal brushings [6] and in primary human bronchial epithelial cells obtained by bronchial brushing from healthy and asthmatic volunteers (PBEC) [7]. Molecular expression of TRP receptors was determined at an mRNA and protein level using PCR, Western blotting and immunocytochemistry. Functional expression was assessed based on the action of selective TRP agonists and antagonists with the use of laser confocal calcium imaging in Fluo-4 loaded cells and patch-clamp recording techniques. ELISA was used to investigate the involvement of TRP activation in the release of the pro-inflammatory cytokines IL-8 and IL-1β.

Gene transcripts for TRPA1, TRPM8 and TRPV1 were revealed in all cells by PCR. Protein expression for these channels was also detected in all cells, with the exception of TRPA1 in HNEC.

In HNEC, the TRPM8 agonist menthol induced intracellular calcium responses in a dose-dependent manner (EC_{50}=62.0±10.0 μM, n=6; this was comparable to EC_{50}=27.6±1.1 μM in HEK293/TRPM8 cells), which were ablated by the TRPM8 antagonist BCTC (10 μM). The responses at 50 μM were 47.5±6.0% (n=7) of those evoked by the Ca^{2+} ionophore A23187 (1 μM). In PBEC, the TRPA1 agonist cinnamaldehyde induced $[Ca^{2+}]i$ rises with EC_{50}~50 μM, which were abolished in the presence of the TRPA1 antagonist HC030031 (30 μM). The responses at 100 μM were 52.5±10.7% (n=20) of A23187-evoked $[Ca^{2+}]i$ rises.

Patch-clamp experiments provided strong evidence for plasma membrane expression and function of these channels. Thus, application of menthol (100-300 μM) (but not cinnamaldehyde) in HNEC and both menthol and the TRPV1 agonist capsaicin (50 μM) in PBEC produced robust membrane current responses with characteristic

biophysical "TRP signatures" (e.g., current kinetics and voltage-dependence). Importantly, increased expression of TRPV1 in PBEC was found in patients with severe asthma [7]. In PBEC from both the asthmatic and nonasthmatic groups, increased dose-dependent induction of IL-8 release by capsaicin was observed, which was significantly ($P<0.001$) inhibited by TRPV1 antagonist capsazepine (10 μM).

We conclude that thermo-TRPs are functionally expressed in the epithelial cells of the upper and lower airways where they can play important roles in airway responses to chemical irritants, environmental pollutants and thermal stimuli. These channels may represent novel therapeutic targets for the treatment of respiratory diseases including asthma and chronic cough.

References

1. Damann N, Voets T, Nilius B (2008). TRPs in our senses. *Curr Biol* 18, R880-R889.
2. Nilius B, Owsianik G, Voets T, Peters JA (2007). Transient Receptor Potential cation channels in disease. *Physiol Rev* 87, 165-217.
3. Banner KH, Igney F, Poll C (2011). TRP channels: emerging targets for respiratory disease. *Pharmacol Ther* 130, 371-384.
4. Gibson PG, Ryan NM (2011). Cough pharmacotherapy: current and future status. *Expert Opin Pharmacother* 12, 1745-1755.
5. McGarvey LP, Elder J (2010). Future directions in treating cough. *Otolaryngol Clin North Am* 43, 199-211.
6. de Courcey F, Zholos AV, Atherton-Watson H et al (2012). Development of primary human nasal epithelial cell cultures for the study of cystic fibrosis pathophysiology. *Am J Physiol* 303, C1173-C1179.
7. McGarvey LP, Butler CA, Stokesberry S et al (2014). Increased expression of bronchial epithelial transient receptor potential vanilloid 1 channels in patients with severe asthma. *J Allergy Clin Immunol* 133, 704-712.

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Oral Presentation No. 7

ATAD3 is a limiting factor in mitochondria biogenesis

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Mitochondrial biogenesis is very complex and is still a poorly understood phenomenon. However, the status of the mitochondrial mass within a cell is clearly involved in many pathologies including cancers and metabolic diseases.

Mitochondria biogenesis is a tightly controlled and globally regulated process that occurs at contact sites with the reticulum. These specific Mitochondrial-Associated-Membranes provided mitochondria with lipids and proteins that can be further processed inside mitochondria.

Using 3T3-L1 white adipocyte differentiation model, we have shown that the unknown-function and vital ATAD3 protein is able to regulate the mitochondrial biogenesis and the consecutive lipogenesis. We have also shown that Resveratrol regulates this effect.

It is therefore hypothesized here that ATAD3 contributes in the contact with, and in the lipids/proteins transfer from the reticulum.

Oral Presentation No. 8

Potential antioxidative effects of Kolaviron on reproductive function in streptozotocin-induced diabetic Wistar rats

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Oxidative stress (OS) plays a central role in the progression of diabetes mellitus (DM). Prevention of DM and its complications is a challenging health problem as it impact on various organ functions, including reproduction. This study explored the pharmacological potential of kolaviron (KV), a natural biflavonoid from the seeds of Garcinia kola, as a remedy for DM and its subsequent complications on male reproductive function.

Male Wistar rats were randomly divided into 5 groups: N (non-diabetic control), STZ (streptozotocin, diabetic control), N+KV, STZ+KV, STZ+INS (insulin). Both KV and INS were administered daily at 100mg/kg (galvaging) and

0.2IU/kg (intravenous) respectively. All animals were fed ad lib for 7 weeks. Lipid peroxidation and antioxidant enzymes (superoxide dismutase: SOD, catalase: CAT and glutathione: GPx) were measured in epididymal and testicular tissue.

Plasma glucose as well as malondialdehyde (MDA) were significantly higher, while body, testicular and epididymal weights were lower in the STZ group compared to N and N+KV. Both KV and INS were able to ameliorate these effects. SOD, CAT and GPx in induced diabetic rat were significantly lower compared to diabetic control group. However, KV treated group shown significantly higher SOD, CAT and GPx activities compared STZ group.

It is evident that KV modulate STZ induced DM and the related OS in the male reproductive system. KV can potentially be used as an anti-diabetic treatment, however further studies are needed.

Oral Presentation No. 9

Neither antioxidant enhancement or exercise affects protein thiol status in aging mouse muscle

Hatice Tohma

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Skeletal muscle is the largest organ in the body and age related loss of muscle mass and strength (sarcopenia) is an unavoidable part of the aging process. One of the factors that could play a key role in sarcopenia is the accumulation of oxidised molecules such as lipofuscin, protein carbonyls or oxidised protein thiols. A distinguishing feature of protein thiol oxidation is that it is reversible in contrast to other oxidised molecules. Although there is a wide range of evidence for lipofuscin accumulation and increased protein carbonyls in aging skeletal muscle, oxidation of protein thiols has been of recent interest due to their role in modulating various signalling pathways. I hypothesized that oxidation of protein thiols could be a factor in the adverse physiological modifications occurring with aging. In addition, suppression of oxidative stress by antioxidant treatment or exercise could be expected to reduce cellular oxidative damage and prevent age related protein thiol oxidation. Therefore, I first examined the level of protein thiol oxidation in the skeletal muscle of catalase over-expressing mice to assess whether the level of protein thiol oxidation was affected by antioxidant status in aging muscle. Second, I examined lifelong exercising mice to determine whether muscle mass was related to thiol status of skeletal muscle proteins.

Oxidation of protein thiols was assessed by a recently developed fluorescence technique, which allows the quantification of reduced, oxidised and total protein thiols. Surprisingly, protein thiol oxidation did not change in course of aging in the skeletal muscle of normal mice. Furthermore, neither catalase over expression nor exercise affected the level of protein thiol oxidation during aging.

I conclude that the level of protein thiol oxidation is not substantially affected by age and interventions such catalase over expression and exercise. Instead, age related muscle wasting might be driven by irreversible damage mechanisms rather than reversible protein thiol oxidation.

Poster Presentations

Poster No. 1

Protective effect of pulsed electromagnetic field against oxidative/nitrosative damage induced by diabetes

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Studies have advocated several regenerative and healing effects of pulsed electromagnetic field (PEMF) including regulation of blood glucose, improvement of diabetic complications and promoting insulin secretion and melatonin secretion (1,2,3). In the present study, the protective effects of PEMF were assessed in an experimental model of diabetes through oxidative/nitrosative parameters. For this purpose, a total of 32 rats were used which were divided into 4 groups including controls (C; n=8), sham PEMF (SPEMF; n=8), diabetes (D; n=8), diabetes+PEMF (D+PEMF; n=8). PEMF therapy was initiated after confirmed diagnosis of diabetes and applied to D+PEMF group for 60 minutes per day for 4 weeks. At the end of experiment, blood and hepatic tissue samples were obtained to measure oxidative stress parameters including malonedialdehyde (MDA), nitric oxide (NO), myeloperoxidase (MPO) and antioxidant parameters including superoxide dismutase (SOD) and glutathione (GSH). It was found that while MPO levels were statistically significantly elevated in SPEMF ($p<0.001$) and D ($p<0.01$) groups versus C group, D+PEMF group showed similar MPO levels with C group. Mean SOD levels were lower in D and SPEMF groups compared to C group and the difference was statistically significant ($p<0.001$). However, D+PEMF group exhibited an elevation in SOD levels which was similar to that of C group and SPEMF and D groups had comparable low SOD levels. Decreased GSH levels were observed in SPEMF, D and D+PEMF groups versus control group ($p<0,001$). However, the reduction in SPEMF and D groups was more prominent. Compared to C group, MDA and NO levels showed a statistically significant increase in SPEMF and D groups ($p<0.001$) but were nearly equivalent to that of C group in D+PEMF group. In conclusion, we suggest that PEMF might have protective effects against diabetes-induced injury based on measurements of serum MPO level and tissue MDA, NO, SOD and GSH levels.

References

1. Naomi M. Shupak. Therapeutic uses of pulsed magnetic-field exposure: A review. The Radio Science Bulletin 2003; 307: 9-32
2. Jeff Dyche A., Michael Anch, Kethera A. J. Fogler1,David W. Barnett and Cecil Thomas. Effects of power frequency electromagnetic fields on melatonin and sleep in the rat. Emerg Health Threats J 2012; 5.
3. Tufan Mert,Ismail Gunay, and Isil Ocal. Neurobiological effects of pulsed magnetic field on diabetes-ınduced neuropathy. Bioelectromagnetics 2010; 31:39-47.

Keywords
diabetes, PEMF, antioxidants, oxidative stress.

Poster No. 2

Defense Enzyme Activities and AChE Levels in Liver and Gill Tissues of *Xiphophorus hellerii* (Swordtail Fish).

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2,4-D is the common name for 2,4-dichlorophenoxyacetic acid, a selective systemic herbicide using weed control and can be used to assess ecological risk in aquatic environments. Fish species have been extensively used as bio-indicators for environmental pollutants in determination of the water quality of aquatic systems. In the present study, herbicide 2,4-D was investigated for its potency to induce oxidative stress and effects on antioxidant systems in gill and liver tissues of Swordtail fish *(Xiphophorus hellerii).* Animals were exposed to sublethal doses of 2,4-D (0.05 ppm, 0.1 ppm, 0.2 ppm) for 96 hours except the control group. Protein, malondialdehyde (MDA), catalase (CAT) and acetylcholine esterase enzyme activity (AChE) were determined using spectrophotometric methods. The results show that protein level was reduced in all experiments when compared to control group. Levels of malondialdehyde were increased in each group. Catalase enzyme activity was significant decreased in all groups. In all groups

except the control group, the 2,4-D's in the control group increased AChE activity was observed. Uncontrolled using of herbicides has been seen to cause important problems in aquatic organisms.

Poster No. 3

The Individual and Combined Effects of CTLA4-Cd28 variants and oxidant-antioxidant status on the development of colorectal Cancer

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Colorectal cancer is the third most frequent cancer with 9,7 % incidence world wide and the second most mortal cancer after lung cancer. Environmental and genetic factors are known to be related with colorectal cancer progression. Current researchs in response to the immune system and anti-inflammatory pathways occurring disruptions and damages to be effective in the development of cancer. The balance between CD28 and CTLA-4 signalling is important for regulation of the immune response. On the other hand, CTLA4 gene is an important regulator of tumor immunity. Previous investigations revealed significant associations of polymorphisms in CTLA4 gene and susceptibility to various types of cancers such as melanoma, breast or gastric cancer. Oxidative stress can damage cellular macromolecules, leading to DNA and protein modification and lipid peroxidation. Oxidant-antioxidant balance is an important factor for initiation and progression of cancer.

The aim of the represented study was to determine oxydant-antioxydant status in colorectal cancer patients. Our study groups consist of 35 colorectal cancer patients and 33 healthy controls.

We used spectrophotometric assay to detect the levels of lipid peroxidation products such as malondialdehyde (MDA) and lipid hydroperoxide (LHP) and measured the concentration of protein damage products including advanced oxidation protein products (AOPP), protein carbonyl (PCO). Additionally antioxidant levels were detected by measuring Copper, Zinc, Superoxide Dismutase (Zn, Cu, SOD) and total tiol (T-SH) levels and advanced glycation end-products (AGEs). The CTLA4 -318C/T, CTLA- 4 49A > G and Cd 28 genotypes were determined by using polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP) method.

According to our results AOPP and PCO levels were significantly increased (p=0,002, p=0,001 respectively) as well as LHP and MDA, AGE levels (p=0,000) in colorectal cancer patients. On the other hand, antioxydant parameters which are Cu-Zn SOD and T-SH levels were significantly decreased in patient group (respectively p=0,000; p=0,039). When we analysed CTLA4 -318C/T, CTLA- 4 49A > G and Cd 28 genotypes in our study groups, we have detected the significance between CTLA4 -318C/Tgenotypes and the risk of colorectal cancer.

In conclusion our data showed that oxydative stress was increased in colorectal cancer patients. We suggest that disturbed oxydative stress satus and trace element levels may contribute to the pathogenesis of colorectal cancer.

Poster No. 4

Effect of prenatal stress on density of NMDA receptors in rat brain

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N-methyl-D-aspartate (NMDA) receptors are important excitatory receptors which contribute to many brain functions. Altered NMDA receptor levels cause maldevelopment of corticostriatal and corticolimbic pathways, which is a neurobiological predisposing factor for development of epilepsy, schizophrenia and other idiopathic psychotic disorders. It was hypothesized that prenatal stress could play a role in pathophysiology of these disorders by affecting expression of the receptors through releasing corticosterone. Sixty eight virgin female Wistar rats were selected and mated with male rats with the same genotype. Then, the pregnant rats were subjected to restraint or predator stress on 15th, 16th and 17th gestation days. Prenatal stress consisted of restraint or predator stresses of the dams under normal room conditions. After parturition, the pups were studied in terms of density of NMDA receptors in brain at different time

points. Meanwhile, blood sample was obtained and corticosterone blood level (CBL) was measured. The pups were then compared with the pups born to unstressed dams. Stress induced significant rise in CBL and NMDA receptors in brain of the offspring. CBL was significantly higher among the stressed rats compared to the control ones; there was significant difference between the two stresses and between the two sexes. The male pups were affected more severely. Stressful events during gestation had important effects on NMDA receptors of the offspring. It can be concluded that stress-induced elevation of NMDA receptors and corticosterone might mediate altered susceptibility to epilepsy and decrease ability of learning and memory and other stress-induced neurologic disorders.

Poster No. 5

Role of microRNAs in cancer development, diagnosis and treatment

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MicroRNAs (miRNAs) constitute one class of endogenous small RNAs, protein-noncoding RNA molecules about 20-23 nucleotide long, which participate in many physiological and pathological processes. miRNAs involve in basic cell functions like cell proliferation, differentiation and apoptosis. However, loss of function and changes in the expression levels of miRNAs can trigger many cellular pathway by affecting tumor initiation, progression, angiogenesis and metastasis. In this review we aimed to summarize the importance of miRNAs on cancer development, diagnosis and treatment.

Loss of function of target regulators that play a role on cell cycle checkpoints and progression such as miR-15a/16, miR17/20, miR-221/222, let-7 and miR-34 family, lead to increasing cell proliferation and tumor growth. It is noteworthy that anti-apoptotic and pro-apoptotic molecules which involved in apoptotic pathways, rearranged by miRNAs in cancer development. Changing energy metabolism is typically in cancer. While miR-133, miR-138 and miR-150 affect the metabolism of cancer cells and cause tumor growth by targeting glucose carriers, miR-33a/b and miR-29b modifying fatty acid metabolism and aminoacid metabolism. miRNAs can trigger invasion and metastasis via affect many signaling pathways. Down regulation in miR-200 and miR-205 family lead to the invasion of cancer cells by starting epithelial-mesenchymal transition(EMT) in a variety of tumors. In addition miR-424 triggered by hypoxia stabilizes hypoxia-inducible factor-α (HIF- α) and enhances angiogenesis in tumor microenvironment.

Recent studies reveal the importance of miRNAs efficiency on treatment as much as their effect on cancer development and diagnosis. miRNAs are thought to be effectively regulated as they have small size and low molecular weights and create a good choice for the development of cancer therapies. As miRNAs can mute target genes and have a great role on the regulation of many genes, they promise hope in cancer treatment. Recent studies contribute to the development of miRNA-based treatment which can be used in clinical practice.

References

1. Le Quesne J, Caldas C. Micro-RNAs and breast cancer. Moleculer Oncology 2010;4:230-41.
2. Lujambio A and Lowe SW. The microcosmos of cancer. Nature 2012; 347-355
3. Kong WY, McCollough DF, Jackson JT, Bushell M. MicroRNAs in cancer management. Lancet Oncol 2012;13:249-258
4. Chen Y, Gao DY, Huang L. İn vivo delivery of miRNAs for cancer therapy: Challenges and strategies. Advanced drug Delivery Reviews 2014; Article in press.
5. Tomasetti M, Santarelli L, Neuzil J, Dong L. MicroRNA regulation of cancer metabolism: role in tumour suppression. Mitochondrion 2014; Article in press.
6. Tomasetti M, Neuzil J, Dong L. MicroRNAs as regulators of mitochondrial function: Role in cancer suppression. Biochimia et Biophysica Acta 2014;1441-1453

Poster No. 6

Effect of benzo(a)pyrene on the homocysteine level and lipid parameters in rats

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In this study, investigation of effects of administration of benzo(a)piren (BaP) to rats on homocysteine level, lipid parameters and coronary arteries was intended. For this purpose, approximately 200 g in Weight, 8-10 weeks age, 14 wistar albino female rats were divided into two groups. These groups; 1st Group (Control Group, tricapyrilin as placebo), and 2nd Group (BaP Group: 3,4 benzo(a)piren dissolved inthe tricapyrilin) administrated BaP 50 mg/kg single dose with subcutaneously. 10 weeks after application and after 12 hours hunger period, blood samples were taken

from heart with punction under ether aneshesthesia. Taken blood samples were investigated for plasma homocysteine, total cholesterol, triglycerides, LDL, VLDL and HDL levels and coronary arteries were investigated for pathological changes.

According to results; despite there was difference found on total cholesterol, triglycerides LDL, VLDL and HDL levels of BaP group statistically ($p<0,05$), there was no significant difference between homocysteine levels ($p>0,05$). There was no significant differences were detected on mean blood vessel diameter and blood vessel wall thickness value between groups ($p>0,05$). In experiment group, vacuolar degeneration and significant increase in peri-arteriolar connectivite tissue of muscle cells in the muscular layer of epicardial coronory arteries.

As a result; we believe determined effects of BaP on lipid parameters and homocysteine level will make a significant contribution to understanding etiology of cardiovascular diseases.

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Poster No. 7

The determination of ADAMTS12 depletion using Western blot analysis technique in insulin-treated OUMS-27 human chondrosarcoma cells

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Aim

A disintegrin and metalloproteinase with thrombospondin motifs (ADAMTS) proteins are a family of enzymes with both proteolytic and protein interaction functions, which have been implicated in several pathologies. The member ADAMTS12 is encoded by the gene ADAMTS12 and known as a metalloproteinase functioning inflammatory response. The aim of this study is to reveal the effects of insulin on ADAMTS RNA and protein levels in OUMS-27 human chondrosarcoma cells to estimate the detrimental effect of diabetes itself or insulin absence on cartilage tissue and/or articular elements.

Materials Methods

OUMS-27 chondrosarcoma cells were induced by 10μmol/mL insulin for up to 7 days in Dulbecco's modified Eagle' medium (DMEM). The groups were control untreated, 1, 3, and 7 days insulin-treated groups. After the induction periods, cells were harvested, and mRNA and protein isolations were performed. mRNA levels and cDNA levels were measured using qRT-PCR and individual protein levels were detected by Western blot technique.

Results

According to qRT-PCR results, there was a significant difference in ADAMTS12 RNA levels between control cells and day 1 ($p=0.008$) and day 7 cells ($p=0.008$). On the other hand, Western blot results showed that after ADAMTS12 protein amount was normalized with GAPDH amount (ADAMTS12/GAPDH), the protein amount in study groups (day 1, 3, and 7 after insulin application) were pretty lower that that of control group.

Conclusion

Insulin application to the OUMS-27 cells lead to deplete ADAMTS12 RNA and protein levels which shows an important regulatory action of insulin on chondrocytes.

Key words

ADAMTS12, chondrosarcoma, OUMS-27, qRT-PCR, Western blot.

Poster No. 8

A disintegrin and metalloproteinase with thrombospondin motif 8 (ADAMTS8) expression analysis by qRT-PCR in OUMS-27 cells before and after insulin administration

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Aim

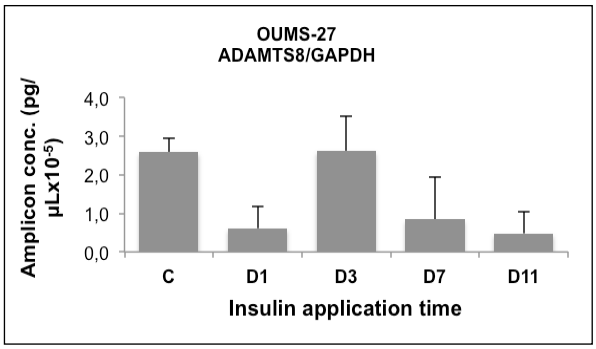
ADAMTS8 is a secreted protease with antiangiogenic properties. It can inhibit VEGF-induced angiogenesis and suppress fibroblast growth factor 2-induced vascularization. Angiogenesis and extracellular matrix degradation are key occurrences in tumor progression. It is also known as a member of aggrecanases family. We aimed to investigate the expression levels of ADAMTS8 in choncrosarcoma cells to elucidate the effect of insulin on the tumor cells in terms of ADAMTS production.

Materials and Methods

OUMS-27 cells were cultured and were separately exposed to 10µmol/mL insulin for up to 11 days in Dulbecco's modified Eagle' medium (DMEM). After determinated time limits (days 1, 3, 7, and 11) culture was terminated and RNA was isolated by using TRIzol reagent and converted to cDNA. The expression levels of ADAMTS8 were evaluated by qRT-PCR.

Results

ADAMTS8 expression in OUMS-27 cells were decreased about 4-fold with the use of insulin on day 11. There were statistically significant differences between control and D1 (p=0.008), D7 (P=0.047), and D11 (P=0.008) groups.



Conclusion

This is the first study that investigates the effect of insulin on chondrosarcoma cells in terms of ADAMTS8 expression. The decrease in ADAMTS8 expression can be accepted as a novel finding that has a potential to explain some pathophysiological mechanisms of tumor cells. The finding has also a potential to enlighten the relationships between matrix degradation and insulin treatment in vitro.

Key words

ADAMTS8, chondrosarcoma, OUMS-27, antiangiogenesis, qRT-PCR.

Poster No. 9

Effect of some stress factors (cryoprotectants, osmotic conditions) on sheep sperm and relationships of these factors with some oxidant/ antioxidant parameters

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Plasma membrane and cytoplasm of spermatozoa contains large amounts of polyunsaturated fatty acids and therefore are highly susceptible to reactive oxygen species (ROS). Cryopreservation produces physical and chemical stress on the sperm membrane, which might be associated with oxidative stress. Although osmotic pressure of solution and cryoprotectants (CPUs) causes physical stress, the effect of osmotic pressure on oxidative status have been not known. The aim of this study was to investigate the effects of osmotic, cryoprotective and oxidative stress parameters and relationships among these parameters in ram sperm. Moreover, the effects of anisoosmotics solutions and CPUs on oxidative stress parameters of sperm were determined so that select the solution having the lowest oxidative damage on sperm.

In this study, three healthy and fertile Awassi rams were used. Sperm samples were obtained by using an artificial vagina and pooled. The study consisted of two steps. 1. After the pooled sperm samples were exposed to solutions of 75 150, 200, 240, 280, 330, 370, 410, 460, 500, 600 and 900±5 mOsm/ kg' for 5 minutes, they were brought to isoosmotic condition (290-325 mOsm/kg) by adding HEPES buffered Tyrode's lactate (TL-HEPES). 2. Toxic or protective effects of glycerol (Gly), methanol (M), 2-methoxyethanol (ME), dimethylacetamide (DMA) and 1,2 propanediol (PR) on spermatozoa were assessed during dilution, equilibration and freezing. Sperm samples were evaluated for motility, membrane integrity, acrosome integrity, oxidant

and antioxidant parameters. For oxidative status, lipid hydroperoxide (LOOH), total oxidant status (TOS), oxidative stress index (OSI), total antioxidant status (TAS), total free sulfhydryl groups (SH), ceruloplasmin (CP), paraoxonase-1 (PON) and arylesterase (ARE) were analyzed.

Anisosmotic solutions and CPUs changed only the activity of CP. When sperm was exposed to CPUs, the level of LOOH, the activities of PON and CP were significantly changed in the groups. While anisosmotic stress did not have an effect on acrosomal integrity of sperm, hypoosmotic or hyperosmotic sucrose solution significantly reduced the motility and membrane integrity of sperm ($P<0.05$). The abruptly addition and removal of 0.5 M Gly, 2-ME, M, DMA or PG had no effect on the motility, membrane and acrosomal integrity of sperm ($P>0.05$). However, the motility and membrane integrity of sperm exposed to 1.0 and 1.5 M Gly significantly decreased ($P<0.05$). Equilibrating sperm diluted with different cryoprotectants significantly reduced the motility and membrane integrity but not acrosomal integrity.

In conclusion, although osmotic and CPUs stress factors adversely affected sperm parameters, an exact relationship between stress factors and oxidative status in ram sperm have not been detected.

Poster No. 10

Protective effects of Coenzyme Q10 and Resveratrol on PeCDD induced oxidative stress on transheterozigot larvae of *Drosophila melanogaster*

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Dioxins are known to be a class of highly toxic and persistent environmental contaminants (1). The aim of this study was to investigate the effects of 1,2,3,7,8- Pentachlorodibenzo-*p*-dioxin (1,2,3,7,8-PeCDD) application on oxidant-antioxidant systems on *Drosophila melanogaster,* and protective roles of Coenzyme Q10 (CoQ10) and Resveratrol (RSV) on these effects.

For this purpose, transheterozygote larvae of *D. melanogaster* were divided as follows: untreated control groups (distilled water, DMSO, RSV and CoQ10) and 1,2,3,7,8-PeCDD application group ($10x10^{-7}$µg/mL), 1,2,3,7,8-PeCDD+RSV (10x10-7µg/mL+100µM), 1,2,3,7,8- PeCDD+CoQ10 (10x10-7µg/mL+150µg/mL).

Later, the oxidant (for dioxin application group) and antioxidant systems (for dioxin+antioxidant application groups) of the biochemical tests and measurements were made. Total antioxidant status (TAS) and total oxidant status (TOS) of adult individuals were measured using commercially available kits. Using tissue homogenates of *D. melanogaster,* oxidative stress index (OSI) was calculated with TAS and TOS measurements.

It was determined that the TAS value was found higher, and TOS value was found lower in dioxin application group than dioxin+antioxidant application groups ($p<0,05$). In addition, it has been put forth that CoQ10 and RSV decrease the oxidative damage and lipid peroxidation caused by 1,2,3,7,8-PeCDD and increased antioxidant activity.

Acknowledgment

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Reference

1. Mitrou, P.I., Dimitriadis, G. and Raptis, S.A., 2001. Toxic effects of 2,3,7,8-tetrachlorodibenzo-*p*-dioxin and related compounds. European Journal of Internal Medicine, 12 (5), 406-411.

Poster No. 11

Hazelnut-enriched diet improves oxidant-antioxidant status beyond a lipid-lowering effect in hypercholesterolemic subjects

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Tree nuts, particularly hazelnut, almonds, walnuts, and pistachios, have been shown to possess cardioprotective effects. One of the mechanisms of cardioprotective effects of these nuts is to improve oxidant-antioxidant status (1,2). There is little information on the effects of hazelnut consumption on oxidant-antioxidant status. The effects of hazelnut consumption on oxidant-antioxidant status in subjects with mild hypercholesterolemia were investigated. Fifteen hypercholesterolemic volunteers (13 men and 2

women) were recruited in a double control sandwich model intervention study with a single group and three isoenergetic diet periods. These were control diet I (4 weeks), hazelnut-enriched diet (4 weeks; hazelnut contributing 18%–20% of the total daily energy intake), and control diet period II (4 weeks) (3,4). The oxidant and antioxidant biomarkers such Malondialdehyde (MDA), Advanced Oxidation Protein Products (AOPP), Total Antioxidant Status (TAS), Total Oxidant Status (TOS), Oxidative Stress Index (OSI), Glutathione Peroxidase (GPx) and Glutathione Reductase (GR) were measured. Consumption of a hazelnut-enriched diet significantly improved oxidant-antioxidant status as well as lipid parameters. It was concluded that hazelnut-enriched diets may exert antiatherogenic effect by improving oxidant-antioxidant status, in addition to their lipid and lipoprotein-lowering effects.

References

1. Orem A, Yucesan B F, Orem C, Akcan B, Kural V B, Alasalvar C, Shahidi F.2013. Hazelnut-enriched diet improves cardiovascular risk biomarkers beyond a lipid-lowering effect in hypercholesterolemic subjects. J. of Clin. Lipid. 7, 123–131.
2. Yucesan B F, Orem A, Kural V B, Orem C, Turan I. 2010. Hazelnut consumption decreases the susceptibility of LDL to oxidation, plasma oxidized LDL level and increases the ratio of large/small LDL in normolipidemic healthy subjects. Anadolu Kardiyol. Derg. 10: 28-35.
3. Kusano C. and Ferrari B. 2008. Total Antioxidant Capacity: A Biomarker In Biomedical And Nutritional Studies. J. Of Cell And Mol. Bio. 7(1) : 1-15.
4. Hu F.B. 2003. Plant-Based Foods And Prevention Of Cardiovascular Disease: An Overview. Am. J. Clin. Nutr.78: 544-551.

Poster No. 12

ATP-sensitive K^+ channels in octopus neurons of mice cochlear nucleus

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In the present study we aimed to study subunit composition and function of ATP-sensitive K^+ (KATP) channels in the octopus neurons of cochlear nucleus by using quantitative real-time reverse transcription-polymerase chain reaction (qRT-PCR), western blotting, immunohistochemistry techniques and patch clamp. ATP-sensitive K^+ (KATP) channels is activated by reactive oxygen/nitrogen species.

Coronal slices of the ventral cochlear nucleus (VCN) were prepared from Bulb-c mice of between 16 and 19 postnatal days. Whole cells patch clamp recordings were taken under current and voltage clamp condition.

Expression of mRNA for SUR1, SUR2, Kir6.1 and Kir6.2 subunits of KATP channels were demonstrated using real time PCR. Ion channel proteins were visualized using western blotting and immunohistochemical staining technique in the neurons of ventral cochlear nucleus. Application of KATP agonists including cromacalim (50 μM), diazoxide (0.2 mM) resulted in hyperpolarization, which were blocked by KATP antagonists, glybenclamide (0.2 mM), tolbutamide (0.1 mM)

In conclusion, KATP channels appear to have neuroprotective effect due to hyperpolarization induced by reactive oxygen/nitrogen species.

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Poster No. 13

TRPM2 channels in octopus neurons of mice cochlear nucleus

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In the current study, we aimed to study if TRPM2 channels are present in the octopus cells of mice cochlear nucleus, if present, to determine the properties and function of TRPM2 channels in octopus neurons. TRPM2 is non-selective cation channels that are a Ca^{2+}-permeable and are stimulated by reactive oxygen/nitrogen species and ADP-ribose (ADPR).

Expression of mRNA for TRPM2 were demonstrated using quantitative real-time reverse transcription-polymerase chain reaction (qRT-PCR), TRPM2 ion channel proteins were demonstrated by western blotting and localization of TRPM2 ion channels on the cellular membrane were visualized by immunohistochemical staining technique in the neurons of ventral cochlear nucleus

Electrophysiological pacth clamp recordings were performed in coronal slices from the ventral mice cochlear nucleus (VCN). Whole cells patch clamp recordings were taken under current and voltage clamp condition.

TRPM2 agonists including ADP-ribose (ADPR) induced a small degree of depolarization in octupus cells, which were blocked by TRPM2 antagonists, flufenamik asit (100 μM), N-(p-amylcinnamoyl) anthranilic acid (50 μM) ve 8-Bomo-cADP ribose (50 μM).

It is concluded that TRPM2 channels are present and appear to function shift the membrane potential in a depolarization direction in octopus cells of cochlear nucleus.

This work was supported by a grant from TUBITAK (SBAG-110S397).

Poster No. 14

The radioprotective effects of propolis and caffeic acid phenethyl ester on nitrosative stress in lens tissue in radiation-induced cataract in rat

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Eye morbidity is widely observed in patients receiving total-body irradiation prior to bone marrow transplantation or radiotherapy for ocular or head and neck cancers. Cataract blindness is the major cause of preventable blindness worldwide especially in the developing countries. The aim of this study was to investigate whether Propolis and Caffeic acid phenethyl ester (CAPE) prevent radiation-induced cataractogenesis. Fifty-four Sprague-Dawley rats were randomly divided into six groups. Group 1 (Irradiation (IR) + Propolis) received total cranium irradiation and propolis was given orally through an orogastric tube daily. Group 2 (IR+CAPE) received total cranium irradiation plus CAPE intraperitoneally (IP) every day. Group 3 (IR) received 5 Gy of gamma irradiation as a single dose to total cranium plus 1 ml saline daily. Group 4 received daily plain saline. Group 5 received daily plain dimethyl sulfoxide (DMSO). Group 6 (Normal control group) did not receive anything. At the end of the 10 day time period, cataract developed in 80% of the rats in group 3. After irradiation, cataract rate drop to 30% and 40% in groups which treated with Propolis and CAPE, respectively. Nitric oxide synthase (NOS) activity, nitric oxide ($NO^{\bullet}$) and peroxynitrite ($ONOO^{-}$) levels were significantly higher in Group 3 compared to all other groups. The results suggest that Propolis and CAPE have an important role on nitrosative stress and free radical scavenging activities in the irradiation-induced cataractogenesis, and reduce nitrosative stress markers. Propolis was found to be more effective in anti-cataractogenic effect than CAPE.

Poster No. 15

Determination of hepatoprotective and antioxidant role of walnuts against ethanol-induced oxidative stress in rats

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The aims of our study were the evaluation of the hepatoprotective effect and antioxidant role of walnuts against ethanol-induced oxidative stress. The hepatoprotective and antioxidant role of the walnuts supplementation feed against ethanol-induced oxidatif stress was evaluated by measuring liver damage serum marker enzymes, AST, ALT, GGT and LDH, ADS such as GSH, GR, SOD, GST, CAT and GPx and MDA content in various tissues of rats. Rats were divided six experimental groups: I (control), II (20% ethanol), III (10% walnuts), IV (20% ethanol + 10% walnuts), V (5% walnuts) and VI (20% ethanol + 5% walnuts). According to the results, The biochemical analysis showed a considerable increase in the serum aspartate AST, ALT, GGT and LDH in the II group as compared to that of I group whereas, decreased in IV group as compared to that of group II. In addition, administration of walnuts supplementation restored the ethanol-induced imbalance between MDA and fluctuated antioxidant system towards near control group particularly in the tissues. The results indicated that walnuts could be as important as diet-derived antioxidants in preventing oxidative damage in the tissues by reducing the lipid oxidation or inhibiting the production of ethanol-induced free radicals in rats.

Key words

Walnuts: Serum enzymes: Antioxidant defense system: Malondialdehyde: Rats

*AST, aspartate aminotransferase; ALT, alanin aminotransferase; GGT, gamma glutamyl transpeptidase; LDH, lactate dehydrogenase; ADS, antioxidant defense systems; GSH, reduced glutathione; GR, glutathione reductase; SOD, superoxide dismutase; GST, glutathione-S-transferase; CAT, catalase; GPx, glutathione peroxidase; MDA, Malondialdehyde;

Poster No. 16

Selenium reduces oxidative stress, apoptosis and Ca^{2+} entry in dorsal root ganglion neurons of diabetic rats: Involvement of TRPV1 channels

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Abstract

Neuropathic pain can arise from a wide variety injury to peripheral, including metabolic disorders, traumatic injury, inflammation, and neurotoxicity, and is characterized by spontaneous pain, hyperalgesia and allodynia which can persist long after the initial injury is resolved. TRPV1 is a Ca^{2+} permeable non-selective channel expressed in sensory neurons. Moreover, activation of TRPV1 during oxidative stress has been linked to cell death. Selenium has been considered a potent antioxidant that detoxifies a variety of reactive oxygen species in many neurological diseases. In addtion recently we observed modulator role of selenium on TRP channels in dorsal root ganglin (DRG) neuron of rtas. In order to better characterize the actions of selenium in the peripheral pain, we tested the effects of selenium on apoptosis, oxidative stress and calcium entry through TRPV1 channel in the DRG neuron of streptozotcin (STZ)- induced diabetic rats.

Sixty rats were randomly divided into four groups. First group was used as control. Second group used as diabetic. Third and fourth groups received selenium and melatonin, respectively. Melatonin and selenium were intraperitonealy given to diabetic rats constituting the fifth (STZ+melatonin) and sixth (STZ+Se) group. Diabetes was induced using a single dose of intraperitoneal STZ. On 14th day of DRG samples were freshly taken from all animals. The neurons were stimulated through TRPV1 channel agonist, capsaicin. We observed modulator role of selenium on apoptosis, caspase 3, caspase 9, mitochondrial depolarization and cytosolic ROS production values in the DRG neurons.

In conclusion, in our diabetes experimental model, TRPV1 channels are involved in the Ca^{2+} entry-induced neuronal death, and modulation of this channel activity by selenium pretreatment may account for their neuroprotective activity against apoptosis and the Ca^{2+} entry.

Keywords

Apoptosis; Calcium ion entry; TRPV1 channels; Selenium; Diabetes.

Poster No. 17

Melatonin and selenium reduce plasma cytokine, brain and erythrocyte oxidative stress levels in diabetic rats

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Abstract

Hyperglycemia plays a critical role in the development and progression of diabetic brain injury via the increased oxidative stress. Melatonin and selenium have been considered a potent antioxidant that detoxifies a variety of reactive oxygen species in many neurological diseases. Erythrocytes and the brain may be vulnerable to oxidative stress induced by diabetes and become exposed to ROS continuously generated via the auto-oxidation of hemoglobin and polyunsaturated fatty acids. Because of their high rate of oxygen consumption, high content of PUFAs and poor enzymatic antioxidant defense, the brain and erythrocytes exhibit increased vulnerability to diabetes-induced oxidative stress. The aim of this study was to evaluate modulator roles of melatonin and selenium on oxidative stress and cytokine levels in blood and brain of streptozotocin (STZ)-induced diabetic rats.

Sixty rats were randomly divided into four groups. First group was used as control. Second group used as diabetic. Third and fourth groups received selenium and melatonin, respectively. Melatonin and selenium were intraperitonealy given to diabetic rats constituting the fifth (STZ+melatonin) and sixth (STZ+Se) group. Diabetes was induced using a single dose of intraperitoneal STZ. On 14th day of blood and brain samples were taken from all animals.

Lipid peroxidation, IL-1β and IL-4 levels were increased in STZ although they were decreased by melatonin and selenium treatments. Glutathione peroxidase (GSH-Px) and reduced glutathione (GSH) in erythrocytes and brain, total antioxidant

status (TAS), vitamin A, beta-carotene and vitamin E concentrations in brain were lower in STZ group than in control. However, the GSH, GSH-Px, TAS and vitamin levels were mostly recovered by melatonin and selenium treatments.

In conclusion, we observed those melatonin and selenium administrations supplementations are beneficial on oxidative stress level and cytokine production in the blood and brain of diabetic rats by modulating antioxidant system.

Keywords
Diabetes, Brain; Erythrocytes; Oxidative stress; Cytokine; Antioxidants.

Poster No. 18

Riboflavin and vitamin E increase brain calcium and antioxidant, and microsomal Ca2+-ATP-ase values in rat headache model induced by glyceryl trinitrate

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The essential use field of riboflavin is prevention of migraine headaches although its effect on migraine is considered to be associated with the increased mitochondrial energy metabolism. Oxidative stress is also important in migraine pathophysiology and vitamin E is the strong antioxidant in the nature and its analgesic effect is not completely clear in migraine. We aimed to investigate the effects of glyceryl trinitrate (GTN)-sourced exogen NO particularly and also riboflavin and/or vitamin E on involved in the headache model induced via glyceryl trinitrate (GTN)-sourced exogen NO on total brain calcium level and microsomal membrane Ca(2+)-ATPase (MMCA) levels.

GTN infusion is a reliable method to provoke migraine-like headaches in humans. GTN resulted in significant increase in brain cortex and microsomal lipid peroxidation levels although brain calcium, vitamin A, vitamin C and vitamin E, and brain microsomal reduced glutathione (GSH), glutathione peroxidase (GSH-Px) and plasma membrane Ca2+-ATPase values decreased by GTN. The lipid peroxidation, GSH, vitamin A, β-carotene, vitamin C and vitamin E and calcium concentrations, and GSH-Px and the Ca2+-ATPase activities were increased both by riboflavin and vitamin E treatments. Brain calcium and vitamin A concentrations were increased through vitamin E only

In conclusion, riboflavin and vitamin E caused protective effects on the GTN-induced brain injury by inhibiting free radical production, regulation of calcium-dependent processes and supporting antioxidant redox system. However, effects of vitamin E on the values seem more important than in riboflavin.

Keywords
Migraine, antioxidants, oxidative stress, calcium, vitamin E, riboflavin.

Poster No. 19

Protective effect of riboflavin and selenium on brain microsomal Ca2+-ATP-ase and oxidative damage caused by glyceryl trinitrate as a rat headache model

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Migraine headaches are considered to be associated with the increased mitochondrial energy metabolism. Mitochondrial oxidative stress is also important in migraine headache pathophysiology although riboflavin and selenium (Se) induced modulator role on mitochondrial oxidative stress in brain. We aimed to determine the effects of Se with/without riboflavin on microsomal membrane Ca^{2+}-ATPase (MMCA), lipid peroxidation, antioxidant and electroencephalography (EEG) values in glyceryl trinitrate (GTN)-induced brain injury rats.

Thirty-two rats were randomly divided into four groups. First group was used as control although second group was GTN group. Se and Se plus oral riboflavin were given to rats constituting the third and fourth groups for 10 days before GTN administration. Second, third and fourth groups received GTN for induction of headache. Ten hours after administration of GTN, EEG records and brain cortex samples were taken all groups. Brain cortex microsomes were obtained from the brain samples.

The brain and microsomal lipid peroxidation levels were higher in GTN group than in control group whereas they were decreased by selenium and selenium+riboflavin treatments. Vitamin A,

vitamin C, vitamin E, reduced glutathione (GSH) concentrations of brain and MMCA, GSH and glutathione peroxidase values of microsomes were decreased by the GTN administration although the values and β-carotene concentrations were increased by Se and Se+riboflavin treatments. There was no significant change in EEG records of four groups.

In conclusion, Se with/without riboflavin administration caused protection against the GTN-induced brain oxidative toxicity by inhibiting free radicals and modulation of MMCA activity, and supporting antioxidant redox system.

Keywords
Antioxidants, brain, Ca^{2+}-ATPase, oxidative stress, riboflavin, selenium.

Poster No. 20

Mechanosensitive TRP channels regulates Ca^{2+} signaling in osteoclastogenesis

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Objectives
Bone remodeling and maintenance require a fine balance between bone formation of osteoblasts and resorption of osteoclasts. Therefore, various skeletal disorders cause by imbalanced differentiation and activities of these cells. RANKL (receptor activator of NF-kB ligand) induces Ca^{2+} oscillations and activates NFATc1 (nuclear factor of activated T cells 1) during osteoclast differentiation. Although Ca^{2+} oscillations play a key role for osteoclastogenesis, the molecular identification of Ca^{2+} influx via mechanosensitive calcium channels located on the plasma membrane for the generation of Ca^{2+} oscillation are not well known.

Methods
We investigated the expression and functional role of mechanosensitive TRP (transient receptor potential) channels on Ca^{2+} signaling during osteoclastogenesis in bone marrow macrophage (BMM) cells using TRPC3 and TRPC6 deficient ($TRPC3^{-/-}$ and $TRPC6^{-/-}$) mice.

Results
Deletion of TRPC3 and TRPC6 affected the bone density and Ca^{2+} entry in BMMs. These mechanosensitive TRPC channels had effects on the expression of NFATc1 and activation of ERK pathway.

Conclusion
These results suggest that mechanosensitive TRP channels play a key role in the Ca^{2+} signaling of osteoclastogenesis. This research was supported by the Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education, Science and Technology (MEST) (NRF-2012R1A1A2007673).

Poster No. 21

Hypotonic stress induces RANKL via TRPM3 and TRPV4 in human PDL cells

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Objectives
Bone remodeling occurs in response to various types of mechanical stress. The periodontal ligament (PDL) plays an important role in mechanical stress-mediated alveolar bone remodeling. However, the underlying mechanism at the cellular level has not been extensively studied.

Methods
We investigated the effect of osmotic stress on the expression of bone remodeling factors, including receptor activator of nuclear factor-kappa B (NF-κB) ligand (RANKL) and osteoprotegerin (OPG), and its upstream signaling pathway in primary human PDL cells.

Results
Hypotonic stress induced the expression of RANKL but not OPG. It also increased intracellular Ca^{2+} concentration ($[Ca^{2+}]_i$). Extracellular Ca^{2+} depletion and non-specific plasma membrane Ca^{2+} channel blockers completely inhibited the increase in both RANKL expression and $[Ca^{2+}]_i$. We identified the expression and activation of transient receptor potential (TRP) M3 and TRPV4 channels in PDL cells. Pregnenolone sulfate and 4α-phorbol 12,13-didecanoate, agonists of TRPM3 and TRPV4, augmented Ca^{2+} influx. Both pharmacological (2-aminoethoxydiphenyl borate (2APB) and ruthenium red (RR)) and genetic (small interfering RNA) inhibitors of TRPM3 and TRPV4 reduced the hypotonic stress-mediated increase in $[Ca^{2+}]_i$ and RANKL expression.

Conclusion
Our study shows that hypotonic stress induced

RANKL mRNA expression via TRPM3- and TRPV4-mediated extracellular Ca^{2+} influx. This signaling pathway in PDL cells may play a critical role in mechanical stress-mediated alveolar bone remodeling.

Poster No. 22

Effect of chemotherapy exposure prior to pregnancy on fetal brain tissue and the potential protective role of quercetin

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Purpose

The central nervous system, possessing relatively weak endogenous and exogenous antioxidant capabilities, is particularly sensitive to oxidative stress induced by the presence of free radicals. The flavonoid Quercetin (QR) is known to enhance cellular antioxidant potential. We examined markers of oxidative stress and evaluated antioxidant capacity in fetal brain tissues following exposure of the mother to chemotherapeutic agents known to induce oxidative stress.

Methods

Rats were treated with the chemotherapeutic drugs Cyclophosphamide (CYC; 27 mg/kg) and Doxorubicin (DOX; 1.8 mg/kg) applied in a single intraperitoneal dose once every 3 weeks for 10 weeks. QR was administered at a dose of 10 mg/kg/day by oral gavage. 48 hours following the experimental chemotherapy exposure, female rats were transferred to cages containing male rats for mating. Fetal brain tissues were removed from fetuses extracted by cesarean section on the 20th day of gestation for evaluation of antioxidant parameters.

Results

A significant increase in superoxide dismutase (SOD) and malondialdehyde (MDA) activity was observed in CYC and DOX treatment groups relative to the control group ($p<0.05$). Similarly, carnitine acylcarnitine translocase (CAT) and Glutathione (GSH) activity was significantly reduced in the CYC and DOX groups relative to the control group ($p<0.05$).

Conclusions

Our results indicate that the use of chemotherapeutic drugs before pregnancy can result oxidative damage to fetal brain tissue. Therefore, women who have been exposed to chemotherapy and may become pregnant should be treated with antioxidant compounds such as QR to reduce the risk of damage to fetal brain tissues.

Reference

1. Agarwal A, Saleh RA, Bedaiwy MA (2003) Role of reactive oxygen species in the pathophysiology of human reproduction. Fertil. Steril 79, 829–843.
2. Bolzan AD, Bianchi MS, Bianchi NO (1997) Superoxide Dismutase, Catalase and Glutatione Peroxidase Activities in Human Blood: Influence of Sex, Age and Cigarette Smoking. Clin Biochem 30(6):449-454
3. Fadillioğlu E, Erdoğan H, Polat A, Emre H (2002) Renal antioksidant status in rats with hypertension ınduced by N sup omega Nitro-L-Arginine Methyl Ester. Kidney Blood Pres Res. 25(4):211–216.

Poster No. 23

The role of Δ9-THC on oxidative stress status of brain and cerebellum in type-2 diabetes

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In this study, we aimed to explore the curative effect on oxidative stress of Δ^9THC in the brain and cerebellum of type-2 diabetic rats. 8-10 week-old Sprague-Dawley rats were divided into 4 groups. Group I: Physiological saline was administered intraperitoneally (i.p) (n=7). Group II: Rats that are given Δ^9-THC for 7 days (3 mg/kg/day) (n=6) (i.p). Group III: Streptozotocin (STZ, 65 mg/kg)+Nicotinamide (NAD, 85 mg/kg) (n=7) (i.p). Group IV: Diabetic rats that are given Δ^9-THC (3 mg/kg/day) for 7 days (n=7) (i.p). Malondialdehyde (MDA) and reduced glutathione (GSH) levels, superoxide dismutase (SOD) and catalase (CAT) activities were measured in brain and cerebellum tissue samples of rats. The results showed that GSH levels of the brain and cerebellum were non-significantly decreased in the diabetic rats as compared with the control group. The GSH levels of the brain and cerebellum were non-significantly increased in the diabetes+Δ^9-THC group when compared with the diabetic group. It was found that the increased MDA levels of the brain and cerebellum in diabetic rats were decreased by treatment with Δ^9-THC. In the diabetic

rats treated with Δ^9-THC, the SOD activities of the brain and cerebellum were elevated as compared with diabetes group. The brain and cerebellum CAT activities were non-significantly increased in the diabetic rats treated with Δ^9-THC, as compared with the diabetes group. In conclusion, it is suggested that Δ^9-THC has curative effects against oxidative stress in type-2 diabetic rats. Δ^9-THC may be conferred in diabetes treatment with an appropriate dose due to its antioxidant effects.

Poster No. 24

The effects of phrenic nerve degeneration by axotomy and crush on the electrical activities of diaphragm muscles of rats

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Abstract

The aim of this study was to investigate the effect of axotomy and crush related degeneration on the electrical activities of diaphragm muscle strips of experimental rats.

The animals in the first group were not crushed or axotomized and served as controls. Phrenic nerves of the rats in the second and third groups were crushed or axotomized in the diaphragm muscle

Resting membrane potential (RMP) was decreased significantly in both Crush and axotomy of diaphragm muscle strips of experimental rats ($p<0.05$). Depolarization time (TDEP) and half-repolarization (½ RT) time were significantly prolonged in Crush and axotomy rats ($p<0.05$).

Crushing or axotomizing the phrenic nerves may produce electrical activities in the diaphragm muscle of the rat by Depolarization time and half-repolarization time prolonged in Crush and axotomy rats.

Keywords

Electro-biophysics, diaphragm muscle, rats

References

1. Lee M, Doolabh VB, Mackinnon SE, Jost S: FK506 promotes functional recovery in crushed rat sciatic nerve. Muscle Nerve 2000, 23(4):633–640.
2. Rotshenker S: Wallerian degeneration: the innate-immune response to traumatic nerve injury. J Neuroinflammation 2011, 8:109.
3. Hyunkyoung Lee, Se-Young Choi, Seog Bae Oh, Kyungpyo Park, Joong Soo Kim, and Sung Joong Lee* Damaged Neuronal Cells Induce Inflammatory Gene Expression in Schwann Cells: Implication in the Wallerian Degeneration International Journal of Oral Biology, Vol. 31, No. 3, September 30 2006, p. 87-92. 21.
4. Greer JJ, Allan DW, Martin-Caraballo M, Lemke RP (1999). An overview of phrenic nevre and diaphragm muscle development in perinatal rat. J Appl Physiol, 86(3),779-860.
5. Shındoh C, Hıda W, Kurosawa H, Ebıhara S, Kıkuchı Y, Takıshımaa T, et al. Effects of unilateral phrenic nerve denervation on diaphragm contractility in rat. Tohoku J Exp Med 1994; 173: 291–302.

Poster No. 25

Melatonin modulates antioxidant vitamin and oxidative stress values in brain and blood of traumatic brain injury-induced rats

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Free radicals induced by traumatic brain injury (TBI) have deleterious effects on the function and antioxidant vitamin levels of several organ systems including brain. Melatonin possesses antioxidant effect on antioxidant enzyme and vitamins by regulating several physiological functions such as mitochondrial and phagocytic activities. We investigated effects of melatonin on antioxidant and oxidant values in brain cortex and blood of TBI-induced rats.

Thirty-two rats were equally divided into four groups. First and second groups were used as control and melatonin groups, respectively. TBI and TBI+melatonin were induced to the rats constituting second and fourth groups, respectively. The melatonin was given to the animals at 1 h after TBI induction. The brain cortex, erythrocytes and plasma samples were taken from the four groups.

TBI resulted in significant increase in plasma, erythrocytes and brain lipid peroxidation levels although their levels were decreased by melatonin treatment. The brain b-carotene, vitamin C, vitamin E, GSH concentrations, and erythrocyte GSH, plasma vitamin C levels were decreased by the TBI whereas they were increased in TBI+melatonin group. The brain b-carotene and vitamin C, and erythrocyte GSH, plasma vitamin C levels in fourth groups were increased as compared to control and TBI groups. Brain vitamin A and glutathione peroxidase values were not changed by TBI.

In conclusion, melatonin seems to have protective effects on the TBI-induced brain and blood toxicity by inhibiting free radical supporting antioxidant vitamin redox system.

Poster No. 26

Melatonin reduces oxidative stress, apoptosis and Ca^{2+} entry in hippocampus of traumatic brain injury-induced rats: Involvement of TRPM2 channels

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Melatonin is very effective reactive oxygen species (ROS) scavenger antioxidant, and also acts through a direct reaction with free radicals. Ca^{2+} entry induced by traumatic brain injury (TBI) has been deleterious effects on function of hippocampus in human. Transient receptor potential melastatin type 2 (TRPM2) is a Ca^{2+} permeable non-selective channel expressed in hippocampal neurons. Moreover, activation of TRPM2 during oxidative stress has been linked to cell death. Despite the importance of oxidative stress in TBI, its role in on apoptosis, Ca^{2+} entry and TRPM2 modulation is poorly understood in TBI. Therefore, we tested the effects of melatonin on apoptosis, oxidative stress and TRPM2 channel activity in the hippocampal neuron of TBI-induced rats.

Thirty-six rats were divided into four groups. First and second groups were used as control and melatonin groups, respectively. TBI and TBI+melatonin were induced to rats constituting third and fourth groups, respectively. The melatonin was given to animals in second and forth groups at 1 h after brain trauma. Hippocampal neurons were freshly isolated from rats of four groups and the neurons were also incubated for 1 min with non-specific TRPM2 channel blocker (2-aminoethyl diphenylborinate, 2-APB) and then they were stimulated by cumene hydroperoxide.

Caspase-3, caspase-9, apoptosis, intracellular ROS production, mitochondrial depolarization and intracellular free Ca^{2+} ($[Ca^{2+}](i)$) values were high in the TBI group, although the values were low in TBI+melatonin group. The $[Ca^{2+}](i)$ concentration was also decreased in the four groups by 2-APB incubations.

In conclusion, in our TBI experimental model, TRPM2 channels are involved in the Ca^{2+} entry-induced neuronal death, and negative modulation of this channel activity by melatonin pretreatment may account for their neuroprotective activity against oxidative stress, apoptosis and Ca^{2+} entry via TRPM2 channels.

Acknowledgement

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Poster No. 27

Effects of *Hypericum perforatum* modulates oxidative stress and calcium entry through TRPM2 channels in dorsal root ganglion in spinal cord injury-induced rats

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In our study, we aimed to investigate the effects of HP on oxidative stress values and Ca signaling occurred on dorsal root ganglion cells after primary spinal cord injury, and determine the changes in the inflammatory period of injured spinal tissue.

In the study, 36 Winstar Albino rats, aged between 12-16 weeks, weighted 250-350 g were used. Rats were divided into 4 groups as: 1- control (n=8); 2- HP given (n=8), 3- SCI (n=10), 4-SCI + HP given (n=10). In the control group, only cell liveliness, Ca^{+2} signaling, MDA, GSH, and GSH-Px values of DRG cells were evaluated without any application. HP was administered as HP extract, 30 mg/kg via gavaj. In the spinal cord injured group, injury was formed as appliying vascular clip to spinal cord for a minute. In the SCI + HP group, spinal cord injury was occurred in the same method and 30 mg/kg HP was given via gavaj for 3 days. HP was beginned to given one hour after the trauma. Same evaluations were done in the other groups with the control group. Evaluations were done daily on the rats selected randomly.

All groups were followed in the same environmental conditions, with same nutrition for 3 days, and spinal cords were taken out after sacrified. DRG cells were isolated. Intracellular Ca amount was measured. Lipid peroxidation analysis was done. Measurement of antioxidant enzyme activity (GSH and GSH-Px analysis) were done. Cell liveliness analysis and protein measurements were done.

According to the statistical analysis results, a protective effect of HP on oxidative stress, that occurred after SCI, and significant reduction on the amount of Ca were seen. Besides this, the rate of liveliness of DRG cell was statistically higher in the HP given rats than the SCI group. The results were statistically significant.

In conclusion, we found a statistically significant protective effect of HP on injured spinal cord, especially on seconder injuries.

Acknowledgement

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Poster No. 28

The protective effect of quercetin on oxidative stress-induced by doxorubicin and cyclophosphamide in female's kidney and liver tissues

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Purpose

Although both of Doxorubicin (DOX) and cyclophosphamide (CYC) are used an anticancer drugs, they have some undesired effect on noncancerous tissue, resulting from causing oxidative stress (1). Quercetin (QR) was shown probably to play a role as antioxidant (2). Hypothesis of the current study was that QR would protect to the toxic effects of drugs applied prior to pregnancy.

Materials and Method: Rats were treated with CYC (27 mg/kg) and/or DOX (1.8 mg/kg) applied in a single intraperitoneal dose once every 3 weeks for 10 weeks and/or QR (10 mg/kg/day) (3). Eventually, six groups were set up as an control (CONT), QR, CYC, DOX, CYC+QR, and DOX+QR. Maternal kidney and liver tissues were removed after the gestation for evaluation of oxidative stress parameters.

Results

DOX gave rise to elevate the MDA level compared to CONT and only QR groups in kidney tissue ($p<0.05$). In the liver tissue, both of CYC and DOX lead to augment the MDA levels ($p<0.05$). DOX gave rise to decrease GSH-Px level in the liver tissue ($p<0.05$). Elevated MDA level by DOX and CYC was restored by QR ($p<0.05$). The decline of GSH-Px level by the DOX and CYC treatment was restored by QR treatment ($p<0.05$).

Conclusion

The oxidative stress resulting from an elevation of MDA and decreasing of GSH-Px might play an important role in DOX and CYC toxicities on liver and kidney tissues. QR might have an therapeutic effect on oxidative stress-induced by DOX and CYC. Quercetin maintains antioxidant defenses and reduces kidney and liver oxidative damage.

Reference

1. Fariasl JW, Furtado FS, Guimarães SD, Silva Filho AR, Vasconcelos PR 2011. Oxidative stress parameters in women with breast cancer undergoing neoadjuvant chemotherapy and treated with nutraceutical doses of oral glutamine. Acta Cir Bras.26: (1):82-7.
2. Gutteridge JM 1995. Lipid Peroxidation and Antioxidants As Biomarkers of Tissue Damage.Clin Chem. 41(12): 1819-1828.
3. Vaisheva F, Delbes G, Hales BF, Robaire B 2007. Effects of the chemotherapeutic agents for non-hodgkin lymphoma, cyclophosphamide, doxorubicin, vincristine, and prednisone (CHOP), on the male rat reproductive system and progeny outcome. Journal of Andrology. 28(4):578-87

Poster No. 29

N-acetylcysteine reduces oxidative stress, apoptosis and calcium entry in the neutrophils of patients with polycystic ovary syndrome: Involvement of TRPV1 and TRPM2 channels

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Abstract

Polycystic ovary syndrome (PCOS) is a common inflammatory and oxidant disease with an uncertain pathogenesis. Recent reports indicated that N-acetylcysteine (NAC) decreased oxidative stress, intracellular free Ca^{2+} $[Ca^{2+}]i$ and apoptosis values in human neutrophil. We aimed to investigate the effects of NAC on apoptosis, oxidative stress and Ca^{2+} entry through TRPV1 and TRPM2 channels in neutrophils from patients with PCOS.

Neutrophils isolated from PCOS group were investigated in three settings: (1) after incubation with TRPV1 channel blocker capsazepine (CPZ) or TRPM2 channel blocker 2-aminoethyl

diphenylborinate (2-APB), (2) after supplementation with NAC (for 6 weeks), and (3) with combination (CPZ, 2-APB+NAC) exposure. The neutrophils in TRPM2 and TRPV1 experiments were stimulated by fMLP and capsaicin (CAP) as Ca^{2+}-concentration agonists, respectively.

Neutrophil lipid peroxidation (LP) and TRPV1 agonist capsaicin (CAP)-induced-$[Ca^{2+}]_i$ concentrations were reduced by TRPV1 channel blocker capsazepine (CPZ) and NAC treatments. However, the $[Ca^{2+}]_i$ concentration did not change by TRPM2 agonist (fMLP) stimulation. Neutrophil LP, apoptosis, caspase-3, caspase-9, ROS production and mitochondrial depolarization values were decreased by NAC treatments although neutrophil glutathione peroxidase and reduced glutathione values were increased by the NAC treatments. Serum LP, LH, free testosterone, insulin, IL-b and Hcy levels were decreased by NAC treatment although serum vitamin A, ß- carotene, vitamin E and total antioxidant status were increased by the NAC treatment.

In conclusion, NAC reduced oxidative stress, apoptosis, cytokine and Ca^{2+} entry through TRPV1 channel, which provide supportive evidence that oxidative stress and Ca^{2+} entry through TRPV1 channel plays a key role in etiology of PCOS.

Keywords
Antioxidant, Inflammation, N-acetylcysteine, Polycystic ovary syndrome, TRPV1 channel; Neutrophil.

Poster No. 30

Effects of combination treatment with amiodarone and white cabbage extract on rat spleen

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Cabbage (*Brassica oleracea* L. var. capitata) is one of the most important vegetables grown worldwide. Numerous studies report protective effects of cabbage against many chronic diseases, several cancer types, cardiovascular, cerebrovascular, ocular and many neurological diseases and peptic ulcers. It may protect from the side effects of amiodarone which is used for the treatment of arrhythmias. In this study, we aimed to investigate the effects of amiodarone and cabbage extract on rat spleen. Female Sprague-Dawley rats were randomly divided into four groups as follows; control group receiving corn oil; cabbage extract (500 mg/kg/day) given group; amiodarone (100 mg/kg/day) given group; amiodaron + cabbage extract (in same dose) given group. Cabbage extract and amiodarone were given by gavage to rats for 7 days. Amiodarone was given to the animals one hour after cabbage extract administration during the experimental period. All animals were fasted overnight and on the 8th day they were sacrificed under anesthesia. Tissue samples were taken from animals and homogenized in saline. Oxidant-antioxidant biochemical parameters were determined in homogenized tissue samples. Results were evaluated statistically and discussed.

Poster No. 31

Changes of the sialic acid levels in acetaminophen-induced hepatotoxicity following blueberry treatment

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Drug induced liver injury have become one of the major causes of morbidity and mortality in the world [1]. Acetaminophen (APAP) is the most widely used over-the-counter or prescription analgesic and antipyretic in the world [2,3]. Researchers have been reported sialic acid concentrations were changed in liver diseases and, the changes in protein glycosylation play an important role in the pathogenesis and progression of liver diseases [4,5]. Blueberry has strong antioxidant activity and it is also effective in activating hepatic antioxidant components [6]. The aim of this study was to assess the effects of blueberry on the changes in the sialylation of glycoproteins by measuring total (TSA) and lipid bound sialic acid (LSA) concentration in the serum and liver tissue in acetaminophen-induced hepatotoxicity. During the experimental period, APAP (250 mg/kg body weight per day) and blueberry (60 mg/kg body weight per day) were administered to the rats by oral gavage. The levels of lipid bound sialic acid and total sialic acid in were determined liver tissue and serum. APAP hepatotoxicity was manifested by an increase TSA and LSA levels in liver tissue and serum. The administration of blueberry significantly prevented APAP-induced alterations in the levels

of diagnostic marker enzymes, TSA and LSA levels in the experimental groups of rats. Blueberry has protective effects on APAP-induced hepatotoxicity by reducing sialic acid levels. This study provides some examples of the significance of sialic acids in normal and hepatotoxicity states. This study can provide great opportunities for new researches.

References

1. Parmar SR, Vashrambhai PH, Kalia K. Hepatoprotective activity of some plants extract against paracetamol induced hepatotoxicity in rats. J Herb Med and Toxicol 2010; 4(2) 101-106.
2. Chun LJ, Tong MJ, Busuttil RW, Hiatt JR. Acetaminophen hepatotoxicity and acute liver failure. J Clin Gastroenterol. 2009; 43(4):342-9.
3. Ben-Shachar R, Chen Y, Luo S, Hartman C, Reed M, Nijhout HF. The biochemistry of acetaminophen hepatotoxicity and rescue: a mathematical model. Theor Biol Med Model. 2012; 19(9):55.
4. Varki A. Sialic acids in human health and Disease. Trends in Molecular Medicine 2008; 14(8):
5. Gruszewska E, Cylwik B, Panasiuk A Szmitkowski M, Flisiak R Chrostek L. Total and Free Serum Sialic Acid Concentration in Liver Diseases. Biomed Res Int 2014 (in press).
6. Wang YP, Cheng ML, Zhang BF, Mu M, Zhou MY, Wu J, Li CX. Effect of blueberry on hepatic and immunological functions in mice. Hepatobiliary Pancreat Dis Int 2010; 9(2):164-8.

Poster No. 32

Determination of Effects of Midkine on Wound Healing and Oxidative Stress of Experimental Diabetic and Healthy Rats

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Midkine plays a role in the control of tissue repairing and development of new tissue (1, 2), and it is an important agent in the regulation of inflammation (3). In the present study, effect of midkine was investigated in the experimental wound healing of rats. 12 Wistar Albino rats are divided two groups as 6 healthy and 6 diabetic positive controls. Remaining 96 rats are divided four groups; healthy group, healhty+midkine group (10 ng/mg, SC, every other day), diabetic group (STZ, 40 mg/kg, SC) (4) and diabetic+midkine group (10 ng/mg, SC, every other day). After 6 rats from per groups were created wound, they were euthanized on 3., 7., 14. and 28. days and their wound skin were removed. Obtained samples were homogenized and level of Matrix Metalloproteinase 8 (MMP8), Transforming Growth Factor Beta (TGFβ), Platelet Derived Growth Factor (PGDF) and Thiobarbituric Acid Reactive Substances (TBARS) were measured. Additionally, the wound skins were evaluated macroscopically. Levels of MMP8 and PDGF fluctuated in all groups and levels of TGFβ fluctuated only in diabetic groups, whereas TGFβ levels were higher than any other groups on 28. days in healhty+midkine group ($p<0.05$). Levels of TBARS decreased in healthy, diabetic and diabetic+midkine groups ($p<0.05$). Macroscopically, midkine groups better healed compared to other groups. Effects of midkine on oxidative stress (5) and growth factors (6) were reported. In conclusion, it may be stated that midkine accelerates to wound healing and influences to growth factors and oxidative status on wound tissues.

References

1. Sumi Y, Muramatsu H, Hata K, Ueda M, Muramatsu T. 2000. Midkine enhances early stages of collagen gel contraction. J Biochem 127: 247-251.
2. Muramatsu T. 2010. Midkine, a heparin-binding cytokine with multiple roles in development, repair and diseases, Proc Jpn Acad Ser B Phys Biol Sci 86(4): 410-25.
3. Muramatsu T. 2011. Midkine: A Promising molecule for drug development to treat diseases of the central nervous system, Curr Pharm Des 17(5): 410-23.
4. Sindelar DK, Havel PJ, Seeley RJ, Wilkinson CW, Woods SC, Schwartz MW. 1996. Low plasma leptin levels contribute to diabetic hyperphagia in rats, Diabetes 48: 1275-1280.
5. Kosugi T and Sato W. 2012. Midkine and kidney : Health and diseases, Nephrol Dial Transplant 27:16-21.
6. Zhao SI, Zhang YJ, Li MH, Zhang XL, Chen SL. 2014. Mesenchymal stem cells with overexpression of midkine enhance cell survival and attenuate cardiac dysfunction in a rat model of myocardial infarction, Stem Cell Research & Therapy 5(37): 1-13.

Poster No. 33

Neuroprotection induced by vitamin E against oxidative stress in hippocampal neurons:Involvement of TRPV1 channels and PMCA

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Poster No. 34

The Importance of Voltage Gated Channels in Breast Cancer

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Cancer metastasis into major organs, including liver, lung, brain and bone marrow is the major reason for death of patiens with cancer. Gradually increasing evidences showed that voltage-gated potassium channels play a key function in proliferation at various cell types including tumor cells. Identification of specific therapeutic targets is important prerequisite for treatment.

In this study we determined the role of Kv1.3 and Kv10.1 voltage gated potassium channels in breast cancer and its metastasis.

Blood samples were provided from Eskişehir Osmangazi University, Faculty of Medical, Department of General Surgery and Radiation Oncology. The total RNA was isolated from mononuclear cells which were derived from blood samples and determined Kv1.3 and Kv 10.1 gene expression levels by using Real Time PCR method.

The presence of Kv10.1 protein was determined from mononuclear cells which are isolated from patients with breast cancer, metastatic breast cancer and healthy people, but presence of Kv10.1 gene expression wasn't determined. Gene expression of Kv 1.3 significantly increased in patients with breast cancer and metastatic breast cancer more than healthy people.

Our results showed that there might be a potential role of Kv1.3 and Kv10.1 in molecular targeted therapy in breast cancer and its metastasis.

Poster No. 35

Evaluation of oxidative stress in regular and exhaustive exercise: the effects of spirulina

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This study investigated the effects of long-term spirulina supplementation in combination with moderate training on antioxidant enzyme activities and oxidative status in the plasma, liver, and muscle and muscular damage after exhaustive exercise in adult male rats.

Wistar rats were divided into six groups: control (CON), spirulina (SP), chronic exercise (CE), chronic exercise with spirulina (CES), exhaustive exercise (E), and exhaustive exercise with spirulina (ES). Spirulina (750 mg/kg) was orally administered to the SP, CES, and ES rats for 6weeks. The chronic exercise groups underwent swimming exercise for 1 h per day for 6 weeks. Animals from groups E and ES were subject to swimming-based exhaustive exercise stress. At the end of the study, creatine kinase (CK), the MB isoform of CK, lactate dehydrogenase, and uric acid levels were determined in the plasma, whereas malondialdehyde, myeloperoxidase, xanthine oxidase, superoxide dismutase, catalase, glutathione peroxidase and antioxidant activities were measured in plasma, liver tissue, and muscle tissue.

Spirulina supplementation led to a correction in the increase in plasma CK activity due to exhaustive exercise. Although chronic exercise increased plasma SOD activity, it promoted decreases in liver tissue XO and MDA levels as well as muscle tissue MDA levels. Exhaustive exercise reduced liver CAT levels, whereas plasma CAT levels increased.

Conclusively, we conclude that Spirulina platensis, a blue-green algae and food supplement, ameliorates increases in the plasma levels of CK, which is used as an indicator of exhaustive exercise-related muscular breakdown, probably by decreasing pre-oxidative MDA levels in skeletal muscle.

References

1. Powers SK, Jackson MJ. 2008. Exercise-induced oxidative stress: cellular mechanisms and impact on muscle force production. Physiol Rev 88: 1243-76.
2. Kalafati M, Jamurtas AZ, Nikolaidis, MG, Paschalis V, Theodorou AA, Sakellariou GK, Koutedakis Y, Kouretas D. 2010. Ergogenic and antioxidant effects of spirulina supplementation in humans. Med Sci Sports Exerc 42: 142-51.

Poster No. 36

Defining the total antioxidant status and oxidative stress indexes of propolis samples obtained from various phytogeographical locations in Turkey

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The composition of propolis, a resinous substance collected by honeybees from various plant sources, depends on time, vegetation, and the area of collection (1). The aim of the present study was examined the biological activities of propolis

samples obtained from different locations of Turkey: Artvin, Balikesir, Duzce, Edirne, Kahramanmaras, Mersin, Mugla, Nigde, Ordu, Sivas and Van. Propolis samples were extracted with specific methods and total antioxidant status, total oxidant status and oxidative stress index values were defined with *in vitro* analyses. These analyses were done with researching kits that newly developed be capable of extremely reliable, sensitive, rapid and simple according to other methods. As a result, the highest total antioxidant capacity was observed in propolis samples obtained from Artvin region (P<0,01). The results showed that total antioxidant capacities of propolis samples originated from different regions which could change according to various phytogeographic characteries of different locations in Turkey. Antioxidant effects of propolis depend on phenolic compounds that could change according to plant vegetation of propolis obtained from different areas (2).

References

1. Zahid N, Ali A, Siddiqui Y and Maqbool M. Efficacy of ethanolic extract of propolis in maintaining postharvest quality of dragon fruit during storage. Postharvest Biol Tec 2013; 79: 69–72.
2. Buratti S, Benedetti S, Cosio MS. Evaluation of the antioxidant power of honey, propolis and royal jelly by amperometric flow injection analysis. Talanta 2007; 71: 1387–1392.

Poster No. 37

Effect of alcoholic extract of tarantula cubensis (theranekron®) on serum thiobarbituric acid-reactive species concentrations in sheep

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Tarantula cubensis alcoholic extract is used in the treatment of gangrene, septicaemia, toxaemia etc. as homeopathic agent in the veterinary medicine (1). Free radical production increase in the wound, and lipid peroxidation is occurred (2). Hence, antioxidant treatment may be useful in the treatment of wound (3). *Thiobarbituric acid-reactive substances* levels are accepted as lipid peroxidation marker, which derived from unbalance between oxidants and antioxidants in the organism (4). The aim of the current research was to evaluate the effect of alcoholic extract of Tarantula cubensis on serum thiobarbituric acid-reactive species concentrations in sheep. Furthermore, it's effect on the hematological and biochemical values were determined. Six Akkaraman sheep were administered single dose (6 mL/sheep, SC) of alcoholic extract of Tarantula cubensis. Blood samples were obtained before (0 hour, control) and 2, 4, 8, 12, 24 and 48 hours after administration. Serum thiobarbituric acid-reactive species concentrations were measured by ELISA reader. The concentrations of biochemical and hemogram values were measured by autoanalyzer and blood cell counter, respectively. Alcoholic extract of Tarantula cubensis dramatically decreased on serum thiobarbituric acid-reactive species con-centrations in sheep but no statistically significant. In addition, it had no any negative effect on the hematological and biochemical values. It is stated that alcoholic extract of Tarantula cubensis may cause antioxidant effect and it may be accepted safe in sheep when evaluation of short time duration was considered.

References

1. Richardson-Boedler C. 2002. The brown spider Loxosceles laeta: source of the remedy Tarentula cubensis?, Homeopathy. 91(3):166-170.
2. Kılıc C, Peker EGG, Acarturk F, Kılıcaslan SM, Coskun Cevher S. 2013. Investigation of the effects of local glutathione and chitosan administration on incisional oral mucosal wound healing in rabbits, Colloids Surf B Biointerfaces. 112, 499-507.
3. Özkorkmaz EG, Özay Y, 2009. Yara iyileşmesi ve yara iyileş¬mesinde kullanılan bazı bitkiler. Türk Bilimsel Derlemeler Dergisi, 2, 63-67.
4. Lykkesfeldt J. 2007. Malondialdehyde as biomarker of oxidative damage to lipids caused by smoking. Clinica Chimica Acta. 380(1-2): 50-58.

Poster No. 38

Effect of *Corynebacterium cutis* Lysate (Ultra-Corn®) on Serum Oxidative Stress and Plasma Prostaglandin F2α Metabolite Levels

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Corynebacterium cutis lysate (CCL), a commercial product, increases the nonspecific immune response. It is used in veterinary medicine as an immunostimulant against infections (1). A balance between oxidants and antioxidants is present in the cell, however, unbalance caused by increased production of oxidizing species leads to oxidative stress and lipid peroxidation. The products of immune reactions in the organism are among the endogenous oxidants. Thiobarbituric acid-reactive substances (TBARS) or malondialdehyde levels are measured as lipid peroxidation markers (2). The aim of this study was to determine the effect of CCL on serum TBARS and plasma 13,14-dihydro-15-keto-prostaglandinF2α (PGM) levels in sheep. Six Merino crossbred ewes were used in this study. A dose of 8 mg (0.4 mL) of commercial CCL was

subcutaneously injected to each of the ewes. Blood specimens were taken from the sheep prior to injection (day 0, control) and after the injection on days 1., 2., 3., and 4. The levels of serum TBARS and plasma PGM were determined using an ELISA reader. Biochemical and hemogram values were measured by autoanalyzer and blood cell counter, respectively. An increase ($P<0.05$) in the levels of plasma PGM and serum cholesterol was detected when compared to the control samples, but there was no statistically significant ($P>0.05$) change in the other parameters. In conclusion, CCL has no effect on the oxidative status and number of blood cells and organ (heart, liver and kidney) damage markers in sheep and it may increase plasma PGM level by stimulating the immune system.

References

1. Selfarma. 2014. http://www.selfarma.com.tr/?p=995, Accessed at: 29.04.2014.
2. Lykkesfeldt J. 2007. Malondialdehyde as biomarker of oxidative damage to lipids caused by smoking. Clinica Chimica Acta. 380(1-2): 50-58.

Poster No. 39

The effect of tannic acid in the monosodium glutamate induced oxidative stress in rats

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Monosodium glutamate (MSG) is commonly used as a flavor enhancer in fast food industry. Previous studies show that MSG used in food has effects increasing oxidative stress on different organs and systems. Therefore, in this study, we were planned to investigate the role of tannic acid against monosodium glutamate induced oxidative stress in rats.

In our study, 28 female Sprague Dawley rats were divided into 4 groups (n=7). The first group of saline, the second group of tannic acid (50 mg / kg), the third group of monosodium glutamate (2g/ kg), the fourth group tannic acid and monosodium glutamate administered intraperitoneally. At the end of the experiment, brain, kidney and liver tissue samples were collected. Results of activity of SOD and MDA were determined.

SOD enzyme levels in brain, kidney and liver homogenates are not statistically significant difference between the groups. (respectively; p=0,135, p=0,491, p=0,809). MDA levels in kidney and liver enzymes were not determined statistically significant. (respectively; p=0,522 p=0,079). Brain homogenates showed a statistically significant decrease in MDA level comparing with the group treated with monosodium glutamate, the group treated with tannic acid ($p \leq 0.001$) and the goup treated with both monosodium glutamate and tannic acid ($p \leq 0.001$). Our study showed that tannic acid to be effective MDA levels in brain.

Key Words
Monosodium glutamate, Tannic Acid, SOD, MDA

Poster No. 40

The effect of zinc sulphate supplementation on the metallothionein levels in rat testes, kidney and heart tissue which applied ischemia-reperfusion

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Metallothioneins, as well as mediating physiological effects and intracellular zinc balance and and attracting attention are proteins with potent antioxidant. The aim of the present study was to search how zinc sulphate supplementation affects metallothionein levels testes, kidney and heart ischemia-reperfuison damage in rats.

Study was performed on the testes, kidney and heart tissue which obtain from 3 different Project, total 94 Wistar-Albino type adults male rats. Experimental protocols were approved by Selcuk University, Veterinary School, Ethics Committee.

Animals groups for testes: Control (T-Cont.), Sham (T-Sh.), Ischemia/reperfusion (T-I/R.) and Zinc supplemented Ischemia/reperfusion (T/Zn-I/R), for kidney: Control (K-Cont.), Sham (K-Sh), Ischemia/reperfusion (K-I/R), Zinc supplemented ischemia/reperfusion (K/Zn-I/R), for heart: Control (H-Cont), Heart ischemia/reperfusion (H-I/R) and Zinc supplemented ischemia/reperfusion (H/Zn-I/R) which totally were 11 groups. Sham groups testes, kidney and heart ischemia/reperfusion were performed under general anesthesia. For Zinc I/R groups, zinc supplemented 5 mg/kg/day for 3 week by intraperitoneally. After supplementations all were decapited and testes, heart and kidney tissues

taken. In mentioned tissue immunohistochemical staining procedures were conducted by rat metallothionein antibody. The stained preparations were photographed and metallothionein stained cells under a light microscope by counting and calculated the percentage of stained cells.

In the testes and kidney tissues, zinc supplementation has increased metallothionein stained cell number compared to the other groups ($p<0.05$). However, in the heart tissue, metallothionein levels were not different among the groups.

The results of present study show that zinc supplementation induces MT synthesis especially in kidney and testes ischemia-reperfusion and may have antioxidant activity by stimulating the synthesis metallothionein.

Poster No. 41

Diabetic neuropathy enhances oxidative stress-activated TRPM2 cation channel activity and its control by N-acetylcysteine in rat dorsal root ganglion

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Abstract

N-acetylcysteine (NAC) is a thiol-containing (sulphydryl donor) antioxidant, which contributes to regeneration of glutathione (GSH) and also acts through a direct reaction with free radicals. NAC may have a protective role on calcium influx through regulation of TRPM2 channels in the diabetic neurons. Therefore, we tested the effects of NAC on TRPM2 channel currents in DRG of diabetic rats.

Forty male rats divided into four groups. First and second groups were used as control and NAC groups. Diabetes was induced in third (DIAB) and fourth (DIAB+NAC) groups by intraperitoneal administration of streptozotocin (STZ, 65 mg/kg). After induction of diabetes, rats in fourth group received NAC. End of the 4 weeks, DRG neurons were freshly isolated from rats. In whole-cell patch clamp experiments, TRPM2 currents in the DRG induced diabetes via STZ were gated by H2O2. TRPM2 channels current densities, cytosolic free Ca^{2+} concentrations, and lipid peroxidation values in the neurons were higher in H_2O_2 and DIAB+H_2O_2 group than in controls; however GSH and GSH peroxidase (GSH-Px) values were decreased. DIAB+H_2O_2-induced TRPM2 channel gating was totally inhibited by extracellular NAC and partially inhibited by 2-ACA and aminoethyl diphenylborinate (2-APB). GSH-Px activity, lipid peroxidation and GSH levels in the DRG neurons were also modulated by NAC.

In conclusion, we observed a modulator role of NAC on Ca^{2+} influx through a TRPM2 channel in the diabetic DRG neurons. Since cytosolic oxidative stress and Ca^{2+} entry is a common feature of neuropathic pain, our findings are relevant to the etiology and treatment of diabetic pain neuropathology in DRG neurons.

Poster No. 42

Effects of prenatal restraint stress and morphine co-administration on vasopressin blood levels in rats female offspring

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Introduction

Stressful events during gestation have important effects on the later physical and mental health of the offspring. Morphine in contribution with stress can show conflicting effects on HPA axis. In the present study, the effect of contribution of prenatal morphine exposure and restraint stress on vasopressin plasma levels has been investigated in rat female pups.

Methods

Twenty pregnant rats divided into 4 groups (n=5, each), namely saline, morphine, stress-saline and stress-morphine. In the morphine/saline-stressed group, they were exposed to stress and received morphine/saline on gestational days 15, 16, and 17. The rats in saline and morphine groups received saline and morphine (0.5 ml) subcutaneously in the same days. On postnatal day 22 (P22), blood samples were collected to determine plasma vassopressin levels in female pups, using ELISA kit.

Results

Our data indicated that co-administration of restraint stress and morphine, increased vasopressin plasma levels in female pups. In this respect, significant differences were observed in

stress-morphine female pups (15.38 ± 1.65, SEM) in comparison to stress-saline female pups (4.11 ± 0.93, SEM), morphine female pups (6.58 ± 1.33, SEM) and saline female pups (4.93 ± 0.75, SEM).

Conclusion

Prenatal morphine exposure and stress make neuroendocrine changes in vasopressin plasma levels. Restrain stress potentiates excitatory effects of morphine on vasopressin plasma level probably due to interaction of morphine and stress on HPA axis.

Poster No. 43

Effects of alpha lipoic acid and 5-FU on oxidative stress values in hydrogen-peroxide-induced kidney cancer cells

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Introduction

renal cell cancers are seen 10000 people each year, which originate from kidney tissues during forming urine and filter the blood. Genetic and envorimental factors effect cancer initiation although the reasons of kidney cancer are not fully known yet. The aim of our study, antioxidative roles of alpha lipoic acid and 5-FU on kidney cancers during oxidative stress induction.

Material-method

MBDK cells were cultured in DMEM with spesific supplements under 37°C with 5%CO_2 condition. In order to determine the appropriate concentration, DNA damage agent applied different periods of time,100 µM H_2O_2 was determined by MTT assay. the protein concentration of cell groups were equalized before analysis. after that, caspase analysis and DNA laddering test were applied.

Results

Caspase activities were increased in a group treated with alpha lipoic acid compared to control group. In other way, H_2O_2 induced group has lower caspase activities than control. DNA fragmentation had shown in oxidative stress group. However, 5-FU acts as antioxidant which regulates alpha lipoic acid effects.

Conclusion

Alpha lipoic acid and 5-FU induce apoptosis of oxidative stress conditions by acting as a antioxidant or pro-oxidant. Thus, antioxidants have predictive properties on renal cancer treatment.

Key words

alpha lipoic acid, 5-FU, renal cancer, oxidative stress

Poster No. 44

The investigation of total oxidant/antioxidant levels in sheep naturally infected with FMD

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Introduction

Oxidative stress is a key factor to initiate infections in animals. When defense mechanism is not enough to compensate cell defect, oxidative damage may occur in cells and leads to the disruption of many functions. Related to our study, FMD (foot and mouth disease) infected organisms has oxidative status which effects economical losses and animal products negatively.

Material-method

In this study, 30 adult sheeps (2-4 years) were used by 2 groups. Group I were contained 15 FMD infected sheeps and group II included 15 healthy sheeps. The blood samples were taken from V.jugularis in animals, they centrifuged for serum separation. Total oxidant and total antioxidant levels were measured with obtained serum.

Results

Total oxidant levels of FMD infected group was significantly higher than control group. At the same time, total antioxidant status were shown decreased levels in FMD infected group compared to control group.

Discussion

Our research shows that oxidative stress is important indicator when increasing levels of total oxidant and decreasing levels of total antioxidant condition on FMD infected group in sheeps. Oxidative stress may play major contributory role at the severity of complications in many diseases. For this reason, oxidative stress should be considered during initiation of disease and treatment.

Poster No. 45

The effects of Lycopene on DNA damage and oxidative stress on Indomethacin-Induced Gastric Ulcer in Rats

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Indomethacin is a nonsteroidal antiinflammatory drug (1). It causes gastric lesions through a number of mechanisms including inhibition of prostaglandin synthesis, generation of reactive oxygen species and induction of apoptosis (2). The aim of this study was to investigate the protective effects of lycopene on DNA damage in lymphocytes, and the oxidant/antioxidant status in stomach tissue of indomethacin-induced gastric ulcer model. Fourty-two adult male Wistar rats were divided into six groups as control, indomethacin, reference, lycopene 10, 50 and 100. The effect of lycopene on gastric ulcers were induced by oral administration of indomethacin (25 mg/kg), and then different doses (10, 50, and 100 mg/kg) of lycopene were treated by oral gavage. The potency of lycopene was compared with lansoprazole (30 mg/kg). DNA damage was measured by comet assay. Levels of malondialdehyde and glutathione as well as catalase, superoxide dismutase and myeloperoxidase activities were determined in stomach tissue. Results show that 100 mg/kg lycopene administration significantly decreased % Tail DNA and Mean Tail Moment in gastric ulcer group as compared with other treatment groups. The same dose of lycopene significantly decreased high malondialdehyde level and myeloperoxidase activity, and increased activity of antioxidant enzymes in tissue (except catalase). Indomethacin caused marked damages in histopathological status of the stomach tissue. These damages were ameliorated by 100 mg/kg lycopene administration. The severity of tunnel findings was correlated with biochemical and histopathological findings. These results indicate that lycopene might have a protective effect against indomethacin-induced gastric ulcer as well as oxidative stress in rat.

References

1. Insel PA. 1996. Analgesic-antipyretic and anti-inflammatory agents and drugs employed in the treatment of gout. In: Hardman JG, Limbird AE, Molinoff PB, Ruddon RW, Goodman Gilman A, editors. Goodman & Gilman's The Pharmacological Basis of Therapeutics, McGraw-Hill, New York, pp. 617-657.
2. Jolly K, Cheng KK, Langman MJ. 2002. NSAIDs and gastrointestinal cancer prevention. Drugs 62: 945-956.

Poster No. 46

The biochemical and histological effects of *Pseudevernia furfuracea* in normal and diabetic rats

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Type 1 diabetes mellitus (T1DM) is a disease that results from the destruction of insulin-producing b cells of the pancreas. Oxidative stress plays an important role in causing diabetes; however, no studies have thoroughly reported on the toxic and beneficial effects of lichen extracts in patients with diabetes mellitus (DM). The aim of this study was to previously investigate unrecognized effect of well-known lichen specie Pseudevernia furfuracae in streptozotocin (STZ)-induced diabetic rat liver tissue. In experimental design, control or diabetic rats were either untreated or treated with aqueous lichen extracts (250–500 mg/kg /day) for 2 weeks starting at 72 h after STZ injection. The biochemical changes was assessed by measuring the levels of the malondialdehyde (MDA), glutathione (GSH), catalase (CAT) in liver tissue The histopathology of liver was examined using four different staining methods. As compared with the controls, the SOD, CAT activities, and GSH level were found to be markedly decreased in the liver of diabetic rats but MDA increased ($p < 0.05$). In alone groups, the P. furfuracea extract increased the level of antioxidant enzymes at both dosages. However, the increase in SOD, CAT, and GSH with exposure to P.furfuracea was not statistically significant in STZ-induced diabetic groups ($p>0.05$). Examination of liver sections of P. furfuracea groups revealed that the liver tissue retained its normal architecture. The results obtained in present study suggested that P. furfuracae is safe but the power of these is limited because of intensive oxidative stress in liver of type 1 diabetic rats.

Poster No. 47

Screening of anti-oxidative effects in *Camellia sinensis* L. leaves treated with boric acid

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Camellia sinensis L. (tea) is one of the most widely consumed drink in the World. The anti-oxidant role of boric acid has been reported. The present study was aimed to evaluate the alteration of anti-oxidative effects of *C. sinensis* L. leaves extract treated with boric acid.

C. sinensis was grown up in Rize, Turkey. The land was divided into four group. Each group was occured five areas (10 m^2). The first group is control. Boric acid in concentration range of 100, 300, 500 mg/m^2 in sodium tetraborate buffer were applied as a single dose on the second, third and fourth groups, respectively in March 2013. *C. sinensis* leaves were collected on two different periods (May and July 2013). The levels of malondialdehyde (MDA) and reduced glutathione (GSH), the activities of superoxide dismutase (SOD) and catalase (CAT) were measured in *C. sinensis* leave samples.

MDA level in tea leaves showed a significant decrease in all groups at first period. At second period, it was seen that MDA level increased at 100 mg/m^2 concentration of boric acid although MDA level reduced at 300, 500 mg/m^2 concentration of boric acid. There was a significant decrease in GSH levels of all groups at first period. A difference did not determined in SOD levels among 100, 300, 500 mg/m^2 concentration of boric acid at first period. However, CAT levels elevated at 500 mg/m^2 concentration of boric acid at first period.

In conclusion, it is suggested that treated boric acid may be elevated antioxidant status of *Camellia sinensis* at second collection period.

Keywords
Camellia sinensis, boric acid, antioxidant

Poster No. 48

Evaulation of ghrelin levels in lung tissue of septic rats with ghrelin treatment

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Ghrelin is a peptid hormone *in vivo* and in vitro Growth Hormone-secratogogue releasing factor. Ghrelin is produced in various tissue in mostly stomach besides in liver, pancreas, lung, testis. It was demonstrated that Ghrelin has antiinflammatory effect by inhibiting cytokine production during pathologic conditions. In this study we aimed to investigate the effects of Ghrelin levels in lung that is the mostly influenced organ during sepsis. The study was approved by Istanbul University Local Ethics Committee for Animal Experiments. In our study, male *Wistar albino* rats 200-250g were separated into four groups including control, sepsis (Lipopolisakkarid (LPS), E.coli 055:B5, 5 mg/kg , n=8), Ghrelin (10 nmol/ kg i.v., n=8), Sepsis+ Ghrelin. Lung Tissues were removed from rats first enjection after 24 hours. Tumor nekrozis factor-alpha (TNF-α), Interleukin-10 (IL-10), Ghrelin levels were determined from lung tissue using by ELISA method. One way ANOVA and Tukey test were used in statistical analyses. p values less than 0.05 were considered statistically significant.

Lung TNF-α levels were found higher in LPS group, Ghrelin treatment with rats were decreased TNF-α levels. However lung IL-10 levels were higher in sepsis and sepsis+Ghrelin groups ($p<0.05$). There was no found the effects of exogenously ghrelin on tissue ghrelin levels in experimental groups. ($p>0.05$). In conclusion, treatment of exogenously ghrelin were no impact on tissue ghrelin levels on the other hand it caused by decreasing of proinflammatory cytokine. We think that understanding of the exogenously ghrelin's effect on proinflammatory response will critical further cellular studies.

References

1. Wu R, Dong W, Zhou M, Zhang F, Marini CP, Ravikumar TS, Wang P. Ghrelin attenuates sepsis-induced acute lung injury and mortality in rats. Am J Respir Crit Care Med 2007;176(8):805-13.

2. Jacob A, Wu R, Zhou M, Coppa GF, Wang P. Mechanism of the inhibitory effect of ghrelin in sepsis. Hepat Med 2010;2:33-8.

Poster No. 49

Investigation of the effectiveness of ghrelin treatment on oxidative parameters in lung tissue of septic rats

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It was shown that Ghrelin is known that has effects on growth hormone secretion and energy metabolism and also antiinflammatuar and antioxidant properties. There were demostrated that Ghrelin prevents lipid peroxidation and decrease in antioxidant enzyme activity in various pathologic conditions. Recent studies have shown that increament of free radical production from inflammatory and immun cells and decreament of antioxidant enzyme activity during sepsis. We aimed to investigate the effects of exogenously ghrelin on oxidative parameters in lung tissue in lipopolysaccharides (LPS)-induced septic rats. The study was approved by Istanbul University Local Ethics Committee for Animal Experiments. In our study, male *Wistar albino* rats 200-250g were separated into four groups including control, LPS (E.coli 055:B5, 5 mg/kg , n=8), Ghrelin (10 nmol/ kg i.v., n=8), LPS + Ghrelin. Rats were decapitated first enjection afer 24 hours. Tissue superoxide dismutase enzyme (SOD) activities and malondialdehyde (MDA) were determined by spectrophotometerically. Data were analysed with using one way ANOVA and Tukey test. p values less than 0.05 were considered statistically significant. We observed that SOD and MDA levels were statistically significant in both of Ghrelin and LPS+Ghrelin groups higher than control group (for both, $p<0.05$). Also in LPS+Ghrelin group, SOD and MDA levels were increased than LPS group ($p<0.05$).

In this study we found that exogenously ghrelin treatment has antioxidant effect in septic animals. Our findings proposed that administration of ghrelin was to be effective in lung tissue damage during sepsis.

References

1. Kheradmand A, Alirezaei M, Birjandi M. Ghrelin promotes antioxidant enzyme activity and reduces lipid peroxidation in the rat ovary. Regul Pept 2010; 162(1–3):84–89.
2. Victor VM, Rocha M, De la Fuente M. Immune cells: free radicals and antioxidants in sepsis. Int Immunopharmacol 2004;4(3):327-47.
3. Sakaguchi S, Furusawa S. Oxidative stress and septic shock: metabolic aspects of oxygen-derived free radicals generated in the liver during endotoxemia. FEMS Immunol Med Microbiol 2006;47(2):167-77.

Poster No. 50

Investigation of protein oxidation in brucellosis cases

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Brucellosis is a zoonotic infection with acute and chronic clinical complications. Each year more than 500000 new cases of this disease with an uneven distribution is reported in the worldwide. Brucella species can cause infection in a wide range of animals and human beings. Present data suggest that reactive oxygen species (ROS) play an important role in the pathogenesis of brucellosis. The aim of this study was to investigate the protein oxidation parameters such as protein carbonyl, total, free and protein bound thiol and advanced protein oxidation product (AOPP) levels in brucellosis patients. This study was performed in 32 brucellosis patients with brucellosis symptoms and control group consisted of 51 healthy volunteers precisely matched for age and sex to the patient group. Data were analyzed using the SPSS v16.0 program. Statistical comparisons of the groups were made using *Independent T* test. Obtained p value of less than 0.05 was considered statistically significant. The data showed that serum protein carbonyl and AOPP levels showed a significant augmentation but total and protein bound thiol concentrations were markedly lower in brucellosis patients. On the other hand, free thiol concentrations didn't show a significant difference between groups. On the basis of increased protein oxidation, it can be concluded that brucellosis patients are subject to oxidative stress. These results are consistent with the underlying hypothesis that there is an imbalance between ROS production and the antioxidant defense systems in brucellosis disease. In conclusion, according to the data

obtained from the present study, increased protein oxidation showed that the human with brucellosis infection were exposed to potent oxidative stress.

References

1. Boschiroli ML, Foulongne V, O'Callaghan D. Brucellosis: a worldwide zoonosis. Curr Opin Microbiol. 2001;4(1):58-64.
2. Sauret JM, Vilissova N. Human brucellosis. J Am Board Fam Pract. 2002;15(5):401-6.
3. Garin-Bastuji B, Blasco JM, Grayon M, Verger JM. Brucella melitensis infection in sheep: present and future. Vet Res. 1998;29(3-4):255-74.

Poster No. 51

CDME reduces PKC-epsilon activity and protein expression in prostate cancer cells

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PKC-ε acts as an oncogenic protein in many cancers, especially prostate carcinoma. PKC-ε is overexpressed in 96% cases of prostate cancer when compared to benign prostatic hyperplasia (BPH) cases. Its oncogenic effects are resulted from the interaction with critical cellular pathways related to tumor promotion/progression. The regulatory domain of PKCs containing a cysteine-rich zinc-finger structure plays a key role in enzyme activity. We aimed to investigate the regulatory effect of CDME, a metabolic precursor of cystine, on the activity of PKC-epsilon via by S-cysteinylation mechanism in prostate cancer cells. LNCaP (androgen-dependent prostate cancer cell), PC3 (androgen-independent prostate cancer cell), and RWPE-1 (nontumorigenic prostate epithelial cell used as a control) cultured in their special media were assayed for the determination of cell cytotoxicity, and the protein expression / enzyme activity of PKC-epsilon by WST-8, western blot and non-radioactive assay, respectively, in the presence and absence of CDME. We showed that CDME caused the inhibition both of PKC-epsilon enzyme activity and protein expression only in prostate cancer cells compared to control cell based on our immunoblot analyses and specific PKC-epsilon enzyme assay in immunoprecipitated samples. Our data demonstrated that CDME regulates PKC-epsilon especially in tumorigenic prostate epithelial cells. Cellular cystine may play a critical role in prostate cancer progression and prevention.

Poster No. 52

The effect of delayed fluid resuscitation on lung oxidative stress and antioxidant vitamin levels in a rat model of controlled hemorrhagic shock

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Aim

to determine the effects of delayed fluid resuscitation on the lung oxidative stress and antioxidant vitamin levels in a rat model of controlled hemorrhagic shock.

Material and Methods

Wistar male rats were randomized to three groups as follows: (1) control (n=5), (2) volume-controlled hemorrhagic shock (HS) for 30 minutes and resuscitated 30 minutes (early ressuscitation, (HS-ER) (n=6), and (3) 90 minutes (delayed resuscitation, HS-DR) (n=6) after hemorrhage. After 24 hours, bronchoalveolar lavage fluid (BALF) was obtained. The right lung was used for biochemical analysis and the left one for histopathological analysis. The slides were subsequently graded by a pathologist using a modified histologic score without prior knowledge of treatment groups (0= no injury; 1=scant, 2= moderate, 3= severe). The lipid peroxidation (MDA), reduced glutathion (GSH), glutathion peroxidase (GSH-Px) and Vitamins A, C and E values were also measured in the BALF and lung homogenate.

Results

Interstitial septum tickhening, alveolar/ interstitial PNL infiltration, and total lung score were higher in hemorhagic shock groups than control group (p=0.004, p=0.006, p=0.002 and p=0.002, respectively). HS-DR group induced more prominent leukocyte accumulation and lung injury than in HS-ER group (p=0.008 and p=0.026). Lung tissue GSH-Px and vitamin E levels are increased in hemorrhagic groups compared to control group (p=0.027 and p=0.001, respectively). We found a significant increase in GSH-Px activity but not any differences in MDA, GSH, Vit-A and Vit-C in BALF of the groups (p=0.007).

Conclusion

We observed that fluid resuscitation in hemorrhagic shock induce antioxidant effect by increasing GSH-Px and vitamin E values. In addition this antioxidant activities were correlated with the time delayed for resuscitation.

Poster No. 53

Enhanced antioxidant defense by Chlorogenic acid accelerates cutaneous wound healing in diabetic rats

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Abstract

Oxidative stress occurs following the impairment of pro-oxidant and antioxidant balance in chronic wounds and finally leads to result harmful delays in healing progress (1). A fine balance between oxidative stress and endogenous antioxidant defense system may beneficial for wound healing under redox control (2). This study tested the hypothesis that oxidative stress in wound area can be controlled with systemic antioxidant therapy and thereby wound healing can be accelerated. We used chlorogenic acid (CGA), a well-known dietary antioxidant, in experimental diabetic wound model that characterized with delayed wound healing. Wounds were created on backs of streptozotocin-induced diabetic rats. CGA (50 mg/kg/day) was injected intraperitoneally and animals were sacrificed on days: 4, 8, 12 and 16. Biochemical and histopathological examinations were performed. We also tested possible side effects of chronic antioxidant treatment on pivotal organs and bone marrow.

CGA accelerated wound healing and enhanced hydroxyproline content, decreased malondialdehyde/nitric oxide levels, elevated reduced glutathione, and did not affect superoxide dismutase/catalase levels in wound bed. Epithelialization was increased while polymorph nuclear leukocytes infiltration decreased. While CGA induced cytotoxicity and genotoxicity as side effects, 15 days of treatment attenuated blood glucose levels. CGA decreased lipid peroxidation level of heart, liver and kidney on different days.

References

1. Fitzmaurice SD, Sivamani RK, Isseroff RR. (2011). Antioxidant therapies for wound healing: a clinical guide to currently commercially available products. Skin Pharmacol Physiol 24(3):113-26. doi: 10.1159/000322643. Epub 2011 Jan 15.

2. Bagdas D, Cam Etoz B, Inan Ozturkoglu S, Cinkilic N, Ozyigit MO, Gul Z, Isbil Buyukcoskun N, Ozluk K, Gurun MS. (2014a). Effects of systemic chlorogenic acid on random-pattern dorsal skin flap survival in diabetic rats. Biol Pharm Bull 37(3):361-370

Poster No. 54

Number of the slices in the medium alters staining of the cortical slices with 2,3,5 triphenyltetrazolium chloride under normoxic or oxygen-glucose deprivated conditions.

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The accurate quantitation of tissue damage produced under in vivo or vitro conditions is important to the investigation of injury mechanisms and therapies (1).

Although 2,3,5-triphenyltetrazolium chloride (TTC), a marker of the mitochondrial enzyme activity, is widely used to assess the effects of cerebral ischaemia, many controversial results, probably due to experimental models used, are easily seen in the literature (2). In present study we demonstrated that number of the slices in the medium significantly alters staining with TTC and thus changes the results observed under in vitro conditions. 1, 3, 6 cortical slices (0.35 mm) prepared from female Sprague Dawley rats were placed into the incubation plates containing 2 ml oxygenated physiological medium. After 60 min of preincubation period, slices were subjected to oxygen-glucose deprivated (OGD) medium for 30 min. After a further 30 min incubation in oxygenated physiological medium (reoxygenation; REO), slices were stained with 0.5% TTC. When incubated in

normoxic medium, staining of the slices were higly correlated with the number of slices in incubation medium; thus highest staining was seen in 6 slices containing group. As expected, OGD significantly reduced TTC staining of the slices, but the highest effect was observed in one slice containing group. In 6 slices containing group, on the other hand, OGD-induced decline in TTC staining was not reach to the statistically significant level. As a result of this study, number of brain slices per ml affects TTC staining and thus alters the results observed either in normoxic or OGD conditions. Changes in the other parameters rather than TTC staining, such as LDH leakage, GSH, MDA, under similar experimental conditions are still on progress.

References

1. Evolving focal cerebral ischemia in cats: spatial correlation of nuclear magnetic resonance imaging, cerebral blood flow, tetrazolium staining, and histopathology. Stroke 1988;19:28–37.
2. Bartkowski HM. Evaluation of 2,3,5-triphenyltetrazolium chloride as a stain for detection and quantification of experimental cerebral infarction in rats. Stroke 1986;17:1304–8.

Poster No. 55

Bogma rakı and walnut effects liver tissue

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Aim

To investigate the Effects of Bogma Rakı (Illegal Alcoholic Beverages) and Walnut consumption on Liver Tissue in rats.

Methods

48 *Wistar albino* adult male rats were randomly divided into four groups; A : Control group, B: Bogma Raki group, C: Walnut group and D: Bogma Raki-Walnut group. Saline, Bogma Raki (9.2 ml/kg/day) and Walnut (10g/kg/day) were given orally for 30 days. Oxidative stress markers such as lipid peroxidation (malondialdehyde (MDA)), superoxide dismutase (SOD), catalese (CAT), glutathione peroksidase (GSH-Px) and liver function tests such alanine aminotransferase (ALT) aspartate aminotransferase (AST) were spectrophotometrically measured. Apoptotic cells were detected in tissue by TUNEL assay. The data were analyzed using SPSS (for Windows, version 18.0). Significance was set at $p< 0.05$.

Results

In group B, the activities of CAT, SOD and GSH-Px were decreased; MDA levels and ALT, AST activities were increased compared to control group. MDA levels both in group B and D were significantly increased compared to control group. SOD, CAT and GSH-Px activities were decreased in group D compared to control group. Also a significant decrease in SOD activity was observed in group D compared with other groups. No difference was seen between A and C group statistically in all parameters. Also, in the histological experiments, TUNEL (+) cells were significantly increased in B group as compared with control.

Discussion

Our findings suggest that Bogma raki induces lipid peroxidation and apoptosis in liver tissue and walnut increases oxidative stress if taken with bogma rakı.

Poster No. 56

Therapeutic potentials of some antioxidants on blood biochemical parameters in hypertensive rats induced by Nω-Nitro-L-arginine methyl ester

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In this study were investigated effects of propolis, Caffeic acid phenethyl ester (CAPE) and pollen on biochemical parameters in hypertensive rats induced by Nω-Nitro-L-arginine methyl ester (L-NAME). Rats were given L-NAME for 28 days and the propolis, CAPE and pollen for the last 14 days with L-NAME together. Rats were divided to five experimental groups as control, L-NAME, L-NAME+propolis, L-NAME+CAPE, L-NAME+pollen. Rats received L-NAME, NOS inhibitor for 28 days to produce hypertension, propolis extract, CAPE and pollen extract the lastest 14 of 28 days. Blood pressure was measured by tail-cuff method. Paraoxanase (PON1), total antioxidant status (TAS), total oxidant status (TOS) and some biochemical

parameters in blood were analysed (1). Asymmetric dimethylarginine (ADMA) and nuclear factor-κB (NF-κB) levels were quantitated by ELISA methods (2,3). L-NAME led to a significant increase in BP compared to the control group. BP were lower in plus to pollen group than those of plus to CAPE and propolis groups (P<0.05). PON1, TAS, HDL and total protein levels significantly decreased in serum of L-NAME group (P<0.05), but these parameters were higher in L-NAME plus to propolis, CAPE and pollen groups compared to L-NAME group. TOS, OSI, ADMA, NF-κB, glucose, cholesterol, LDL, triglyceride, ALT, AST, ALP, urea, creatinine levels increased (P<0.05) in L-NAME group, but these parameters were lower (P<0.05) in L-NAME plus to propolis, CAPE and pollen treated rats compared to L-NAME group (P<0.05). These results suggest that homeostasis in L-NAME administrated rats by adding propolis, CAPE and pollen may modulate.

References

1. Selek S, Aslan M, Horoz M, Gur M, Erel O. Oxidative status and serum PON1 activity in beta-thalassemia minor. Clin Biochem 2007; 40: 287–291.
2. Gönenç A, Hacışevki A, Tavil Y, Çengel A, Torun M. Oxidative stress in patients with essential hypertension: A comparison of dippers and non-dippers. Eur J Int Med 2013; 24: 139-144.
3. Villarreal-Molina MT, Antuna-Puente B. Adiponectin: Anti-inflammatory and cardioprotective effects. Biochimie 2012; 94: 2143-2149.

Poster No. 57

The investigation of a disintegrin and metalloproteinase with thrombospondin motif (ADAMTS) 16 in insulin-induced chondrosarcoma cells

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Objectives

A Disintegrin-like Metalloproteinase with Thrombospondin Motifs (ADAMTS) proteins is a proteinase enzyme group that primarily located in the extracellular matrix (ECM). Insulin has been known to stimulate proteoglycan biosynthesis in chondrosarcoma chondrocytes and thereby the levels of ADAMTS proteins. The aim this prospective study is to evaluate the time-dependent effects of insulin on the ADAMTS16 expression in OUMS-27 human chondrosarcoma cell line to test the hypothesis that insulin affects ADAMTS16 expression because of multifaceted properties.

Methods

To test this hypothesis OUMS-27 cells were cultured in Dulbecco's modified Eagle' medium (DMEM) containing 10μg/mL insulin. The medium containing insulin was changed every other day up to 11th day. Cells were harvested at 1, 3, 7, and 11th days and protein and RNA isolations were performed at the proper times. The levels of RNA expression of ADAMTS was estimated by qRT-PCR using primers while protein levels was detected by Western blot technique using anti-ADAMTS16 antibody.

Results

Although there was a decrease in RNA levels of insulin applied cell groups detected by qRT-PCR instrument, it was not statistically significant. On the other hand, there was a gradual decrease in immune-reactant ADAMTS16 protein levels by the time-course in insulin treated cell groups when compared to control cells.

Conclusion

Under the light of our findings, it is suggested that insulin might possibly participate in regulation of ADAMTS16 in OUMS-27 chondrosarcoma cells.

Key words

Insulin, ADAMTS16, chondrosarcoma, OUMS-27, RNA, protein

Poster No. 58

The effects of melatonin and wireless devices (2.45 GHz EMR) on oxidant-antioxidant system in blood of rat

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Nowadays, 2.45 GHz irradiation is extensively used in industrial, scientific, medical, military and domestic purposes, and its possible leakage into the environment is possible. Therefore, there is growing public concern about the potential human health hazard caused by exposure to electromagnetic radiation (EMR). This study was designed to investigate the effects of 2450 MHz EMR in blood of rat and possible ameliorating effects of melatonin. Thirty two male Wistar Albino rats were randomly grouped (eight each) as follows: Cage-control group [dimethyl sulfoxide (DMSO) 10 mg/kg/day, i.p., without stres and EMR; Group I], shame-control group [rats stayed in restrainer without exposure to EMR and DMSO (10 mg/kg/day, i.p.); Group II], rats exposed to 2450 MHz EMR; Group III, 2450 MHz EMR exposed+melatonin (10 mg/kg/day, i.p.) treated group; Group IV. Group III and Group IV were exposed to 2450 MHz EMR 60 minutes/day for 30 days. At the end of the 30 days, blood samples were taken for oxidant-antioxidant examination. There was no significantly difference between the groups by means of the erthrocytes GSH, GSH-Px activity, plasma LP level and vitamin A concentration ($p>0.05$). However, in the Group IV, erythrocytes LP levels ($p<0.05$) were observed significantly decresed and plasma vitamin C, vitamin E concentrations ($p<0.05$) increased and when compared to Group III. In conclusion, these results demonstrated that wireless (2.45 GHz) devices slight cause oxidative-antioxidative changes in blood of rat and the moderate melatonin supplementation may play an important role on antioxidant system (plasma vitamin C and vitamin E). However, further investigations are required to clarify the mechanism of action of the applied 2450 MHz EMR exposure.

Keywords

2450 MHz electromagnetic radiation, blood of rat, oxidant-antioxidant system, melatonin.

Poster No. 59

Investigating of the relationship between the first trimester screening biochemical markers and complications and anomalies in pregnant women

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In antenatal ultrasonography for detection of fetal anomalies as well as with the additional use of biochemical screening tests started to get better pregnancy outcomes (1). The idea of determination of first trimester maternal serum PAPP-A and free beta-hCG values was significant in predicting the risk of chromosomal abnormality and gestational age complications that prompted the researchers on this subject of numerous studies (2, 3). The possible relationship between the first trimester maternal serum pregnancy-associated plasma protein A (PAPP-A) and - free β human chorionic gonadotropin (f ß-hCG) values in the complications and fetal abnormalities in pregnant women were investigated. 143 women who scans in the first trimester of pregnancy were included in the study. Mean age was 28 ± 0.46 (mean ± SEM). The consent of the pregnant women were received. Retrospective chart scanning was performed. Statistical analysis was performed with SPSS program. It was found that Free β-hCG MOM (Multiples of the median) values have a stronger correlation than Free β-hCG values with the Down syndrome. A correlation wasn't detected between biochemical markers in the first trimester and DM and low birth weight. However future studies with a larger number of patients may be useful.

References

1. Bobyr R, Vile Y. First Trimester Screening Tests. In: James DK, Steer PJ, Weiner CP, Gonic B, editors. High Risk Pregnancy Textbook. 3rd edition. London; Sounders Elservier 2005; 150-157.
2. Krantz D, Goetzl L, Simpson JL, Thom E, Zachary J, Hallahan TW, Silver R, Pergament E, Platt LD, Filkins K, Johnson A, Mahoney M, Hogge WA, Wilson RD, Mohide P, Hershey D, Wapner R. Association of extreme first-trimester free human chorionic gonadotropin-beta, pregnancy-associated plasma protein A, and nuchal translucency with intrauterine growth restriction and other adverse pregnancy outcomes. Am J Obstet Gynecol 2004;191:1452-1458.
3. Pihl K, Sorensen TL, Norgaard-Pedersen B, Larsen SO, Nguyen TH, Krebs L, Larsen T, Christiansen M. First-trimester combined screening for Down syndrome: prediction of low birth weight, small for gestational age and pre-term delivery in a cohort of non-selected women. Prenat Diagn 2008; 28:247-253.

Poster No. 60

The effects of treadmill exercise on oxidant-antioxidant status in rat hippocampus

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In living organisms, oxidant and antioxidant systems are in balance. Reactive products formed continuously by exogeneous and endogeneous sources which are rendered harmless by the antioxidant system (1). Oxidative stress is one of the etiological factor in aging and development of various neurodegenerative diseases (2). In the present study, we aimed to investigate the effects of subchronic treadmill exercise on oxidant-antioxidant parameters in hippocampus. 25 adult male, Wistar albino rats obtained from Suleyman Demirel University, Experimental Animals Laboratory were included in the study. Rats were divided into three groups as control (n=8), cage control (n=6) and experiment (n=11) groups. The treadmill exercise was performed to experiment group, twice a day (15+15 min) for 8 weeks. The velocity of treadmill was started with 10 m/min and increased to 15 m/min in 2 minutes. Hippocampi of rats were isolated and homogenized at the end of the experiment. Total antioxidant and total oxidant status (TAS&TOS) was determined by Erel's method using a commercial kit (Rel Assay Diagnostic Turkey) with a biochemical auto-analyser (Beckman Coulter AU 5800. USA). Oxidative stress index was calculated by using the following formula; OSI = TOS/TAS. Data was assessed by Kruskall Wallis test and <0.05 was regarded as statistically significant. No significant difference was found among the groups about data of TAS, TOS and OSI values. Although the exercise we have performed seemed to have no effect on oxidant and antioxidant status, exercise with different duration and frequency programmes may yield positive findings.

References

1. Burçak G and Andican G. Oksidatif DNA hasarı ve yaşlanma (oxidative DNA damage and aging) Cerrahpaşa J Med 2004; 35:159-169.
2. Halliwell B and Gutteridge J.M.C. Oxygen toxicity, oxygen radicals, transition metals and disease. Biochem J 1984; 219:1-4.

Poster No. 61

Relationship between manganese superoxide dismutase enzyme genotype and progression of renal function in patients with predialytic chronic kidney disease

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Objective

Oxidative stress has been linked to the progression of disease, including chronic kidney disease (CKD). Antioxidant enzymes (superoxide dismutase, catalase and myeloperoxidase etc.) proved to be related to gene polymorphism. Our study aimed to evaluate the association between manganese superoxide dismutase (Mn-SOD) gene polymorphism and progression of CKD.

Method

This is a prospective cohort study of 125 CKD patients (stage 2-4) and 54 healthy controls followed for up to 12 months. CKD patients and controls were screened for SNPs of Mn-SOD by a restriction fragment length polymorphism-PCR method. The rates of change over the study period of estimated glomerular filtration rate (eGFR) were measured. The demographic data of the individuals participating in the study were collected.

Results

Patients with the Ala/Val and Val/Val Mn-SOD genotypes had a more rapid decline in GFR compared to the Ala/Ala genotype (Ala/Val compared to the Ala/Ala odds ratio (OR) 0.93, 95 % CI 0,87 to 0,99; Val/Val compared to the Ala/Ala OR 0.84, 95 % CI 0.76 to 0.93) (Table 1). During the study, GFR declined in 68%, increased in 23.2% and was stable in 8.8% of patients. Demographic data were similar for both groups, but genotypes frequencies were different. The observed and

expected genotype frequencies were significantly different, thereby not fulfilling the Hardy Weinberg equilibrium.

Conclusion

CKD patients with the Mn-SOD Ala/Val and Val/Val genotypes have a greater decline in kidney function than those with the Ala/Ala genotype in Turkish population.

Table 1. Mn-SOD enzyme genotypes and changes in kidney function (mean±SD)

	SOD Genotypes		
	Ala/Ala	Ala/Val	Val/Val
N	5	98	22
Age	65±14.9	59.6±15.9	59.6±15.5
Baseline eGFR (mL/min/1.73 m^2)	31±18.4	36.7±20.7	33±14.6
Δ eGFR (mL/min/1.73 m^2/ year)	9.6±15.9	-1.13±8.5*	-5.54±5.9**

N: Number of patients.
* (P=0.028) compared with Ala/Ala; **(P=0.001) compared with Ala/Ala.

Poster No. 62

Allelic variations in manganese superoxide dismutase gene and diabetic nephropathy in type 2 diabetic subjects

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Objective

Diabetic nephropathy is a major complication of type 2 diabetes and its pathogenesis is still insufficiently known. However, oxidative stress and genetic susceptibility have been suggested to contribute to the development of diabetic nephropathy. Manganese superoxide dismutase (Mn-SOD) protects the cells from oxidative damage by reducing superoxide radicals to hydrogen peroxide. Associations of Mn-SOD gene variants with diabetic nephropathy were reported several times in patients with type 1 diabetes. In the present study, we aimed to investigate whether the genetic polymorphism in Mn-SOD gene influences the development of diabetic nephropathy in patients with type 2 diabetes.

Method

A total of 143 patients with type 2 diabetes were recruited in the study and investigated with case-control design. The patients were divided into two groups according to the presence (Group A, n = 82) or absence (Group B, n = 61) of overt diabetic nephropathy. Overt diabetic nephropathy was defined as having a daily albumin excretion > 300 mg/day or glomerular filtration rate (GFR) estimated by Modification of Diet in Renal Disease (MDRD) equation< 60 mL/min/1.73 m^2. The genomic DNA was extracted from the peripheral venous blood and genotyping was conducted using real-time PCR for Ala-9Val polymorphism in the Mn-SOD gene. The statistical analysis has been made using SPSS version 15.0 software (SPSS, Chicago,IL) chi-square (or Fisher's exact test) was used to compare the genotype frequencies between the two groups.

Results

There was not any significant difference between diabetic nephropathy (Group A) and type 2 diabetics without overt nephropathy (Group B) groups regarding age (59.2±10.1 vs 62.4 ±10.7), duration of diabetes (10.9±5.2 vs 11.3±3.6), smoking habitus (31.1% vs 25.6%) and gender distribution (24 M/37 F vs 40M/42 F). Genotypic distribution with 11(13.4%) Ala/Ala, 51(62.2%) Ala/Val and 20(24.4%) Val/Val subjects in Group A was not statistically different from those of Group B with 9 (14.8%), 37 (60.7%) and 15 (24.6%).

Conclusion

The genotypic distribution of Mn-SOD gene was found to be similar between the patient group with nephropathy and the patients without nephropathy. The results of our study suggest that genotypic variations of Mn-SOD gene do not contribute to the development of diabetic nephropathy in Turkish type 2 diabetic patients group.

Poster No. 63

Effect of pentoxifylline on rat liver and kidney oxidative damage induced by methotrexate

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Objective

Methotrexate (MTX) is widely used as a therapeutics agent for malignances that are used at high doses and for autoimmune diseases that are used at low doses (1). Many side effects occur during use of MTX. The oxidative damage caused by reactive oxygen species has been responsible of developing these side effects, especially hepatotoxicity and nephrotoxicity (2-4). Pentoxifylline (PTX) is known as non-specific cAMP inhibitor. PTX blocks tumor necrosis factor alpha (TNF-α) synthesis (5, 6) and TNF-α-induced macrophagic NO synthesis (5, 7-10). Also it prevents the extra release of O2.- ve H_2O_2 that it indicates the antioxidant activity of PTX (11). We aimed to investigate on effect of PTX on structural and biochemical changes induced by MTX in liver and kidney tissues.

Materials and Methods

Sprague-Dawley male rats were used. rats; group 1 (control group, saline); group 2 (MTX group); group 3 (PTX+MTX group) has been divided into 3 groups. At the end of the experiment, biochemical (oxidative parameters), histochemical (Hematoxylin-Eosin) and immunohistochemical (iNOS and TNF-α) examinations were performed on liver and kidney tissues.

Results

In both tissues, Catalase, Malondialdehyde, Nitric Oxide and Xanthine Oxidase levels have approached the control value in group 3 while they have increased in group 2. In Hematoxylin-Eosin staining, consisting of damage in group 2 has regressed in group 3. iNOS and TNF-α immunostaining in both tissues, the intensity has reduced in group 3 whereas the intensity has been intense in group 2.

Discussion

Based on our findings, we believe that PTX has a protective effect on MTX-induced oxidative tissue damage in liver and kidney tissues.

References

1. Widemann BC, Balis FM, Kempf-Bielack B, Bielack S, Pratt CB, Ferrari S, et al. High-dose methotrexate-induced nephrotoxicity in patients with osteosarcoma. Cancer. 2004 May 15;100(10):2222-32.
2. Jahovic N, Cevik H, Sehirli AO, Yegen BC, Sener G. Melatonin prevents methotrexate-induced hepatorenal oxidative injury in rats. Journal of pineal research. 2003 May;34(4):282-7.
3. Kolli VK, Abraham P, Isaac B, Selvakumar D. Neutrophil infiltration and oxidative stress may play a critical role in methotrexate-induced renal damage. . Chemotherapy. 2009 55(2):83-90.
4. Miyazono Y, Gao F, Horie T. Oxidative stress contributes to methotrexate-induced small intestinal toxicity in rats. Scandinavian journal of gastroenterology. 2004 Nov;39(11):1119-27.
5. Loftis LL, Meals EA, English BK. Differential effects of pentoxifylline and interleukin-10 on production of tumor necrosis factor and inducible nitric oxide synthase by murine macrophages. The Journal of infectious diseases. 1997 Apr;175(4):1008-11.
6. Zabel P, Schade FU, Schlaak M. Inhibition of endogenous TNF formation by pentoxifylline. Immunobiology. 1993 Apr;187(3-5):447-63.
7. Trajkovic V, Badovinac V, Popadic D, Hadzic O, Stojkovic MM. Cell-specific effects of pentoxifylline on nitric oxide production and inducible nitric oxide synthase mRNA expression. Immunology. 1997 Nov;92(3):402-6.
8. Poulakis N, Androutsos G, Kazi D, Bastas A, Provata A, Bitsakou C, et al. The differential effect of pentoxifylline on cytokine production by alveolar macrophages and its clinical implications. Respiratory medicine. 1999 Jan;93(1):52-7.
9. Trajkovic V. Modulation of inducible nitric oxide synthase activation by immunosuppressive drugs. Current drug metabolism. 2001 Sep;2(3):315-29.
10. Beshay E, Croze F, Prud'homme GJ. The phosphodiesterase inhibitors pentoxifylline and rolipram suppress macrophage activation and nitric oxide production in vitro and in vivo. Clinical immunology (Orlando, Fla). 2001 Feb;98(2):272-9.
11. Noyan T, Sahin I, Sekeroglu MR, Dulger H. The serum vitamin C levels in Behcet's disease. Yonsei medical journal. 2003 Oct 30;44(5):771-8.

Poster No. 64

Effects of leptin on oxidative stress in kidney of rats: A histological study

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Objective

Obesity, one of the preventable health problems like smoking, increases the risk of renal disease one and a half times more compared to the non-obese individuals (1). Leptin is a type of adipokinine hormone which is released from adipose tissue cells

in proportion to the amount of adipose tissue. It is known that leptin leads to a rise in reactive oxygen radicals in the tissue (2). This study aimed at investigating if leptin affects renal tissue by giving leptin to the rats.

Materials and Methods

16 Wistar albino rats in the study were randomly divided into groups of eight in two different cages. The first group was the control group (salin) and the second group was the group with leptin (0,1 mg/kg Leptin). The subjects, which were given leptin intraperitoneally for 7 days, and the ones in the control group, which were given SF to produce the same stress, were sacrificed and their kidneys were taken out for examination. The kidneys fixed with 10% neutral form were subject to routine histological procedure. The sections stained with Hematoxylin-Eosin were analyzed under light microscopy.

Results

The sections in the control group were found to be normal hystologically. Compared to these, the renal tissue samples in the leptin group were discovered to have mononuclear cell infiltration in the cortex, tubular dilatation in the medulla, hemorrhagic areas in the medulla, glomeruler vacuolar degeneration and proximal and distal tubular dilatation.

Discussion

Revealing the effects of leptin on renal damage is important for avoiding harmful effects of obesity through hormonal and behavioral arrangements (3). This study suggested that leptin could cause renal pathologies by damaging renal tissue. We are of the opinion that being able to explain renal damage etiology exactly will be useful to differential diagnosis and treatments.

References

1. Koç M. Arıkan H. obesity, metabolıc syndrome and kıdney Turkiye Klinikleri J Int Med Sci 2007; 3: 47- 51
2. Cooke JP, Oka RK. Does leptin cause vascular disease? Circulation. 2002; 106: 1904-1905
3. Blackburn G. Effect of degree of weight loss on health benefits. Obesity research. 1995; 2: 211- 216

Poster No. 65

Evaluation of M30-M65 Cell Death Assays for Tumor Regretion in Rectal Cancer Patients Treated with Neoadjuvant Therapy (Chemoradiotherapy)

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Aim

We are aimed to evaluate the tumor regretion levels of indicative cell death M30 and M65 in patients that are treated with neoadjuvant chemoradiotherapy due to the locally advanced rectal cancer.

Method

Long term neoadjuvant chemotherapy(NKRT) was used to the 16 patients that were locally advanced rectal cancer(T3 and N+)and were detected after endoscopic and radiologic investigations. M30 and M65 levels were measured with ELISA method in patients serum that were before NKRT and at the end of the 2, 3, 4 and 5th week of NKRT. Beside the M30-M65 levels age, gender, pathological stage and tumor regression levels were evaluated.

Results

10 patients(62%) male and 6 (38%) were female. Mean age was 58 (34-75). The average levels of M30 before treatment was 130±64 M65 was 390±113. M30 and M65 levels after the treatment were determined as 123±56 and 309±108. According to the histopathological examination M30-M65 levels of lymph node metastasis compared to patients who had no lymph node metastasis was significantly higher in the pre-treatment and post-treatment. This increase was statistically significant in each period for M30 ($p<0.05$). If we take a look on tumor regression M30 levels in pre-treatment period (M30=148±50) specific tumor regretion(regretion score:4) were detected and were declined during the treatment period and the M30 levels on 5th week were (M30= 124-62). In cases that tumor regretion is less (regretion score=1) at the begining of treatment M30 leveles were significantly low (M30=86±9) during the treatment it was observed that the levels are increased (M30= 128±49). Referring to association between tumor regretion

and M65 level the results are not homogenous like M30 and it is not correlated with tumor regretion.

Discussion

M30 and M65 levels were significantly higher in lymph node metastasis cases that was a study with case limited patients. After neoadjuvat therapy there were no correlation between tumor regretion and M65, while with high levels of pre-treatment tumor regretion of M30 and a significant decline in the levels of M30 was detected during treatment.

References

1. Linder S, Olofsson MH, Herrmann R, Ulukaya E. Utilization of cytokeratin-based biomarkers for pharmacodynamic studies. Expert Rev Mol Diagn. 10: 353-359, 2010.
2. Barak V, Goike H, Panaretakis W.K, et al. Clinical utility of cytokeratins as tumor markers. Clin Biochem 2004;37:529-540.
3. Lian Zhang, Brian D. Kavanagh, Andrew M. Thorburn, et al. Preclinical and Clinical Estimates of the Basal Apoptotic Rate of a Cancer Predict the Amount of Apoptosis Induced by Subsequent Proapoptotic Stimuli Clin Cancer Res 2010;16:4478-4489, 2010.
4. Emer Fitzpatrick, Ragai R. Mitry, Alberto Quaglia, Munther J. Hussain, Ruth deBruyne, and Anil Dhawan, Serum Levels of CK18 M30 and Leptin Are Useful Predictors of Steatohepatitis and Fibrosis in Paediatric NAFLD. JPGN 2010;51: 500–506, 2010.
5. Assessment of Non-alcoholic Fatty Liver Disease Using Serum Total Cell Death and Apoptosis Markers J. Shen, H. L.-Y. Chan, G. L.-H. Wong, A. W.-H. Chan, P. C.-L. Choi, H.-Y. Chan, A. M.-L. Chim, D. K.-W. Yeung, J.Yu, W. C.-W. Chu, V. W.-S. Wong Aliment Pharmacol Ther. 2012;36(11):1057-1066.

Poster No. 66

Antioxidant activity and polyphenol content of leaves of spinach *(Spinacia oleracea)* monitored by LC-MS/MS

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Spinach (Spinacia oleracea) is an comestible flowering plant (Amaranthaceae family) native to central and southwestern of Asia, now cultivated all over the world, which is renowned for its high content of carotenoids (1). We investigated Spinach (Spinacia oleracea) for phenolic contents and antioxidant activities.

The antioxidant activities of ethanol and aqueous extracts of Spinach (Spinacia oleracea) were determined by different in vitro methods such as DPPH·radical scavenging, reducing power by FRAP and CUPRAC methods, separately. In addition, total phenolic and total flavonoid contents were determined as gallic acid equivalent (GAE) and quercetin equivalent (QE), respectively. Finally, the quantities phenolic compounds such as of caffeic acid, ferulic acid, ascorbic acid, p-coumaric acid, p-hydroxybenzoic acid and vanillin were detected by high performance liquid chromatography and tandem mass spectrometry (LC-MS/MS).

The both plant extracts revealed significant antioxidant activity in all used antioxidant assays. The total phenolic compounds in AES and EES were 64.85 and 51.85 µg GAE/mg extract, respectively.

In this study, for the first time, we determined phenolic contents, investigated antioxidant potential of Spinach. The results indicate that Spinach (Spinacia oleracea) is a good dietary source with phenolic properties.

Keywords

Antioxidant activity; LC-MS-MS; Phenolic compounds; Spinach; Spinacia oleracea

References

1. Vazquez E, García-Risco MR, Jaime L, Reglero G, Fornari T. Simultaneous extraction of rosemary and spinach leaves and its effect on the antioxidant activity of products. J Supercrit Fluid 2013; 82:138–145.
2. Bursal E, Köksal E, Gülçin İ, Bilsel G, Gören AC. Antioxidant activity and polyphenol content of cherry stem (Cerasus avium L.) determined by LC–MS/MS. Food Res Int 2013; 51:66–74.

Poster No. 67

Anti-inflammatory actions of terpinen-4-ol: Evidence for a new TRP ligand

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Terpinen-4-ol is an oxygenated monoterpene found in natural products of essential oils including members of the Labiatae family. Inflammatory diseases are one of the traditional use of terpinen-4-ol containing essential oils.

Smooth muscle inhibiting and cytotoxic effects were reported but the mechanism of action of terpinen-4-ol is not clearly documented. The aim of this study was to investigate anti-inflammatory actions of terpinen-4-ol on paw edema of mice.

Antiinflammatory actions of terpinen-4-ol was studied on rat paw oedema, induced by plantar

injection of %2 formaline (Merck).

Inhibitory effects of three different doses of terpinen-4-ol (10, 50 and 100 mg/kg i.p.)and DMSO which used to dissolve test substances were measured at 0, 45 and 90th minutes using a plethysmometer. Ruthenium red was used as standard antagonist for TRP cation channel antagonist and indomethacine for standard anti-inflammatory drug.

Data were statistically evaluated by one way variance and post hoc Tukey HSD multiple comparison analysis.

Terpinen-4-ol was found to possess antiinflammatory actions on the rat paw oedema in a dose dependent manner and this effect was blocked by ruthenium red. Results of our experiments supplied evidence for the involvement of the TRP channels for the mechanism of action of terpinen-4-ol. Since this molecule has different isomers, new investigations are required to elucidate active isomer of terpinen-4-ol which are currently conducted at our laboratories.

As a conclusion terpinen-4-ol has anti-inflammtory action via TRP channels, being a possible new drug for inflammatory diseases and and also a new ligand for TRP cation channel studies.

Poster No. 68

Combination of imatinib and celecoxib, synergistically inhibit cell prolifration in colon cancer cells

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Colon cancer is c-kit positive and responsive to the specific tyrosine kinase inhibitor imatinib. Besides, Celecoxib, a unique coxib with anti-prolifrative effects might be useful for the prevention and treatment of colorectal cancers. In this study, we investigated the effects of imatinib and celecoxib alone or in combination on prolifration of human HT-29 colon cancer cell line.

HT-29 cells were treated with celecoxib and imatinib alone or in combination. Proliferation inhibition of cells were assessed with Tetrazolium-based cell line proliferation assay (MTT assay) after 24 hours. IC50 values were determined using CompuSyn software. To determine the interaction between the drugs, the combination index (CI) was calculated using the Chou Talalay method.

Our data showed that celecoxib and imatinib inhibited cell proliferation in a dose-dependent manner with IC50 of 30 and 7 μmol/l respectively. In addition, a synergistic effect (CI of 0.664) was observed when cells were exposed to combination of celecoxib (15 μM) and imatinib (3.5 μM). Celecoxib in combination with imatinib had stronger effects on growth inhibition of HT-29 cells than either agent used individually.

In conclusion, the results indicated that combination treatment with low dose celecoxib and imatinib resulted in synergistic antiproliferative effects on human colon cancer cells. However, the molecular mechanisms underlying their combined actions are not well understood but celecoxib might exert its effects by COX-2 dependent and independent mechanisms.

Poster No. 69

TRPV1 mediates 17β-estradiol cell protection against oxidative stress maintaining the mitochondrial function

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The ability to live in an oxidative environment requires effective cellular strategies for preventing irreversible damage and cell death. Specifically, 17β-estradiol has been directly implicated in cell protection by acting as a potent survival factor. However, the molecular entities involved in this mechanism are not well understood. We postulated that the non-selective cation channel TRPV1 is an ionotropic receptor involved in the rapid protective effect of 17β-estradiol. We studied this hypothesis using a three-state based kinetic model: alive-vulnerable-dead (A-V-D model) in heterologous expression system (HeLa cells) transfected with TRPV1. In flow cytometer experiment we found that H_2O_2 induced vulnerability to cell death through early mitochondrial depolarization and late plasma membrane collapse, independent of the TRPV1 expression. Furthermore, by calcium imaging we show that TRPV1 mediates calcium influx triggered by 17â-estradiol but not by its epimer 17â-estradiol. Also the expression of TRPV1 mediates estrogen cell

protection in a concentration-dependent manner. Indeed, the effect was mimicked by membrane-impermeable 17â-estradiol-BSA and independent of estrogen receptor â and â but not of membrane estrogen receptor GPR30. Moreover, 17α-estradiol was unable to induce cell protection and neither did their precursor testosterone. Specifically, 17β-estradiol in the first three hours avoids the H_2O_2- dependent mitochondrial depolarization and protects against irreversible damage. These results suggest that 17β-estradiol can activate the GPR30 improving mitochondrial function dependent of calcium influx through TRPV1 activity.

Key words
17β-estradiol, TRPV1, oxidative stress.

Poster No. 70

Oxidative stress level and its relation to develop post-traumatic stress disorder in child victims of sexual abuse

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Objective
The current study evaluated the level of oxidative stress in child victims of sexual abuse. It also evaluated whether or not the level of oxidative stress differed between children who developed versus those who did not develop post-traumatic stress disorder (PTSD) after abuse.

Materials and Methods
The present study was conducted at the Department of Child Psychiatry at Dicle University. The study included a total of 64 children aged between 6-17 years who were the victims of sexual abuse and 64 children matched for age and gender and who did not have a history of sexual abuse as the control group. The socio-demographic features and abuse characteristics were recorded. The post-traumatic stress disorder scale (CAPS) developed by the clinics were used to evaluate the presence and severity of post-traumatic stress disorder (PTSD). Of the cases, 25 (39%) were diagnosed with PTSD. The activities of glutathione peroxidase (GSH-Px), superoxide dismutase (SOD), catalase (CAT), and the level of malondialdehyde (MDA) were measured to evaluate the level of oxidative stress.

Results
There was no significant difference between the sexual abuse group and the control group in terms of the activities of GSH-Px, SOD, and CAT and MDA levels. On the other hand, the activities of GSH-Px and SOD were lower and MDA level was higher in children who experienced PTSD. A positive correlation was found between MDA levels and the scores in CAPS.

Discussion
The results indicated an association between free radical production and PTSD. Prospective studies are required to determine the causal relationship between oxidative stress and PTSD.

Poster No. 71

Effects of Tc-99m HMPAO on Oxidant and Antioxidant Parameters in Rat Brain

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Introduction
Heksametilpropilenaminoksim marked with Technetium 99m(99mTc HMPAO) is one of the radiopharmaceutical agent which were used to evaluate the brain perfusion. These radioactive chemicals cause ionizing radiation and lead dissociation of water to hydroxyl and hydrogen radicals which produce a serious oxidative stress. Brain tissue is one of the highly metabolic active organ which consumes lots of oxygen. In this study we aimed to asses effects of Tc-99m HMPAO on oxidant and antioxidant parameters in rat brain.

Material and Methods
Sixteen male, 5 months old wistar albino rats divided as an experiment group (n=8) which was given 129,5 MBq 99mTc HMPAO from tail vein and a control group (n=8) which was administered isotonic sodium. After 30 minutes from enjection rats were sacrified and brain tissues were extracted. We used for malondialdehid (MDA) measurement Draper and Hadley's double heat method, for catalase enzyme activity(CAT) Aebi method, for Superoxide Dismutase (SOD) enzyme activity

Woolliams' method, for glutathione peroxidase enzyme activity(GSH-Px) Paglia and Valentina's method. TAS and TOS levels were measured by Rel Assay Diagnostics kits and OSI was calculated.

Results

Data are assessed by Mann Whitney U test. We found experiment group's OSI and MDA levels were significantly increased(p=0.001,p=0.016) and SOD, GSH-Px, Cat activity significantly decreased(p=0.016, p=0.06, p=0.037) when compared to control group.

Discussion

Using 99mTc HMPAO for brain scintigraphy had increased oxidative stress and that could cause the exhaustion of antioxidant enzymes. We are thinking that in necessary cases which 99mTc HMPAO administration needed, giving antioxidant vitamin support may enhance defence system and decrease adverse effects.

Poster No. 72

Effects of interferon gamma on the vitamins A and E with β-caroten in liver and kidney of mice and rats with different resistance and immunities experimentally infected with Fasciola hepatica

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Studies shown that rats are more resistant to *Fasciola hepatica* infection than mice. This difference could be mediated by antioxidant enzymes of the parasite. Enzymes are known to be crucial in parasite survival against host-derived immune responses. This study was focused on investigation of the effects of IFN-γ on the vitamins A and E with β-carotene in the liver and kidneys of parasite resistance to killing by the rats and susceptibility to killing by the mice under experimental *Fasciola hepatica* infections. After dividing the animals into three groups, those in the first group, the mice were administered daily with 100 U IFN-γ and the rats with 250 U IFN-γ. The animals in the third group were administered with a placebo only. With the exception of the animals in the three groups (controls), the remaining mice and rats were infected, respectively, with 4 and 25 *F. hepatica* metacerceria. Superoxide dismutase (SOD) and glutathione peroxidase (GPx) activities were found to be higher in liver and kidney of the rats than the mice of the IFN-γ and fascioliasis groups (P<0.05), calatase (CAT) activity was not significantly in any of the two hosts with fascioliasis. In kidney and liver of mice with fascioliasis and IFN-γ groups, levels of MDA were statistically higher than in rats (p<0.05). These results suggest that the SOD and GPx are important molecules in determining susceptibility in *F. hepatica*-infected mice and resistance in *F. hepatica*-infected rats. In turn, this may leads to develop new drugs to inhibit this parasite.

Key words

Fasciola hepatica, Rat, Mice, antioxidant enzymes, Malondialdehite

Poster No. 73

Lipid profile status in erosive and non-erosive reflux disease

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Introduction

Lipid disorders are known risk factors for gastroesophageal reflux disease (GERD) -especially for erosive reflux disease (ERD) - has recently come to be recognized as a serious clinical problem. We sought to investigate the lipid profile status in ERD and non-erosive reflux disease (NERD) patients.

Material and Methods

Eighty- five ERD patients (44 male/41 female) and 69 NERD patients (23 male/ 46 female) were enrolled. ERD and NERD patients were those who had heartburn and/ or regurgitation with and

without erosion(s), respectively. Blood samples were drawn for measurement of total Cholesterol (TC), triglyceride (TG), high density lipoprotein (HDL) and low density lipoprotein (LDL). Data was compared among ERD and NERD patients.

Results

There were no significant differences between ERD and NERD patients in age (42.2±14.3 vs. 43.4±16.9 year; p=0.653), BMI (25.7±4.7 vs. 25.3 ±4.8 kg/m2; p=0.573), systolic blood pressure (87.0±17.9 vs. 83.4±11.9 mmHg; p=0.174) and diastolic blood pressure (131.7±20.7 vs. 127.3±16.5 mmHg; p=0.176). There was a significant increase in the levels of TC in NERD patients (212.0±49.1mg/dl) when compared to ERD patients (188.4±52.3 mg/dl; p=0.011). No statistically significant difference was observed between ERD and NERD for TG (72.7±39.3 vs. 86.3±57.1 mg/dl; p=0.119), LDL (81.6±28.7 vs. 82.3±28.1 mg/dl, p=0.894) and HDL (33.6±12.1 vs. 35.8±12.2 mg/dl, p=0.336).

Conclusion

GERD could be taken as an indicator for the presence of metabolic abnormalities. We revealed that cholesterol disorders are associated with NERD symptoms and it seems to be a disease triggered by lipid imbalance.

Poster No. 74

Effects of artichoke against cyclophosphamide-induced nephrotoxicity and oxidative stress in rats

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The aim of this study was to investigate the effects of artichoke on cyclophosphamide (CP)-induced nephrotoxicity and oxidative stress in rats. Rats were randomly divided into four groups. The first group received no medication and was regarded as the control group; the second group was treated with artichoke for 7 days; the third group was injected with a single dose of CP; the fourth group was treated with artichoke for 7 days before and for 5 days after the administration of a single dose of CP. CP (150 mg/kg) was intraperitoneally (i.p.) injected as a single dose and artichoke extract (1 g/kg/day) was administered by gavage. The levels of malondialdehyde (MDA), activities of glutathione peroxidase (GSH-Px), glutathione-S- transferase (GST) and superoxide dismutase (SOD) were higher in the group treated with CP alone than in the control group, and were lower in the groups administered with artichoke and artichoke+CP than in the CP alone group. The activities of catalase (CAT) and levels of reduced glutathione (GSH) were lower in the CP alone group than in the control group and were higher in the groups administered with artichoke than in the CP alone group. Although the levels of GSH were higher in the artichoke+CP group than in the CP alone group, activities of CAT were not significantly different in the kidneys. In particular, treatment with artichoke+CP normalized levels of GSH, activities of GSH-Px and GST. Histopathologically, in the CP group, dilatation in the distal tubulin, glomerular atrophy in a few areas and tubulin of foamy appearance were encountered. In the CP+artichoke group was observed less frequently dilatation in the distal tubule. In the CP+artichoke and artichoke groups were remarkable hyperemia of the peritubular vessels. Glomerular and tubular structures were appearanced more regular than the CP group. Glomeruli and tubules were distinguished normal structure in the artichoke group. Results from this study indicate that the novel natural antioxidant artichoke might have protective effect against CP-induced nephrotoxicity and oxidative stress in rats.

Poster No. 75

Effects of YC-1 on oxidant antioxidant system parameters and trace element levels in epileptic seizures in pentylenetetrazole-induced epileptic rats

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Epilepsy is one of the most important central nervous system disorder and 1% of the total

world population suffers from this disorder which require a chronic drug treatment(1).It is known that oxidative stress play an important role in the pathophysiology of epileptic seizures, and antioxidant strategies for seizure treatment(2,3). The potential role for 3-(5-hydroxymethyl-2-furyl)-1-benzyl-indazole(YC-1) is a novel modulator of the NO-soluble isoform of guanylyl cyclase pathway in brain(4).The current study designed to determine the effects of YC-1 on the levels of lipid peroxidation(MDA),reduced glutathione(GSH),nitric oxide(NO),iron,copper and zinc in a single dose pentylentetrazole(PTZ)-induced epilepy model. Twenty eight Wistar rats were divided into experimental groups including:1-received PTZ(55 mg/kg i.p.) and YC-1(1 mg/kg i.p.), 2-single dose PTZ-recevied rats, 3-YC-1(1 mg/kg i.p.) as a control group and 4-0.1%DMSO(vehicle) treated group. YC-1 was injected 10 minutes prior to PTZ injection for animals.Tissues samples were taken from the animals under anesthesia after decapitation oxidant/antioxidan parameters and trace element levels were determined in brain cortex and kidney tissues.Trace element levels (Cu,Zn,Fe) were determined by Spectroblue ICP-OES. MDA, GSH and NO levels were determined by biochemical methods in all study samples.Results were compared with the one-way ANOVA and Tukey post-hoc tests.The brain and kidney levels of MDA in group 2 were found to be significantly higher than the group 4. Also, the brain levels of NO in group 2 were found to be significantly higher than the group 1, 3 and 4.However, the kidney levels of Zn in group 2 were found to be significantly lower than the group 3.In conclution, YC-1 administration caused protection against the single dose PTZ-induced brain and kidney oxidative toxicity by inhibiting reactive oxygen species production and epileptic seizures, and suppoting antioxidant redox system.

References

1. Durmus N, Kaya T, Gılturk S, Demri T, Parlak M, Altun A. The effects of L type calcium channels on the electroencephalogram recordings in WAG/RIJ rat model of absence epilepsy, Eur Rev Med Pharmacol Sci 2013;17:1149-1154.
2. Shin EJ, Jeong H, Chung YH, et al. Role of oxidative stres in epileptic seizures, Neurochem Int 2011; 59(2): 122-137.
3. Nazıroglu M, Akay MB, Çelik O., et al. Capparis ovata Modulates brain oxidative toxicity and epileptic seizures in pentylentetrazol-induced epileptic rats, Neurochem Res 2013; 38: 780-788.
4. Bredt DS, Nitric oxide signaling in brain: potentiating the gain with YC-1, Mol Pharmacol, 2003; 63: 1206-1208.

Poster No. 76

Associations among plasma lipid peroxidation, selenium, zinc and tumor necrosis factor-alpha concentrations in patients with chordae tendineae

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Disturbance of trace element balance and proinflammatuary processes increase the oxidative stress of many different inflammatuary diseases (1-3). The aim of this study was to determine whether plasma zinc (Zn), selenium (Se), malondialdehyde (MDA) and tumor necrosis factor-alpha (TNF-α) levels are associated with inflammatuary process in the context of a potential etiology causing aggravation of mitral regurgitation and/or ruptured chordae tendineae. Eighty-six subjects who were identical in demographic charecteristics were selected for the study; 40 with chordae tendineae disease, and 46 healthy volunteers. Plasma Zn and Se levels were determined by Spectroblue ICP-OES. MDA levels were determined biochemical methods. TNF-α levels were determined by enzyme-linked immunosorbent assay (ELISA) in all study subjects. Results were compared with student's t-test and Mann-Whitney U test. Plasma MDA levels were found to be higher in the patients group when compared to controls. While Zn and Se levels in the patients group were found to be significantly lower than the control group. Additionally, no significant differences were found between the groups as TNF-α levels in plasma were taken into consideration. This study shows that selenium and zinc may be an effective complementary supplement for reducing the severity of oxidative damage in chordae tendineae patients through alleviating oxidative stress and inflammation.

References

1. Ustundag B, Yılmaz E, Doğan Y, et al. Levels of cytokines(IL-1β, IL-2, IL-6, IL-8, TNF-α) and Trace Elements (Zn, Cu) in Breast Milk From Mothers of Preterm and Term Infants Mediators Inflamm. Dec 14, 2005; 2005(6): 331–336.
2. Kocyigit A, Gur S, Erel O, Gurel MS, Associations among plasma selenium, zinc, copper, and iron concentrations and immunoregulatory cytokine levels in patients with cutaneous leishmaniasis. Biol Trace Elem Res. 2002 Winter;90(1-3):47-55.
3. Salehi M1, Sohrabi Z, Ekramzadeh M, Fallahzadeh MK, Ayatollahi M, Geramizadeh B, Hassanzadeh J, Sagheb MM, Selenium supplementation improves the nutritional status of hemodialysis patients: a randomized, double-blind, placebo-controlled trial. Nephrol Dial Transplant. 2013 Mar;28(3):716-23. doi: 10.1093/ndt/gfs170. Epub 2012 Jul 4.

Poster No. 77

The study of antioxidant capacity by in vitro methods in plants that have different levels of allantoin metabolism

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Allantoin is the final product of purine catabolism by the oxidation of uric acid with the enzyme uricase. Allantoin is also a common constituent of plants (1). It has been pointed out that uric acid acts as an antioxidant and is capable to react with biologically relevant oxidants to form allantoin (2). We aimed to study the antioxidant capacities of three plants that has different levels of allantoin metabolism *Plantago major, Platanus orientalis* and *Aesculus hippocastanum* by 1,1- diphenyl-2-picrylhydrazyl (DPPH) radical scavenging method, cupric reducing antioxidant capacity (CUPRAC), reducing power assay and β-carotene bleaching method as in vitro. All of plant samples showed antioxidant effects but *plantago major* showed the highest antioxidant activity. These plants showed different antioxidant activities as depend on different levels of their allantoin metabolism.

References

1. Roman K, Pavla Z, Vladimira M. Monitoring of antioxidant properties of uric acid in humans for a consideration measuring of levels of allantoin in plasma by liquid chromatography. Clinica Chimica Acta 2006; 365: 249-256.
2. Maximiliano GB, Maria AA, Juan AC, Israel AV, Alfredo CV. Uric acid deposits and estivation in the invasive apple-snail, Pomacea canaliculata. Comp. Biochem. Physiol., A: Comp. Physiol 2011; 158: 506-512.

Poster No. 78

Cytotoxic effects of benzyl benzoate on L929 cells

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Xenobiotics can have negative effects on human health and people are exposed to them in various ways. Food additives are natural or synthetic chemicals added to food to preserve flavor, enhance it texture or its appearance or for other technological functions (1). Food additives include preservatives, nutrients, flavoring agents or antioxidants (2). One of these chemicals, Benzyl Benzoate, is widely used as a flavoring agent in foods, and it is also used as an acaricide, a scabicide, a solvent in cosmetic industry and an additive in many pharmaceutical products (3). However, according to EPA's report, benzyl benzoate toxicity is categorized in Group II and the acute oral toxicity were calculated 1100 -1980 mg/kg for rats, mice, rabbits and guinea pigs (4). In our study, we evaluated cytotoxic effects of benzyl benzoate on L929 fibroblast cell line. The cells were treated with different dosages of benzyl benzoate for 24 and 48 hour period to determine LC50 values. MTT test, LDH activity test, trypan blue dye exclusion method and acridin orange – propidium iodide dual staining was performed at the end of treatment period. We compared benzyl benzoate cytotoxicity with these assays which were based on mitochondrial membrane or cell membrane damage and cell death type. Our findings demonstrated that a significant decrease in viability was observed in all treatment groups. On the basis of these observations, we suggest that benzyl benzoate is able to induce cytotoxicity through membrane damage.

References

1. Tomaska L.D. and Brooke- Taylor S. "Food Additives: Food Additives – General", Encyclopedia of Toxicology, Volume 2: Hazard and Diseases, 2014, pp 449-454.
2. Omaye S.T. 2004. Food and Nutritonal Toxicology. CRC Press, Washington D.C. Chapter 17: Food Additives, Colors, and Flavors pp 255.
3. Jamaluddin Shaikh "Benzyl Benzoate", in Philip Wexler, Encyclopedia of Toxicology (2nd ed.), Elsevier, 2005; pp 264–265.
4. http://www.epa.gov/chemrtk/hpvis/hazchar/Category_Benzyl%20Derivatives_September_2010.pdf

Poster No. 79

Antioxidant enzyme activities in Vero cell line inoculated with Herpes Simplex Virus type 1

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Herpes simplex viruses are common infections worldwide. Herpes simplex virus (HSV) locates latency in ganglia and causes a persistent infection for life (1). Herpes Simplex Virus-1 (HSV-1) infection is commonly characterized by oral or facial lesions (2). Some viruses as Bovine Viral Diarrhea Virus and Human Immunodeficiency Virus generate oxidative stress (3,4). The aim of the present study was to determination of antioxidant enzymes in Vero cell line inoculated with HSV-1. Vero cells were cultivated at 37°C and 5% CO_2 incubator in 27 flasks and HSV-1 was inoculated by non-adsorption method. Cells supernatants were collected periodically (1 hr) during 1 day. Levels of superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase (GPx) enzymes were analyzed by commercially available ELISA kits. In addition to this, flasks were evaluated for cytopathogenic effects (CPE) by microscopically. CPE was detected at 6 hours after inoculation, whereas SOD, CAT and GPx enzyme activities decreased minimum level at 1, 18 and 6 hours, respectively. Viruses caused oxidative stress were reported (3,4), and in this research, HSV-1 effected oxidative enzyme (SOD, CAT, GPx) activities in vitro in Vero cell line. In conclusion, SOD activity may be useful for detection cell damage because of SOD activity decrease before occurring CPE. Besides, antioxidant supplementation may be recommended in the treatment of HSV-1 infection and SOD activity may be evaluated in HSV-1 caused oxidative stress.

References

1. Cusini M, Ghislanzoni M. The importance of diagnosing genital herpes. J Antimicrob Chemother 2001; 47: 9-16.
2. Corey L, Wald A. 1998. Genital herpes. In: Holmes KK, Mardh PA, Sparling PF, et al, eds. Sexually transmitted diseases. New York: McGraw-Hill, pp. 285-312.
3. Suresh DR, Annam V, Pratibha K, Prasad BVM. Total antioxidant capacity - A novel early bio-chemical marker of oxidative stress in HIV infected individuals. J Biomed Sci 2009;16:61.
4. Schweizer M, Peterhans E. Oxidative stress in cells infected with bovine viral diarrhea virus: a crucial step in the induction of apoptosis. J Gen Virol 1999; 80:1147-1155.

Poster No. 80

Superoxide dismutase, catalase and glutathione peroxidase activities in vero cell line inoculated with bovine ephemeral fever virus

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Bovine Ephemeral Fever (BEF), caused by Bovine Ephemeral Fever Virus (BEFV), is a viral vector borne disease (1). Infection cause acute disease, suddenly fever, anorexia, depression, arthritis, immobility and joint swelling in both cattle and buffalo (2,3). Viral agents like Bovine Viral Diarrhea Virus and Human Immunodeficiency Virus generate oxidative stress in the body (3,4). The aim of the present study was to determination of activities of superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase (GPx) in Vero cell line inoculated with BEFV (Genbank No: GQ229452.1). Cell supernatants were collected 4 h/day for 5 days after BEFV inoculation. SOD, CAT and GPx enzyme values were analyzed by commercially available ELISA kits. In addition to this, cytopathogenic effects (CPE) of BEFV in cell culture were evaluated periodically by invert microscope. In this research, cytopathogenic effect of BEFV was observed at 72 h post-infection. Maximum level of SOD was determined at 56 h, while minimum levels of CAT and GPx were determined at 8 and 104 hours, respectively. In addition, CAT and SOD activities decreased before developing BEFV-caused CPE. In conclusion, it may be stated that CAT and SOD levels may be used as marker in BEFV-caused oxidative changes, and antioxidant therapy may be recommended in the treatment of BEFV infection.

References

1. Murray MD. Possible vectors of bovine ephemeral fever in the 1967/68 epizootic in northern Victoria. Aust Vet J 1997; 75(3):220.
2. Mellor PS. Culicoides: vectors, climate change and disease risk. Vet Bull 1996; 66:301-306.
3. Uren MF, St. George TD, Murphy GM. Studies on the pathogenesis of bovine ephemeral fever in experimental cattle III. Virological and biochemical data. Vet Microbiol 1992; 30(4):297-307.
4. Schweizer M, Peterhans E. Oxidative stress in cells infected with bovine viral diarrhea virus: a crucial step in the induction of apoptosis. J Gen Virol 1999; 80:1147-1155.

Poster No. 81

Purification and characterization of mitochondrial thioredoxin reductase enzyme from rainbow trout *(Oncorhynchus Mykiss)* liver and investigation of some metal ions' *in vitro* effects on enzyme activity

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Thioredoxin reductase (E.C 1.6.4.5.; TrxR) is a homodimeric enzyme belonging to flavoenzymes family. TrxR catalyzes the NADPH-dependent reduction of thioredoxin and other substrate disulphide bonds via its selenocysteine/FAD active site. Mammalian TrxR consequently participates in diverse metabolic reactions involving oxidation-reduction cycles and it is widely believed to be central to intracellular ROS mitigation (1). Thioredoxin/ Thioredoxin reductase system reduces free radicals and functions on oxidized ascorbat recycles. The reduced thioredoxin acts as an electron acceptor and thioredoxin peroxidase reduces hydrogen peroxide to water (2). In this study; purification and characterization of mitochondrial TrxR, an enzyme that play important roles in oxidative stress and many important cellular events was aimed. The purification of the enzyme was performed by two steps as preparation of homogenate and 2',5'-ADP Sepharose 4B affinity chromatography. Enzyme was obtained having a specific activity of 11.9 EU/ml proteins with a yield of 2.38% and 672 of purification fold. The purity of the enzyme was controlled and molecular weight of its subunits were calculated as 70 kDa by SDS-PAGE. The native molecular mass of the enzyme was found to be approximately 151 kDa by gel filtration chromatography. Optimal pH, optimal ionic strength, optimal temperature, stable pH for enzyme were determined as pH 7.5 at 500 mM phosphate buffer, 0°C and pH 8.0 at phosphate buffer, respectively. Besides, K_M constants and V_{max} values for both substrates, DTNB and NADPH, were calculated as 0.828 µM and 0.079 EU/ml and 12.65 µM and 0.513 EU/ml. Respectively *in vitro* effects of Al^{3+}, Co^{2+}, Fe^{3+}, Cu^{2+}, Ni^{2+} and Se^{4+} metal ions on the enzyme activity were examined. While Se^{4+} metal ions were enhancing the enzymatic activity, other metal ions showed inhibition. V0 values and turnover number (Kcat) for DTNB were calculated as 44×10^3 min^{-1} μM^{-1} and 36.2× 103 min^{-1}. Mitochondrial TrxR which has antioxidant property and is subject of cancer research was purified from rainbow trout liver more practical method than literature, characterized and determined kinetic properties. Then, effects of some metal ions on the enzyme activity were examined to give an idea of treatment of diseases associated with TrxR.

References

1. Tibodeau JD, Benson LM, Isham CR, Owen WG and Bible KC. The anticancer agent chaetocin is a competitive substrate and inhibitor of thioredoxin reductase. Antioxidants & Redox Signaling 2008; 11:1096-1106
2. Karaca Ş, Güder H. Dermatolojide antioksidan sistem. Turkish Journal of Dermatology 2009; 3: 32-39.

Poster No. 82

Effects of YC-1 on zinc, copper, lipid peroxidation, nitric oxide levels and superoxide dismutase activities in single-dose pentylenetetrazole-induced epileptic seizures

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Epilepsy, one of the neurological conditions, is known that oxidative stress and certain trace element balance play an important role in it's pathophysiology, and certain antioxidant treatment strategies for seizure have been proposed(1,2).YC-1, a synthetic bezylindazol derivate 3-(5-hydroxymethyl-2-furyl)-1-benzyl-indazole(YC-1), that has been demonstrated to have neuroprorecrive effect on neurons and the blood brain barrier(3). The aim of the study was evaluated the effects of YC-1 on the levels of lipid peroxidation(MDA),superoxide dismutase(SOD),nitric oxide(NO),copper and zinc in a single dose pentylentetrazole(PTZ)-induced epilepy model. 28 Wistar rats were divided into experimental groups including:1-received PTZ(55 mg/kg,i.p.) and YC-1(1 mg/kg,i.p.),2-single dose PTZ-recevied rats,3-YC-1(1 mg/kg i.p.) as a control group and 4-0.1%DMSO(vehicle) treated group. Trace element levels (Cu,Zn) were determined by Spectroblue ICP-OES. MDA, NO levels and SOD activities were determined by biochemical methods

in all study samples.Results were compared with the one-way ANOVA and Tukey post-hoc tests.The brain levels of MDA in group 2 were found to be significantly higher than the group 3 and 4. Also, the brain and liver levels of MDA and NO in group 2 were found to be significantly higher than the group 1. Additionally, the liver levels of MDA in group 2 were found to be significantly higher than group1 and 4.The liver levels of Zn in group 3 were also found to be significantly higher than the group 1, 2 and 4. In conclution, YC-1 administration caused protection against the single dose PTZ-induced brain and liver oxidative toxicity by inhibiting reactive oxygen species production and epileptic seizures, and supporting trace element homeostasis and oxidant/antioxidant redox system.

References

1. Shin EJ, Jeong H, Chung YH, et al. Role of oxidative stres in epileptic seizures, Neurochem Int 2011; 59(2): 122-137.
2. Nazıroglu M, Akay MB, Çelik O., et al. Capparis ovata Modulates brain oxidative toxicity and epileptic seizures in pentylentetrazol-induced epileptic rats, Neurochem Res 2013; 38: 780-788.
3. Yan J, Zhou B, Taheri S, Shi H. Differential effects of HIF-1 inhibition by YC-1 on the overall outcome and blood-brain barrier damage in a rat model of ischemic stroke. PLoS One. 2011;6(11):e27798.

Poster No. 83

The role of selenium level and oxidative stress markers in pathophysiology of absence epilepsy

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It is known that oxidative stress and distribution of trace element balance play an important role in the pathophysiology of neurodegenerative diseases (1,2). The aim of this study was to determined the levels of Se, malondialdehyde (MDA), reduced glutathione (GSH) and nitric oxide (NO) in brain cortex underlying absence epileptic seizure in WAG/Rij rats. 1,3 and 6-months-old female WAG/Rij (n=28) rats were used in our study. All animals were decapitated using transcardiac perfusion. The cortex was dissected from brains of WAG/Rij rats in all groups. The levels of Se in brain cortex were determined by Spectroblue ICP-OES. MDA, NO levels and SOD activities in brain cortex were determined by biochemical methods in all study samples. Results were compared with the one-way ANOVA and Tukey post-hoc tests. The brain levels of MDA and NO in the 6- mo old WAG/Rij rat group were found to be significantly higher than the 1-mo old WAG/Rij rat group. Also, the brain levels of MDA in 6- mo old WAG/Rij rats were found to be significantly higher than the 3- mo old WAG/Rij rats. However, the brain levels of GSH in 6- mo old WAG/Rij rat group were found to be significantly lower than 1-and 3-mo old WAG/Rij rats. Additionally, no significant differences were found between the groups as Se levels in brain cortex were taken into consideration. From these results, it can be concluded that increased oxidative stress-induced damage of macromolecules, probably due to reduced antioxidant system parameters, is associated with seizure maturation of cortex in WAG/Rij rats.

References

1. Shin EJ, Jeong H, Chung YH, et al. Role of oxidative stress in epileptic seizures, Neurochem Int 2011; 59(2): 122-137.
2. Nazıroglu M, Akay MB, Çelik O., et al. Capparis ovata Modulates brain oxidative toxicity and epileptic seizures in pentylentetrazol-induced epileptic rats, Neurochem Res 2013; 38: 780-788.

Poster No. 84

Alterations of renal oxidative stress in response to exercise and detraining of 10 weeks in spontaneously hypertensive rats

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Hypertension leads various pathological changes within kidneys (1). Oxidative stress is implicated in the pathogenesis and/or maintenance of elevated blood pressure in hypertension (2). An understanding of the alterations in oxidative stress in response to exercise and detraining in spontaneously hypertensive rats (SHR) might be relevant for the development of potential future exercise regimens in the treatment of hypertension. Therefore, we investigated the effect of low-moderate intensity swimming exercise on renal oxidative stress markers and the role of

10 week detraining in spontaneously hypertensive rats (SHR) and control Wistar–Kyoto (WKY) rats. SHR and WKY rats were further randomized into 8 groups of either exercise training/detraining and sedentary training/detraining, 6 rats being in each group. Exercising rats swam for a total period of 10 weeks, 60 min/day and 5 days/week. The total oxidant status (TOS) and total antioxidant status (TAS) of kidneys were detected by a colorimetric kit. The ratio of TOS/TAS is referred as the oxidative stress index (OSI). Systolic blood pressure (SBP) of 8 week old SHR was slightly higher than WKY rats. Exercise reduced SBP, while detraining resulted in increment of SBP towards baseline levels in both SHR and WKY rats. TOS of SHR was lower, as TAS was higher compared to WKY. The exercise protocol resulted in decrement of TOS and TAS just in SHR rats. Detraining caused reduction in OSI of WKY rats and enhancement of this parameter in SHR rats. These results demonstrate the favorable effect of exercise on oxidative stress in hypertension.

References

1. Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK, He J. Global burden of hypertension: analysis of worldwide data. The Lancet 2005; pp 217– 223.
2. Kizhakekuttu TJ, Widlansky ME. Natural antioxidants and hypertension: promise and challenges. Cardiovascular Therapeutics 2010; pp 20–32.

Poster No. 85

Effects of agomelatine on apoptosis through TRPV1 channels in hippocampus of depression induced rats

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Abstract

The antidepressant agomelatine (AGOM) is a potent agonist of melatonin receptors and antagonist of 5-HT2C. AGOM-induced changes in the brain have been reported under basal conditions. Yet, little is known about its effects in the brain exposed to chronic stress as a risk factor for major depressive disorders. TRPV1 is a Ca^{2+} permeable non-selective channel expressed in hippocampal neurons. Moreover, activation of TRPV1 during oxidative stress has been linked to cell death. Despite the importance of antioxidant AGOM in depression, its role on apoptosis and TRPV1 channel modulation is poorly understood in depression. In order to better characterize the actions of AGOM in the stress-compromised brain, we tested the effects of melatonin on apoptosis and oxidative stress through TRPV1 channel in the hippocampal neuron of rats with chronic mild stress (CMS) model.

Rats were divided into six groups. First, second and third groups were used as control, DMSO and AGOM groups (without CMS), respectively. Fourth, fifth and sixth groups were used as CMS, CMS+DMS and CMS+AGOM, respectively. Hippocampal neurons from all rats were freshly isolated. AGOM was dissolved in DMSO. The neurons were stimulated through TRPV1 channel agonist, capsaicin. Apoptosis, caspase 3 and 9 values were higher in CMS and CMS+DMS groups than in control, DMSO and AGOM groups. However, apoptosis, caspase 3 and 9 values were decreased in CMS+AGOM group by AGOM treatment. There were no statistical change on cell viability (MTT), intracellular ROS production and mitochondrial membrane depolarization values in the six groups.

In conclusion, in our stress experimental model, TRPV1 channels are involved in the Ca^{2+} entry-induced neuronal death, and modulation of this channel activity by AGOM pretreatment may account for their neuroprotective activity against apoptosis.

Keywords

Apoptosis; Calcium ion entry; TRPV1 channels; Agomelatin; Chronic mild stress.

Poster No. 86

Effects of agomelatine on oxidative stress in brain of rats with chronic mild stress depression model

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Abstract

The antidepressant agomelatine (AGOM) is a potent agonist of melatonin receptors and antagonist of 5-HT2C. To our knowledge, there is no report whether agomelatine has antioxidant properties in brain of rats with chronic mild stress (CMS). The current study was designed to determine the effects of agomelatine on lipid peroxidation and antioxidant levels and in CMS-induced depression rats.

Rats were divided into four groups. First and second were used as control and agomelatine, respectively. Third and fourth groups were used as CMS and CMS+ agomelatine, respectively. Brain cortex samples from all rats were freshly taken. Glutathione peroxidase (GSH-Px) activities were lower in CMS group than in control although its activation was increased by agomelatine treatment. There were no statistical change on lipid peroxidation, reduced glutathione, vitamin A, β-carotene and vitamin E values in brain cortex of the four groups.

In conclusion, in our stress experimental model, both CMS and agomelatine didn't induce significant oxidant and antioxidant effects in brain cortex of rats.

Keywords
Oxidative stress; Vitamin E; Glutathione peroxidase; Agomelatine; Chronic mild stress.

Poster No. 87

Calcineurinβ regulates PERK autophosphorylation in astrocytes after stress

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The accumulation of unfolded proteins in the Endoplasmic Reticulum (ER) triggers a signal transduction cascade called the Unfolding Protein Response (UPR), which attempts to restore homeostasis. An immediate response is the activation of (PKR)-like-ER kinase (PERK) that leads to phosphorylation of eukaryotic initiation factor-2 alpha, thereby attenuating protein synthesis. We demonstrated that calcineurin-A/B(CN-A/B), a heterodimeric Ca2+ phosphatase, associates with PERK, increasing its auto-phosphorylation and significantly enhancing inhibition of protein translation and cell viability in *Xenopus oocytes.*

Here, we report that the level of CNAb/B, the astrocytes specific CN isoform, as well as PERK phosphorylation were significantly increased after Oxygen and Glucose Deprivation (OGD) treatment. Furthermore, overexpression of CNAb increased the viability of wild-type astrocytes exposed to OGD but not in astrocytes null for PERK(-/-). Kinase assays with recombinant proteins demonstrated that PERK autophosphorylation was increased in presence of CNAb/B but not in the presence of only regulatory subunit B. Finally, we observed that light- or chemical-induced heterodimerization of PERK and CNAbB, leads to increase PERK phosphorylation in astrocytes. It was markedly enhances by thapsigargin treatment, suggesting that Ca2+ release from the ER further enhanced the CN-PERK interaction. Taken together, our findings indicate that the protective role of CN-PERK interaction observed in *Xenopus* oocytes can be extended to astrocytes stressed by OGD. Funded in part by NIHR21-NS085732, and PID-2010.

Poster No. 88

Evaluation of serum levels of total antioxidant capacity (TAC), reduced glutathione (GSH) and oxidized glutathione (GSSG) in early stage breast cancer

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Breast cancer is the second most common type of cancer in women and is a leading cause of cancer related deaths in women worldwide. (1) Oxidative stress is considered to be involved in the pathophysiology of all cancers. Oxidative stress caused by increased free radical generation and/or decreased antioxidant level in cell has been suggested to play an important role in carcinogenesis and treatment of cancer with chemotherapeutic drugs.(2) The human body has developed different antioxidant systems to defend against free radical attacks. There has been some study which reports the changes of antioxidant status in blood and tissues in the patient with breast cancer and the results in this subject remain complicated and controversial. (2) We studied GSH, GSSG and total anti-oxidant values in 15 patients with stage I breast cancer and 15 individuals in control group. The age of the studied individuals was between 25-40 years old. We measured GSH, GSSG values by manual kit (Oxford Biomedical research USA kit) and total anti-oxidant value by BT-3000 (Randox Laboratories UK kit). The obtained values of test results in stage I breast cancer and comparing with normal values indicate that GSH production in patients' serum decreases as compared with normal group and GSSG production in patients' serum increase as compared with normal group. We obtained the mean values of GSH and GSSG in patients' serum 0.39±0.1 and 0.29±0.9 µmol, respectively and in control group 3.1±0.1 and

0.02±0.3 µmol, respectively (Pvalue <0.05). Total anti-oxidant production in patients decreases as compared with normal individuals. We obtained the mean values of total anti-oxidant in patients' serum and control group 0.79±0.09 and 1.56±0.3 mm/l, respectively (Pvalue < 0.05). According to our results, loss of the large amount of serum GSH and TAC may be due to increased detoxification capacities and protect against oxidative stress but further studies are required in this subject.

References

1. Rajneesh CP, Manimaran A, Sasikala KR, Adaikappan P. Lipid peroxidation and antioxidant status in patients with breast cancer. Singapore Med J. 2008 Aug;49(8):640-3.
2. Panis C, Herrera AC, Victorino VJ, Campos FC, Freitas LF, De Rossi T, et al. Oxidative stress and hematological profiles of advanced breast cancer patients subjected to paclitaxel or doxorubicin chemotherapy. Breast Cancer Res Treat. May;133(1):89-97.

Poster No. 89

Otherwise perspective of voltage-gated potassium channels

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MicroRNAs are the small regulatory RNA molecules of target gene expressions in physiological and pathological processes which are apoptosis, stress response, proliferation, differantiation, development and regulating systems. In various cancer, miR-126 is located in intron 7 section of epidermal growth factor gene (Egfl-7), and it effects signalling, angiogenesis, vascular development and regulation by vascular endothelial growth factor (VEGF).Voltage-gated potassium channels (VGPCs) are fundamental to cellular physiology and play a number of key functions, including control of volume, apoptosis, adhesion, proliferation, migration and influence solute/water transport. These functions are linked to formation of primary and metastatic tumors.In our study, we aimed to reveal the diversity of miR-126/126* and Egfl-7 by inhibition of voltage gated potassium channels with toxins. For this study, potassium channel inhibitors including tetraethylammonium (5mM, TEA), 4-Aminopyridine (5mM, 4-AP), Margatoxin (1µM) and Astemizole (2µM) was treated to MCF-7 and MDA-MB-231 breast cancer cell lines. After total RNA isolation from the cells, Real-Time Polymerase Chain Reaction (RT- PCR; Stratagene MxPro3000) was used for identification of gene expressions. OneWay ANOVA was used for variation analyses and Tukey HSD and Tamhane was used for multiple comparisons as statically assessment. Our results showed that increased of miR-126/126* expressions and decreased of Egfl-7 gene expression after channel inhibition of MCF-7 and MDA-MB-231 cell lines (p<0.001). miR-126/126*, which is known to be related with breast cancer and its metastasis, may be interacted with voltage gated potassium channels. Further studies in other cancers may be needed to verify our results.

Key Words

Breast Cancer, Egfl-7, miR-126/126*, Voltage-Gated Potassium Channels

Poster No. 90

Involvement of apoptosis and calcium accumulation through TRPV1 channels in neurobiology of epilepsy

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Abstract

Epilepsy is a common neurological disorder affecting approximately 50 million (>1%) of the population worldwide and acute transient complex neurobehavioral disorders resulting from increased excitability of neurons in various brain regions. To date, cannot be cured although antiepileptic drugs provide partially control of seizures. Calcium ion accumulation into cytosol of hippocampus and dorsal root ganglion (DRG) are mean reasons in etiology of epilepsy and peripheral pain, respectively. TRPV1 channel is a cation-permeable calcium channel found in the DRG and hippocampus. Although previous studies implicate TRPV1 channels in the generation of epilepsy, suppression of ongoing seizures by TRPV1 antagonists has not yet been attempted. We tested the effects of TRPV1-specific antagonists, capsazepine (CPZ) and 5′-iodoresiniferatoxin (IRTX), in the modulation of calcium accumulation, apoptosis and anticonvulsant properties in hippocampus of DRG and hippocampus of pentylentetrazol (PTZ) and capsaicin (CAP) administrated rats.

Forty rats were divided into 5 groups as follows; control, PTZ, CAP+PTZ, IRTX, IRTX+PTZ groups. In Fura-2 and patch-clamp experiments, the stimulations of the neurons were performed by CAP although their inhibitions were performed CPZ. PTZ and CAP+PTZ administrations increased intracellular

free Ca2+ concentrations, TRPV1 current densities, apoptosis, caspase 3 and 9 values although the values were reduced by IRTX and CPZ treatments. Latency time was extended by application CPZ and IRTX although CAP produced acceleration of epileptic seizures.

Taken together, current results support role of TRPV1 channels in inhibition of apoptosis, epileptic seizures and calcium accumulation, indicating that TRPV1 inhibition may possibly to a novel target in DRG and hippocampus for prevention and epileptic seizures and peripheral pain.

Keywords

Apoptosis; Calcium ion; Epilepsy; Hippocampus; TRPV1 channels; Seizures.

Poster No. 91

Dysregulation of capacitative calcium entry in hypertensive rats associated to mitochondrial dysfunction

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Mitochondria located in close proximity to calcium microdomains are exposed to high Ca^{2+} concentrations, and therefore they are able to buffer it. We hypothesized that mitochondria Ca^{2+} buffering are impaired in vascular cells and induce adaptive changes, affecting capacitative calcium entry (CCE) and cytosolic calcium overload in spontaneously hypertensive rats (SHR) compared with normotensive Wistar Kyoto rats (WKY).

Changes in isometric tension of aortic arteries were recorded by force transducers FT202 connected to an amplifier ETH 400 and to an analogical/digital converter PowerLab linked to a computer. Fura-2 dye and Rhod-2 were used to study the cytosolic and mitochondrial calcium by florescense recordings.

In the present work, we have observed that SHR shows an organelle and cytosolic calcium overload which may be due to mitochondrial damage and a consequent Ca^{2+} homeostasis dysregulation mediated by CCE-mitochondria interaction in aorta rings and smooth vascular muscle cells. This conclusion is supported by the following findings in SHR, compared with WKY rats: 1) augmented contraction of vascular tone after depletion of intracellular Ca^{2+} stores with successive stimulation with caffeine, ryanodine or thapsigargin in 0 Ca^{2+} solutions; 2) reintroduction of 2.5 mM Ca^{2+} in store-depleted vessels at 0 Ca^{2+} induce higher contractions; 3) these contractions induced by Ca^{2+} reintroduction were antagonized by Gd^{3+}, La^{3+} and SKF-96365 (a Stromal Interaction Molecule inhibitor; STIM-1 inhibitor); 4) similar results were obtained in smooth muscular cerlls 5) western-blot shows that STIM-1 expression is up-regulated in aorta tissue of SHR and cultures of smooth muscular cells of this arteries, also observed by immunohistofluorescence studies. 6) accumulative concentration response curve in the presence of FCCP in aortic rings shows a mitochondrial dysfunction.

These results support the hypothesis that mitochondrial Ca^{2+} imbalance affect the regulation of CCE which is an important factor in calcium overload and cell damage. The major cytosolic calcium concentration in hypertensive rats due to the mitochondrial dysfunction perform a negative feed back in the store operated channel (SOC) preventing the Ca^{2+} entry. The suppression of this Ca^{2+} influx mechanism is balanced by the cells with a STIM overexpression, leading to a greater CCE when the reticulum depletion occurs. Thus, mitochondria and STIM-1 could be new targets for the treatment of hypertension.

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Poster No. 92

Modulation of colon motility by TRPV1, V4 and A1 channels in rat

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Transient receptor potential (TRP) channels are a superfamily of receptors that can be divided in 6 main subfamilies: the TRPC (canonical), TRPV (vanilloid), TRPM (melastatin), TRPA (ankiryne),

TRPML (mucolipina), and the TRPP (polycistin) channels. With the exception of TRPM4 and TRPM5, all TRP channels are Ca^{2+} permeable cation channels.

In this work, we focus on the study of some of these receptors: TRPV1, TRPV4 and TRPA1. TRPV1 and TRPV4 are proposed to be located in visceral afferent and respond to different noxious stimuli (chemical and mechanical). On the other hand, TRPA1 is activated by noxious cold and it is present in sensory neurons.

To characterize these receptors, we accomplish two sets of experiments. First, we evaluate the response of longitudinal smooth muscle to selective and non-selective agonists, and antagonists, by performing cumulative concentration response curves (CCRC), after precontraction with acetylcholine. In the other set of experiments, we apply electrical stimuli at different frequencies and length to distinguish pre and postsynaptic components of the relaxation observed.

When challenged with selective or TPRA1 and TPRV1 agonists, longitudinal smooth muscle exhibits significant relaxation characterized as a biphasic response, comprising a slow phase followed by a steeper phase with ascending concentrations, while the TPRV4 agonist behave as monophasic. We further explore the implication of a variety of substances that mediate relaxation or contraction effects in the capsaicin-evoked response.

In conclusion, our main observations are that TRP channels modulation takes place at a presynaptic level, through an interplay between liberation of both relaxant and contracting factors such as VIP, Substance P, NO, 5-HT, and purines. The fact that reliance of colon motility regulation on the TRPV1 and TRPA1 receptors is greater than that on TRPV4 is due to differences in densityexpression and localization of the different subtypes.

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Poster No. 93

The impact of high fructose on cardiovascular system; role of alpha lipoic acid"

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Aim

Corn syrup enhanced oxidative stress by lipid peroxidation. Chronic consumption of corn syrup that contains fructose increased endothelial damage causes hypertension. The aim of this study was to evaluate effect of high dose fructose on vascular endothelium and cardiac tissues, and protective effects of Alpha Lipoic Acid (α-LA) on these corn syrup related lesions.

Material and Methods

In this study rats were randomly distributed into three groups each contains eight Wistar Albino female rats aged 4 months and weighing 250–300 g. Control group has no administration, Corn syrup group fed with 30% of F30 form, α-LA treated (100 mg/kg/oral) group for last 6 weeks with Corn syrup (30% of F30 form). All F30 (24% fructose, 28% dextrose) fructose syrup solution and given to rats in drinking water for 10 weeks. At the end of experiment aort and cardiac tissues were quickly removed and divided equally into two sections for histopathological examination and biochemical studies. The histopathologic scores were according to research article of Abdel-Wahhab et al.

Results

In aorta, corn syrup consumption showed the degeneration of muscle cells and mononuclear cell infiltration statistically significant ($p<0.05$), and increase lipoidosis in tunica media layer insignificantly($p>0.05$). The degeneration of heart muscle cells, mononuclear cell infiltration, vascular congestion, hemorrhagic areas, microvesicular and macrovesicular lipoidosis was observed in the myocardial layer. In α-LA treated group all of these changes were significantly ($p<0.05$) improved.

Conclusion

In conclusion high fructose intake showed significant structural changes in aorta and heart. α-LA prevents these organs to related structural changes.

Keyword

High fructose, cardiotoxicity, endothelial damage, alpha lipoic acid

References

1. Johnson RJ, Segal MS, Sautin Y, Nakagawa T, Feig DI, Kang DH, Gersch MS, Benner S, Sánchez-Lozada LG. Potential role of sugar (fructose) in the

epidemic of hypertension, obesity and the metabolic syndrome, diabetes, kidney disease, and cardiovascular disease. Am J ClinNutr 2007; 86: 899-906.
2. Nakagawa T, Hu H, Zharikov S, Tuttle KR, Short RA, Glushakova O, Ouyang X, Feig DI, Block ER, Herrera-Acosta J, Patel JM, Johnson RJ. A causal role for uric acid in fructose-induced metabolic syndrome. Am J Physiol Renal Physiol 2006; 290: F625-31.
3. Nickander KK, McPhee BR, Low PA Tritschler H (1996) Alpha-lipoic acid: antioxidant potency against lipid peroxidationof neural tissues in vitro and implications for diabeticneuropathy. Free RadicBiol Med 21:631–639
4. Ceriello A, Motz E (2004) Is oxidative stress the pathogenic mechanism underlying insulin resistance, diabetes, and cardiovascular disease? The common soil hypothesis revisited. Arterioscler Thromb Vasc Biol 24: 816–823)

Poster No. 94

Aspirin and Vitamin C prevent corn syrup induced renal damage in rats

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Aim

Corn syrup (CS) may lead to elevations in uric acid levels and made insulin resistance that cause oxidative stress. So chronic consumption of CS increased possibility of hyperuricemia and chronic kidney disease. The aim of this study was preventive effect of Aspirin (Asp) and Vitamin C (Vit C) on CS induced nephrotoxicity.

Material and Methods

In our study 250-300g weighing male Sprague Dawley rats are divided into 5 groups each contain 8 rat. CS form (30% of f30) were supplied with drinking water. Groups were; Control, CS, CS+Asp (10 mg/kg/d), CS+ Vit C (200 mg/kg/d) and CS+Asp+Vit C (10 mg/kg/d Asp + 200 mg/kg/d Vit C). Rats in all groups, at the end of 6 weeks following the last application after 24 hours were sacrificed. Kidney tissues were removed to evaluate histopathologically. The histopathologic scores were according to research article of Abdel-Wahhab et al.

Results

Macro and microvesicular lipoidosis, dilatation and degeneration of the proximal and distal tubule, glomerular degeneration, vascular congestion, hemorrhagic areas, mononuclear cell infiltration and tubular dilatation in medulla was observed in CS group. In CS+Asp and CS+ Vit C groups, there were partial recovery in histopathological findings compared with CS group but it was not significant ($p>0.05$). Whereas in CS+Asp+Vit C group, there was marked improvement in histopathological findings were observed significantly ($p<0.05$), compared with CS group.

Conclusion

Implementation of Asp with vit C, the improvement was detected in renal histopathology. Antioxidants should be recommended in the prevention of kidney damage that occured in oxidative stress of insulin resistance and hyperuricemia for routine use. This issue should be supported by pharmaceutical companies.

Keywords

Corn syrup, nephrotoxicity, oxidative stress, aspirin and vitamin C

References

1. Bomback AS1, Derebail VK, Shoham DA, Anderson CA, Steffen LM, Rosamond WD, Kshirsagar AV. Sugar-sweetened soda consumption, hyperuricemia, and kidney disease. Kidney Int. 2010 Apr;77(7):609-16. doi: 10.1038/ki.2009.500. Epub 2009 Dec 23.
2. Polidori MC1, Praticó D, Ingegni T, Mariani E, Spazzafumo L, Del Sindaco P, Cecchetti R, Yao Y, Ricci S, Cherubini A, Stahl W, Sies H, Senin U, Mecocci P;AVASAS Study Group. Effects of vitamin C and aspirin in ischemic stroke-related lipid peroxidation: results of the AVASAS (AspirinVersus Ascorbic acid plus Aspirin in Stroke) Study. Biofactors. 2005;24(1-4):265-74.

Poster No. 95

The effects of the mixture of apple and banana juices on immunoglobulin, complements and acid folic

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Nutrition can have an important influence on immune functions. There are dietary components that are capable of boosting immune functions. Apple and banana are fruits which are rich sources of vitamin C , A and E that protect our body from harmful effects of free radicals and helps body make white blood cells and improve their function. A recent research shows ascorbic acid participates in immunity. Research shows that ascorbic acid raises the levels of IgG and IgM as well as the concentration

of C3 in the bloodstream (1). An immunoglobulin is a large Y-shaped protein produced by plasma cells that is used by the immune system to identify and neutralize foreign objects. Complement system completes the function of immune system and finally acid folic is that helps body convert food into fuel. The effect of mixture of apple and banana juices on immunoglobulin , complement system and acid folic were tested .twenty six healthy people aged between 20 and 50 years were given 3 glasses of juice in three times a day for one month. Blood samples were taken before and after one month period. Immunoglobulin i.e. IgA, IgM, IgG and complements i.e. C3, C4, CH50 were measured by nephlometry and folic acid tested by RIA methods . The amount of IgA, IgM and C4 showed an increasing significantly after one month in serum level but IgG, C3, CH50 and acid folic were stable. In conclusion, that the mixture of apple and banana juices consumption influence in IgA, IgM and C4 serum levels.

References

1. Padayatty SJ, Katz A, Wang Y, Eck P, Kwon O, Lee JH, et al. Vitamin C as an antioxidant. Evaluation of its role in disease Prevention.J Am Coll Nutr2003; 22:18–35
2. Lehninger principles of biochemistry, 5th, 2008 Lehninger, An Ibert Wikipedia the free encyclopedia

Poster No. 96

Effect of the mixture of peach and mango juices on the serum level of IgA, IgM, IgG, C3, C4, CH50 and acid folic

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Antioxidants are the substances that support the body against free radical effects. Antioxidants include nutrients (vitamins and minerals), enzymes and etc. It is known that these materials have an important role in prevention of diseases. Fruits like peach and mango are full of Antioxidants which these include C and E vitamins. Studies of ascorbic acid at the cellular and clinical levels have revealed that it plays multiple biochemical roles (1). Folate is a water soluble vitamin that helps with generation of new cells and protection of body cells and it is essential for hemoglobin formation and generation of red blood cells (2). Fruits are natural resources of folate. The effect of the mixture of peach and mango juices on the serum level of IgA, IgG, IgM, C3, C4, CH50 and acid folic experiments were carried out in individuals aged between 20 – 50 years old .They were given three glass of juices every day. Serum levels of IgA, IgG, IgM, C3, C4, CH50 were measured before and after one month by Nephlometry and acid folic was tested by RIA methods.The levels of IgA, IgG, IgM, C4 and acid folic were increased and the levels of C3 and CH50 were decreased in the serum. In conclusion, our finding demonstrates that in over all, antioxidants are essential for effective immune systems with changing the levels of immune factors in the serum level.

References

1. Padayatty SJ, Katz A, Wang Y, Eck P, Kwon O, Lee JH, et al. Vitamin C as an antioxidant. Evaluation of its role in disease Prevention.J Am Coll Nutr2003; 22:18–35
2. Biochemistry with Clinical Correlations, 7th edition, 2011, Thomas M. Devlin

Poster No. 97

Orange juice consumption and its relation to immune system and oxidative stress in healthy adults

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Fruits and vegetables, foods rich in flavonoids and antioxidants, have been associated with lower risk of stroke, coronary heart disease, and markers of inflammation and oxidative stress in adults.(1)Citrus fruit could be notable source of anti-oxidative, anti inflammatory and cancer preventive compounds.(2) Citrus juices, especially orange juice are rich source of flavonoids, folate and vitamin Cthat plays an important role in human health, including effects on Immune system.In the current study, we investigate effects of orange juice on the IgA,IgM, IgG, C3, C4, CH50 and folatelevels in healthy persons. 22 healthy persons with an age range 30-55 years old were chosen. They consumed daily to drink twice 200 ml of orange juice for one month. IgA, IgM, IgG, C3, C4, CH50 and folatelevels were measured by turbidimetry,nephlometry and radioimmunoassay methods before and after consumption.Result showed that orange juice consumption increased IgM, C3 and C4 levels significantly but changes in other immunoglobulines, CH50 and folate were insignificant. Our results suggest that orange juice is a bioavailable source of antioxidants, which might be necessary for proper function of the immune system and the antioxidant defense system. However, the long-term effects and mechanism of its consumption needed further investigation.

References

1. Holt EM, Steffen LM, Moran A, Basu S, Steinberger J, Ross JA, et al. Fruit and vegetable consumption and its relation to markers of inflammation and oxidative stress in adolescents. J Am Diet Assoc. 2009 Mar;109(3):414-21.
2. Murakami A, Nakamura Y, Ohto Y, Yano M, Koshiba T, Koshimizu K, et al. Suppressive effects of citrus fruits on free radical generation and nobiletin, an anti-inflammatory polymethoxyflavonoid. Biofactors. 2000;12(1-4):187-92.

Poster No. 98

Identification of total oxidant and antioxidant levels in mesothelioma

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Mesothelioma is a kind of primary tumor which is the most common cancer in pleura, highly aggressive with a very poor prognosis. Asbestos is the major reason of generation the primary tumor. Asbestos is known as a carcinogenic mineral which have fiber structures and result of its pathogenesis, reactive oxygen species (ROS) causes pulmonary fibrosis, pleural diseases, and malignancies. In healthy cells, facient deformation of oxidant level is balanced by antioxidant system. If free radicals, which are placed in cells exposure of asbestos, is not neutralized by antioxidant system, this causes increase of oxidant level and cancer.

In our study, we aim to identification of the differences between total oxidant and antioxidant levels of serum samples taken from patients with mesothelioma and healthy controls.

For this study, serum samples of 23 patients who applied and diagnosed as mesothelioma was taken from Eskisehir Osmangazi University, Medical Faculty, Department of Thoracic Surgery. Antioxidant levels were determined by using Total Antioxidant Status kit (TAS, Rel assay diagnostics kits, MegaTip, Gaziantep, Turkey) and oxidant levels were determined by using Total Ontioxidant Status kit (TOS, Rel assay diagnostics kits, MegaTip, Gaziantep, Turkey). Student t test was used for variation analyses and Shapiro-Wilk test was used for multiple comparisons as statically assessment.

Our results show that there is no differences between total antioxidant level of mesothelioma patients (0.64) and healthy controls (0.53; p=0.325). Total oxidant level of mesothelioma patients (120.88) increased according to healthy controls (6.26; p<0.001).

Result of our study, there is an increase of total oxidant level in mesothelioma exposure of asbestos. Then, with further studies of possible mechanisms that can be specified as an alternative in the treatment of this disease and the molecules involved in the oxidative stress mechanisms will be determined whether it will be.

Poster No. 99

Role of *canB2,* calcium binding subunit of calcineurin, in maintaining calcium homeostasis during the Drosophila indirect flight muscle development and function

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Muscle contraction is one of the major biological processes regulated by calcium. Many proteins are known to bind calcium and regulate calcium homeostasis for proper functioning of the muscles. Present study involves functional characterization of a calcium binding protein 'Calcineurin' that is involved in skeletal and cardiac muscle hypertrophy in humans. Using indirect flight muscles (IFM) of the Drosophila as genetically tractable model system, we have tried to dissect the role of Calcineurin in muscle development and function and how it may be involved in pathogenesis of muscle hypertrophy in vertebrates. By knocking down *canB2*, regulatory subunit of calcineurin in IFM using GAL4-UAS system, we observed a hypercontraction phenotype which is characterized by extensive muscle thinning and tearing. This phenotype has been previously reported for mutants of structural proteins like Troponin I *(hdp^2, hdp^3)* and Troponin T *(up^1, up^{101})*. Further insight into the mechanism of this protein came by genetic interaction studies between Calcineurin and hypercontracting troponin alleles. Enhancement of phenotype along with complete loss of muscles in several flies is observed when calcineurin level is reduced in up^{101} (TnT regulatory mutant) background in comparison to other mutants *(hdp^2, hdp^3 and up^1)*. We hypothesize

that *canB2* affects the calcium homeostasis in muscles and therefore leads to enhancement of phenotype in calcium sensitive mutant, *up*^{101}. This hypothesis was supported by genetic interaction studies between *canB2* and mutants of calcium channels namely SERCA (*kum170, kum295*) and Itpr *(itpr*^{ka901}*, itprwc*^{703}*)*. SERCA mutants prevent calcium absorption in ER on the contrary Itpr mutants push double the amount of calcium in cytoplasm and therefore increase the levels of calcium in the cytoplasm. We observe complete absence of muscles in these flies confirming the perturbation of calcium levels in *canB2* knockdown flies. In conclusion, these results reflect an important role of *canB2* in maintaining calcium homeostasis in muscles.

Poster No. 100

Lonicera caprifolium L. attenuates cognitive impairment induced by D-galactose in mice via inhibition of oxidative stress

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Aging is a natural biological process, affecting various systems such as nervous system. Oxidative stress has been suggested to have an important role in the pathogenesis of brain aging. The purpose of this study was to investigate *Lonicera caprifolium* L. *(L. caprifolium)* effect on oxidative stress and cognitive impairment in aging mice induced by D-galactose. A total of 30 Balb-C mice randomly divided into five groups (control, D-galactose, D-galactose + *L. caprifolium* 50, D-galactose + *L. caprifolium* 100, D-galactose + *L. caprifolium* 200) were used in the study. Mice were administered subcutaneous injection of D-galactose (100mg/kg) and orally administered *L. caprifolium* (50, 100 or 200mg/kg) daily for 8 weeks. Chlorogenic acid (273,002 mg/g) and vanillic acid (0,028 mg/g) were detected in extracts of *L. caprifolium* and the total amount of phenolic acids was 273,029 mg/g. *L. caprifolium* attenuated D-galactose induced learning dysfunctions in mice and significantly increased memory retention. MDA levels increased and SOD, GPx and CAT activities decreased in D-galactose group. *L. caprifolium* (200mg/kg body weight) significantly decreased MDA level and increased SOD, GPx and CAT activities. Histopthological evidence supported the ability of *L. caprifolium* to attenuate D-galactose induced aging. On the basis of these results, the improving effect of *L. caprifolium* on learning and memory function may be partially related to its decreasing lipid peroxidative markers and also increasing the antioxidant cascade.

Key words
Aging, *Lonicera caprifolium* L., D-galactose, Oxidative stress, Cognitive impairment

Poster No. 101

Cytogenetic findings in breast cancer patients who underwent chemotherapy

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Abstract
Purpose: The aim of the present study was to investigate the DNA damages in the peripheral blood lymphocytes of breast cancer (BC) patients before and after administration of the chemotherapy .

Methods
we analyzed the frequency of sister chromatid exchange (SCE), the occurrence of micronuclei and the lymphocyte proliferation rate index (PRI) as cytogenetic markers in the peripheral blood lymphocytes of 28 women with BC patients before and after chemotherapy, and 20 age-matched healthy females volunteers.

Results
Before chemotherapy, the BC patients had a significantly increased background level of SCE and micronuclei, and lowered PRI as compered with the healthy women. Significantly elevated frequency of SCE, micronuclei and depressed PRI were recorded in blood samples collected after the chemotherapy

as compared with the before chemotherapy levels.

Conclusion

Our findings indicate that all of SCE, micronuclei and PRI may serve as sensitive biomarkers for t he routine detection of genetic abnormalities which may occur after the administration of antineoplastic drugs in the clinical setting, as well as for possible monitoring of high-risk individuals among patients who have chemotherapy to treat breast cancer.

Reference

1. Acevedo F, Sanchez C, Jans J, Rivera S, Camus M, Besa P. How much survival benefit is necessary for breast cancer patients to opt for adjuvant chemotherapy? Results from a Chilean survey. Ecacermedicalscience 2014;8:391-400
2. Digkas EN, Chrisafi S, Passadaki T, Lialiaris TS. In vitro and in vivo cytogenetic effects of recombinant human erythropoietin on the frequency of sister chromatid exchanges alone or in combination with mitomycin C. Chemotherapy 2010;56:239-247.
3. Kopjar N, Milas I, Garaj-Vrhovac V, Gamulin M. Cytogenetic outcomes of adjuvant chemotherapy in non-target cells of breast cancer patients. Hum Exper Toxicol 2007;26:391-399.

Poster No. 102

Evaluating apoptosis, Ca^{2+} entry and oxidative stress markers as indicator of oocyte quality in granulosa cells of women undergoing in vitro fertilization (IVF): Involvement of TRPV1 channels

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Infertility is defined as the failure to conceive a recognized pregnancy after 1 year of unprotected intercourse. 20-30 % of infertility etiology is the female factor and ovulatory disorders and 30% male factors, infertility rates have been increasing. Granulosa cells are somatic cells of ovarian follicle and closed relationship with oocyte. Calcium ion (Ca^{2+}) is an intercellular second messenger and important in oocyte metabolization. The free radicals may occur in normal physiological conditions and neutralized by antioxidant mechanisms. Changing the parameters against to oxidant parameters is called oxidative stress the cells may go under apoptosis. TRPV1 is a Ca^{2+} permeable and non-selective channel gated by heat, oxidative stress and capsaicin (CAP). Capsazepine (CPZ) is the blocker of this channel. There is known that apoptosis and oxidative stress acts an important role on infertility. Therefore we tested different types of infertility prognoses on apoptosis, Ca^{2+} entry, oxidative stress values in IVF-induced granulosa cells. After controlled ovarian hiper-stimulation, the follicles were taken via oocyte pick up process from IVF patients and granulosa cells are separated from oocytes. Study groups were designed as male infertility (control), PCOS (patient). We evaluated the levels of apoptosis, Ca^{2+} entry, oxidative stress markers on IVF granulosa cells. There was a statistically significant change between patient and control group on intracellular free Ca^{2+} entry, ROS production, mitochondrial depolarization, apoptosis, caspase 3 and caspase 9 values in the granulosa cells. Treatment granulosa cells with CAP+CPZ may account a light protection against these markers. In conclusion, it seems Ca^{2+} entry through TRPV1 channels is mean reason of oocyte quality as ROS production and apoptosis values in granulosa cells of IVF. Oxidative stress and apoptosis values might be reduced by using TRPV1 channels blockers.

Poster No. 103

The role of l-type calcium channels in iron-induced hippocampal and nigral neurotoxicity

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Purpose

Iron plays an important role in maintaining normal brain function. However, iron overload and enhanced hydroxyl radical formation have been implicated as the causative factors of some neurodegenerative disorders such as Parkinson's and Alzheimer's diseases (1). Iron and calcium are essential for neuronal function but, when present in excessive level, they induce neuronal damage and may even cause neuronal death (2). Some reports suggest that voltage gated calcium channels (VGCCs) are an alternate route for iron entry into neuronal cell lines under conditions of iron overload (3). The aim of the present study was to investigate the effects of L-type VGCCs on iron-induced neurotoxicity.

Material and Method

Rats were divided into four groups: control, iron, nicardipine and iron+nicardipine. Iron neurotoxicity was generated by intracerebroventricular FeCl3 injection. Nicardipine treatment (10 mg/kg/day) was applied to block L-type VGCCs for 10 days. Rats were perfused intracardially under deep urethane anesthesia after treatment period. Removed brains

were processed using the standard histological techniques. The numbers of neurons in hippocampus and substantia nigra of all rats were estimated by stereological techniques.

Results

Findings of present study show that nicardipine decreased hippocampal and nigral neuron loss from 43.9 to 18.4% and 41.0 to 12.1%, respectively. When compared the neuroprotective effects of nicardipine on iron-induced hippocampal and nigral neurotoxicity, there was no difference in the protection afforded the hippocampus and substantia nigra

Conclusion

Outcomes of the present study propose that blocking of L-type VGCCs may reduce the neurotoxic effects of iron by inhibiting the cellular influx of excessive calcium and/or iron ions.

References

1. Qian ZM, Wang Q. Expression of iron transport proteins and excessive iron accumulation of iron in the brain in neurodegenerative disorders. Brain Res Rev. 1998; 27: 257-67.
2. Hidalgo C, Nunez MT. Calcium, iron and neuronal function. IUBMB Life. 2007; 59:280-285.
3. Gaasch JA, Geldenhuys WJ, Lockman PR, Allen DD, Van der Schyf CJ. Voltage-gated calcium channels provide an alternate route for iron uptake in neuronal cell cultures. Neurochem Res. 2007; 32: 1686-1693.

Poster No. 104

Leptin expression in prenatal and postnatal rat tissues

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Leptin, the protein product of the ob (obese) gene, is a 16 kDa hormone that is predominantly synthesized by adipocytes. Leptin is important nutritionally in the regulation of energy balance. Also, leptin is expressed in the placenta and in certain fetal tissues, but there is no much knowledge on functions of this hormone in these tissues. Previously studies suggest that fetal leptin acts as a fetal growth factor, also leptin may also have physiological effects on the placenta, including angiogenesis, growth and immunomodulation (Hoggard et al, 2001).

This study was designed to determine the expression and distribution of leptin in prenatal and postnatal rat tissues by immunohistochemistry. Tissue samples were obtained from fetal rats on prenatal 15, 17 and 19 days of gestation and rats on postnatal 2 and 4 days. After routine histological processing, tissues were embedded in paraffin and obtained 4-5 µm sections for light microscopic examination. Leptin expression was assessed by immunohistochemistry.

In the study, leptin were expressed in variety of tissues, including the heart, cartilage, lung and skin, from the fetal rats, especially on angiogenetic cells and serosa cells. Also, leptin expression was observed in alveolar septal cells from the offsprings aged 2 and 4 days of postnatal period. The localisations of leptin in fetus has led to the proposal that leptin is involved in the control of fetal growth (Forhead and Fowden, 2009).

In conclusion, all the results suggest that leptin may be effective in maturation of organs and differentiation of cells during perinatal and postnatal ages.

Key words

İmmunohistochemistry, Leptin, Rat Fetus

References

1. Hoggard' N, Haggarty P, Thomas, L and Lea RG. 2001. Leptin expression in placental and fetal tissues: does leptin have a functional role? Biochemical Society Transactions, 29 (2): 57-63.
2. Forhead AJ, Fowden AL. 2009. The hungry fetus? Role of leptin as a nutritional signal before birth. J Physiol 587 (6): 1145–1152

Poster No. 105

Decreased antioxidant paraoxonase-1 activity is associated with essential hypertension

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Essential hypertension is a chronic systemic disease characterized by high blood pressure and plays an important pathogenetic role in the development of various diseases such as cerebrovascular disease, and heart-kidney failure. Increased vascular oxidative stress is one of the most important causes of essential hypertension.

Endothelial injury, inhibition of apoptosis, monocyte adhesion, platelet aggregation and

endothelial nitric oxide synthase expression triggered by oxidized low-density lipoprotein (ox-LDL) are contributing to the hypertension. Paraoxonase-1 (PON-1) known as an antioxidant enzyme, hydrolyses ox-LDL and protects LDL from oxidative stress. PON-1 enzyme is usually synthesized in the liver, carried by high-density lipoproteins (HDL) in blood circulation.

The aim of the present study was to determine whether there was an association between plasma PON-1 activity and essential hypertension. Fifty patients with essential hypertension diagnosis and fifty controls without a history of hypertension were randomly selected from the Department of Cardiology and included in this study. Plasma PON-1 concentration in these volunteers was measured spectrophotometrically at a wavelength of 450 nm by enzyme-linked immunosorbent assay (ELISA) method. The mean values and standard deviations of PON-1 concentration for patients and control groups were calculated as 137.10±16.75 µg/ml and 145.66±10.01 µg/ml respectively. The difference between the groups was evaluated by Student t test and found significantly (p=0.003).

This result shows that PON-1 concentration is lower in essential hypertension patients. Our findings conclude that PON-1 protects LDL molecules from oxidative stress and the lower concentration of the PON-1 may contribute the hypertension.

Poster No. 106

Cytogenetic biomonitoring and Cytomorphometric analysis in women with Trichomonas vaginalis infection: Micronucleus frequency in exfoliated cervical epithelial cells

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Trichomonas vaginalis is a causal parasite of human trichomoniasis, the most common non-viral sexually transmitted disease. The aim of this study was to explore the cytogenetic and cytomorphometric effects of *Trichomonas vaginalis* by analyzing the frequencies of micronuclei and cellular abnormalities and by measuring dimensions of the cells in exfoliated epithelial cells. We performed light microscopic analysis for the Papanicolaou's stained cervical smears in thirty-two *T. vaginalis* cases and thirty two control cases. The micronucleated, binucleated, karyorrhectic, karyolytic, karyopyknotic cell and cell with perinuclear halo per 1000 epithelial cells were counted. In cytomorphometric analysis, nuclear area and cellular area were evaluated in 70 clearly defined cells in each smear using ımage analysis software in 400x magnification. We demostrated that the frequencies of micronucleus and cellular abnormalities in the *T.vaginalis* infected group were higher than the control values and the difference was found to be statistically significant ($p<0.05$). There was a positive correlation between the presence of micronucleus and these cellular changes ($p<0.05$). The nuclear and cytoplasmic areas of epithelial cells were diminished in patients with Trichomoniasis as compared with non-infected controls. In addition, only nucleus/cytoplasm ratio was increased.

Our study reveals that cervical mucosa of patients undergoing Trichomoniasis exhibited significant changes in the nuclear and cytoplasmic size and nuclear shape of the cervical cells. *T.vaginalis* effects chromatine damage marker, cell proliferation marker, cell death marker and cytoskelatal flaments in epithelial cells. The rising frequency of micronuclei and nucleus/cytoplasma ratio may reflect genotoxic damage and sustained mutagenesis in cervical epithelium in Trichomoniasis.

Poster No. 107

Effects of strenuous anaerobic exercise on 8-hydroxydeoxyguanosine (8-OHdG) in sedentary cigarette smokers and nonsmokers

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Both cigarette smoking and strenuous physical work are associated with increased oxidative stress, which is implicated in the pathogenesis of cardiovascular disease (1). The present study aimed to compare 8-hydroxydeoxyguanosine (8-OHdG), an indirect marker of DNA damage, before and after strenuous anaerobic exercise (Wingate anaerobic test-WAnT) in 13 cigarette smokers and 12 nonsmokers of similar age (respectively: 28.46±5.96; 31.42±5.47) and fitness status. After collecting the anthropometric data, each participant underwent a graded treadmill exercise test, using the Bruce protocol, to determine VO2max and then familiarized with the first 10sec of WAnT. The

WAnT was conducted according to widely accepted recommendations for standardization (2) and was administered for 30sec and the resistance was set at 7.5% of body mass. The blood samples were obtained before and immediately after the test and after 60min the test. At the beginning of the study there were no statistically significant differences in physical characteristics (age, height, weight, body mass index, body fat) of the subjects and exercise performance ($VO2_{max}$, peak power, average power) between two groups ($p>0.05$). Results indicated that blood LA concentration increased significantly in both groups ($p<0.001$; $1-\beta=1.00$) therefore, no significant smoking status ($p>0.05$) and smoking status x time interaction ($p>0.05$) was observed for blood LA. Additionally, 8-OHdG level increased in both groups; significant main effect of exercise (times effects) were noted ($p<0.001$; $1-\beta=1.00$) for 8-OHdG with values higher for smokers than nonsmokers. There were no significant smoking status ($p>0.05$) and smoking status x time interaction ($p>0.05$) for 8-OHdG. In conclusion sedentary life style is harmful as smoking itself; recent studies suggest that regular long term exercise may reduce the potential damage of cigarette by up-regulating antioxidant defense system (3,4).

References

1. Bloomer RJ, Creasy AK, Smith WA. Physical work–induced oxidative stress is exacerbated in young cigarette smokers. Nicotine Tob Res 2007; 9(2): 205–211.
2. Inbar O, Bar-Or O, Skinner JS. The Wingate anaerobic test. Champaign IL: Human Kinetics, 41-71; 1996
3. Leelarungrayub D, Pratanaphon S, Pothongsunun P, et al. Vernonia cinerea Less. supplementation and strenuous exercise reduce smoking rate: relation to oxidative stress status and beta–endorphin release in active smokers. J Int Soc Sports Nutr 2010; 7: 21
4. Sakano N, Wang DH, Takahashi N, et al. Oxidative stress biomarkers and lifestyles in Japanese healthy people. J Clin Biochem Nutr 2009; 44(2): 185 – 195.

Poster No. 108

Importance of Reactive Oxygen Species in Toxicology

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SUMMARY

Free radicals can be produced from both endogenous and exogenous factors in the cells. Due to the presence of stay under the action of chemicals such as paraquat, drug toxicity such as carbon tetrachloride and acetaminophen toxicity, ionizing and ultraviolet radiation, phytochemicals which cause air pollution, cigarette smoke, environmental factors such as solvents, antineoplastic agents such as nitrofurantoin, bleomycin, doxorubicin and adriamycin, habit-forming substances such as alcohol and drugs in exogenous factors, free radicals is important in toxicology.

Free radicals can be defined as reactive molecules having one or more unpaired electrons, short-lived, unstable, very low molecular weight. In most cases, production of free radicals are part of patho-mechanism and many xenobiotics toxicity is related to the production of free radicals. Long occupational exposure to some environmental pollutants such as lead, cadmium can cause oxidative stress and this is an underlying mechanism of undesirable effects in biological systems. Oxidative stress can be defined in a simple way as an imbalance between the body's antioxidant defense with the production of free radicals that cause peroxidation of the lipid layer. Oxidative stress as a possible mechanism of toxicity has been focus of toxicological research for the last decade.

Pesticides may lead to oxidative stress, free radical production and changes in antioxidants. Lipid peroxidation is indicated as one of the poisoning mechanisms in the poisoning that caused by pesticide. The action mechanism of mycotoxins on the cell is mediated through the production of free radicals and reactive oxygen species too. Killing of rat hepatocytes by Aflatoxin B1 was prevented by CAT, SOD, mannitol or deferoxamine. The results of this experiment indicated the important role of active oxygen species in the cytotoxicity of hepatocarcinogens and suggested the possible existence of free radical metabolites. Metal ions react to produce very reactive species such as H_2O_2, superoxide anion and hydroxyl free radicals and metal-oxygen complex in biological systems and eventually oxidative DNA damage occurs. The metal-mediated oxidative DNA damage plays an important role in chemical carcinogenesis.

Poster No. 109

The determination of effective concentration of pollen extract with biochemical analyses in liver tissue of fish *(Oncorhynchus mykiss)*

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The aim of this study was to investigate the effective concentration of pollen extract in liver tissue of fish. Pollen extract in various concentrations (0.5, 2.5, 5, 10, 20 and 30 ppm) was administered to aquarium which habitat of fish for 96 h. The malondialdehyde (MDA) levels, total antioxidant status (TAS), total oxidant status (TOS), oxidative stres index (OSI) and levels of total free sulfhydryl groups were analyzed in liver tissues of fish. MDA levels in liver tissues of various concentration groups (2.5, 5, 10, 20 and 30 ppm) decreased ($P<0.05$) compared to control group. The highest value of TAS ($P<0.05$) and the lowest value of TOS ($P<0.05$) occured in liver tissues of 10 and 20 ppm concentration groups. The lowest levels of OSI have been determined in liver tissues of 10, 20 and 30 ppm concentration groups compared to control group ($P<0.05$). The highest values of total sulfhydryl groups have been occured ($P<0.05$) in liver tissues of 10 and 20 ppm groups compared with control group. As result, the antioxidant effects depend on concentrations of pollen extract in liver tissues of fish (1,2).

Keywords
pollen, malondialdehyde, total antioxidant status, total oxidant status, free total sulfhydryl, rainbow trout, liver

References

1. Sanz A, Trenzado CE, Castro HB, López-Rodríguez MJ, Figueroa JMT. Relationship between brain and liver oxidative state and maximum lifespan potential of different fish species. Comp Biochem Phys A 2013; 165: 358-364.
2. Saric A, Balog T, Sobocanec S, Kusic B, Sverko V, Rusak G, Likic S, Bubalo D, Pinto B, Reali D, Marotti T Antioxidant effects of flavonoid from Croatian Cystusincanus L. Rich bee pollen. Food Chem Toxicol 2009; 47: 547-554.

Poster No. 110

The relationship between tannic acid and myeloperoxidase enzyme activity in the inflamed paw tissue formed by formalin injection in rats

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Tannic acid is a natural polyphenolic compound which has antioxidant and radical scavenging properties. Myeloperoxidase (MPO) is an enzyme associated with both inflammation and oxidative stress. It is released by leukocytes and catalyzes the formation of reactive species.

In this study, the anti-inflammatory activity of tannic acid and its relationship to myeloperoxidase (MPO) enzyme activity was investigated and compared with the non-steroidal anti-inflammatory drug indomethacin.

35 female Spraque Dawley rats were divided into 5 groups with 7 rats in each group. The paw edema induced by injecting 0.01 ml of 5% formalin into sub-plantar tissues of the rat's paw in all groups, except for the control group that received physiologic saline only. After 1 h formalin injection, indomethacin (10mg/kg) and tannic acid (25 mg/kg and 50 mg/kg) were administered intraperitoneally. At the end of the study rats were sacrificed under anesthesia. MPO enzyme activity in hind paw homogenate was determined using 4- aminoantipyrine-phenol solution as the substrate for MPO-mediated oxidation by H_2O_2 and changes in absorbance at 510 nm were recorded.

Our results showed MPO activity in paw tissue was decreased (not found statistically significant) in indomethacin and tannic acid groups. Tannic acid (25mg/kg) may have similar effect with anti-inflammatory agent indomethacin. These results indicate that tannic acid may influence inflammatory process but the molecular mechanism is still not clear.

Poster No. 111

The extent of oxidative stress in patients with acute myocardial infarction

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Acute myocardial infarction (AMI) is an event known as a heart attack. Oxidative stress has an important role in the ischemia-reperfusion injury in AMI. The purpose of this study was to measure serum paraoxonase-1 and arylesterase activities (PON-1 and ARE: antioxidant enzymes) and malondialdehyde level (MDA: lipid peroxidation product) in AMI patients undergoing primary

percutaneous coronary angioplasty. Serum PON–1 and ARE activities and MDA level were measured spectrophotometrically in 34 patients with AMI before and after angioplasty procedure for the determination of the extent of oxidative stress. Before angioplasty procedure, serum PON and ARE activities were 88.38±53.75 U/mL and 64.99±24.41 U/mL, respectively; these values significantly increased after angioplasty procedure (PON-1: 123.30±64.41 U/mL, ARE: 99.74±30.55 U/mL); the differences were statistically significiant (p<0.001). On the other hand, MDA levels were 34.04±10.27 μM before and 24.55±5.54 μM after angioplasty. The difference was statistically meaningful (p<0.001). That increased PON and ARE and decreased MDA values after angioplasty when compared to baseline values may indicate the restorative effect of angioplasty on oxidant/antioxidant system

Poster No. 112

Are paraoxonase–1 and arylesterase enzymes antioxidants in hyperbilirubinemic newborn infants?

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Hyperbilirubinemia is one of the most common diseases in neonates. Levels of bilirubin up to 6 mg/dL in the blood act as an antioxidant, whereas levels above 12.5 mg/dL are strongly prooxidant. Many enzyme systems such as superoxide dismutase and catalase protect against reactive oxygen species. In addition, paraoxonase-1 (PON–1) also exerts antioxidant and anti-inflammatory effects. PON–1 comprises three molecules: PON–1, arylesterase (ARE), and dyazoxonase. The aim of this study was to investigate the relationship of hyperbilirubinemia in term infants with PON–1 and ARE activities and to evaluate effects of phototheraphy on levels of them. Twenty-eight full-term infants aged 2– 6 days who had admitted to the neonatal intensive care unit because needed to treat high indirect hyperbilirubinemia and who were exposed to phototherapy. The serum PON–1 and ARE activities, total and direct bilirubin levels were measured before and after phototherapy. The same parameters were measured in healthy full-term infants who had not require treatment with physiological bilirubinemia as controls. Mean serum PON–1 and ARE activities were significantly lower before treatment compared with after treatment in patients and the control group ($p < 0.001$). There were also negative weak correlations of total serum bilirubin levels with PON–1 and ARE activities ($r = -323$, $p = 0.003$, and $r = -390$, $p < 0.000$, respectively). The activities of the antioxidant enzymes PON–1 and ARE were low before phototherapy, but reached normal levels after phototherapy. This suggests that hyperbilirubinemia cause oxidative stress and that PON–1 and ARE may role function as antioxidants.

Poster No. 113

Investigation of the effect of exercise on zinc and copper levels in the heart tissue of hyperthyroid rats

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Hyperthyroidism is a condition in which the thyroid gland is overactive and produces and secretes excessive amounts of thyroid hormones. Zinc (Zn) and copper (Cu) are two of the elements playing an important role in the action of thyroid hormones. The aim of present study was to investigate whether any effect of a regular endurance exercise on Zn and Cu levels in heart tissue of hyperthyroid rats.

Twenty-three male Sprague Dawley rats were divided into four groups: control, hyperthyroidism, exercise, and hyperthyroidism+exercise. The rats in exercise groups were submitted to run on a treadmill at a speed of 23 m/min for 45 minutes, 5 day/week for 8 weeks. Hyperthyroidism was

induced by L-thyroxine (0.25 mg/kg/day s.c.), and was confirmed by the measurements of TSH, FT3 and FT4 in serum.

Zn and Cu levels in heart tissues were determined by using the atomic absorption spectrophotometer. One-way ANOVA was used to compare the group means. Cu and Zn levels in hyperthyroidism groups (Cu: 1.82±0.06 mg/L, Zn: 24.57±5.36 mg/L) were higher than those of control group (Cu: 1.56±0.5 mg/L, Zn: 21.53±3.75 mg/L) ($p<0.05$). As compared with hyperthyroidism group, Zn and Cu levels in hyperthyroidism+exercise group (Cu: 1.69±4.56 mg/L, Zn: 17.34±3.12 mg/L) were decreased but this decrease was not statistically significant ($p>0.05$). Cu level (1.49±0.12 mg/L) of exercise group was statistically lower than those of hyperthyroidism group ($p=0.012$).

Consequently, regular endurance exercise leads to a decrease of levels of increased Zn and Cu in heart tissues of hyperthyroid rats but this was not statistically significant.

References

1. Yatoo MI, Saxena A, Deepa PM, Habeab BP, Devi S, Jatav RS and Dimri U. Role of trace elements in animals: a review. Veterinary World. 2013; 6: 963-967.
2. Biondi B. Mechanisms in endocrinology: Heart failure and thyroid dysfunction. European Journal of Endocrinology. 2012; 167: 609-18.
3. Klein I, Danzi S. Thyroid disease and the heart. Circulation. 2007; 116: 1725-35.
4. Hazar S. Egzersize bağlı iskelet ve kalp kası hasarı. SPORMETRE Beden Eğitimi ve Spor Bilimleri Dergisi. 2004; II: 119-126.

Poster No. 114

Effects of TRPC1-silencing and -overexpression on proliferation in human primary aortic smooth muscle cells

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Earlier we showed thatTRPC1 and TRPC6 expressionswere reciprocally altered in aging rat thoracic aorta which was also mimicked in aortic cell line via TRPC1 RNA interferance. This study investigates whether these alterations in TRPC1 levels are operational in proliferation of primary human aortic smooth muscle cells (HASMC). Similar to our previous studies, TRPC1 downregulation significantly increased SOCE without any change in overexpressed cells suggesting its regulatory role in primary HASMC. For this purpose, overexpression- and shRNA-vector- transfected HASMCs were used in quantitative PCR and functional analyses. In functional analyses, changes in proliferation were monitored via real-time cell analyzer. Based on RT-PCR analyses, TRPC1 mRNA levels were decreased by 46% in shTRPC1-transfected HASMCs while mRNA levels of TRPC1-overexpressed cells were drastically increased by 2000-fold. In TRPC1 over-expressed cells, TRPC6 mRNA levels were significantly decreased ($p<0.05$) whereas silencing of TRPC1 did not affect the TRPC6 expression. Furthermore, TRPC1-silencing and –overexpression procedures have suppressing and facilitating effects on cell proliferation observed in a real time fashion, respectively. Our accumulating data suggest that 1) TRPC1 has a regulatory role in proliferation and 2) TRPC6 expression is reciprocally controlled by a mechanism associated with that of TRPC1 in primary HASMC as well. This study was supported by The Scientific and Technological Research Council of Turkey (TUBITAK, 110S096 to MT) and in part by Ege University (EBİLTEM 11BİL004 to MT).

References

3. Erac Y, Selli C, Kosova B, Akcali KC and Tosun M. Expression levels of TRPC1 and TRPC6 ion channels are reciprocally altered in aging rat aorta: implications for age-related vasospastic disorders. AGE, 32(2):223-230, 2010.
4. Selli C, Erac Y, Kosova B and Tosun M. Post-transcriptional silencing of TRPC1 ion channel gene by RNA interference upregulates TRPC6 expression and store-operated Ca2+ entry in A7r5 vascular smooth muscle cells. Vascul Pharmacol, 51: 96-100, 2009.

Poster No. 115

Serum paraoxonase/arylesterase activities and malondialdehyde levels in hellp syndrome

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Objectives

Paraoxonase (PON-1), synthesized in the liver and released into the circulation, plays an important role in protection of LDL and HDL particles from oxidation, in antioxidant effect against lipid peroxidation on cellular membranes. HELLP syndrome is characterized with hemolysis, elevated liver enzymes, and trombocytopenia. The aim of this study was to investigate possible alterations associated with serum paraoxonase-1 (PON-1) and arylesterase (ARE) activities and malondialdehyde (MDA) levels in pregnancies with HELLP syndrome.

Method

Twenty pregnancies with HELLP syndrome and twenty-five healthy pregnancies subjects were included in the study. Serum basal/NaCl-stimulated PON-1 and ARE activities, and MDA levels in serum samples were measured spectrophotometrically.

Results

Serum PON-1 activities and ARE activity were lower in the pregnancies with HELLP syndrome than in the healthy pregnancies (PON HELLP:26.55±18.10 U/mL, Control:37.89±20.32 U/mL, p=0.043; ARE HELLP: 24.62 ± 12.25 U/mL, Control: 30.60 ± 8.89 U/mL, p=0,64). MDA levels of the study groups were not significantly different (HELLP: 22.28 ± 12.32 µg/L, Control:24.76 ± 10.68 µg/L, p=0,33). It was not found any correlation among serum PON-1, ARE activitys and MDA levels.

Conclusions

It was observed a signaficant decreasing in the levels of serum PON-1 activities between patients with HELLP syndrome. Lower PON-1 and ARE activities in patients with HELLP syndrome may result from increased oxidative stress in during dissease.

Poster No. 116

Protective effects of intralipid and caffeic acid phenyl esther (CAPE) on nephrotoxicity induced by dichlorvos

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Abstract

Objective

It was investigated to the protective effects of Caffeic Acid Phenetyl Ester (CAPE) and intralipid (IL) on kidney injury in rats caused by the toxic effects of acute Dichlorvos (D).

Materials and Methods

Forty-eight Wistar Albino rats were randomly divided into 7 groups. The groups included control, D, CAPE, Intralipid, D+CAPE, D+IL, and D+CAPE+IL.

Results

Compared with the Dichlorvos group, the TAS values in the Control, CAPE, and D+IL+CAPE groups were significantly higher ($p<0.05$). Compared with the Dichlorvos group, the TOS values in Control, IL, CAPE, D+CAPE, and D+IL+CAPE groups were significantly lower ($p<0.05$). Compared with the Dichlorvos group, the OSI values in Control, CAPE, and D+IL+CAPE groups were significantly lower. Compared with the Dichlorvos+IL+CAPE group, the TOS and OSI values in the Dichlorvos group was significantly higher ($p<0.05$). When we assessed the mitotic counts of the pesticides in the renal tissues, we found them higher in the D group and significantly lower in the D+CAPE, D+IL, and D+IL+CAPE groups compared to the control group ($p<0.05$). Immune reactivity shows increased apoptosis in the kidneys medicated with D group, low profile of apoptosis in the D+CAPE group, the apoptosis level in the D+IL+CAPE group is significantly lower than in the D group ($p<0.05$).

Discussion

We conclude that combine with CAPE and IL can be used as supportive therapy or as facilitators for the therapeutic effect of the routine treatment in the patients presenting with pesticide poisoning.

Poster No. 117

Determination of obestatin-like immunoreactive subtances in appetite-suppressant and appetite-sitimulating plants

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Obestatin is a novel 23–amino acid amidated peptide, recently identified as a product of the ghrelin gene. Obestatin and ghrelin peptide hormones with opposing action in weight regulation are derived from the same ghrelin gene (1). The aims of this study are to detect hormonally active obestatin-like substances in plants and determine the obestatin-like immunoreactive substance levels in appetite-suppressant and appetite-sitimulating plants. Total proteins were extracted the plant samples using the trichloroacetic acid (TCA)/acetone precipitation followed by SDS and phenol extraction method (2). Ghrelin-like immunoreactive substances in plant tissue was investigated using a human obestatin ELISA. The concentration of obestatin-like substance in *Opuntia ficus-indica, Anethum graveolens, Brassica oleracea capitata, Camellia sinensis, Vitis vinifera, Morus spp, Asparagus officinali, Zeo mays and Lepidium sativum, Brassica oleracea acephala* and human serum pool were 0,86, 1,69, 0,99, 0,859, 1,489, 1,419, 1,889, 0,90, 0,77, 3,78, 0,052 ng/mg protein, respectively. It was concluded that the plants have varying concentration obestatin-like immunoreactive substances. When ingested, plant obestatin-like immunoreactive substances can effect the suppressed food intake, inhibited jejunal contraction, and decreased body-weight gain in the same way that endogenous obestatin does.

References

1. Zhang JV, Ren PG, Avsian-Kretchmer O, Luo CW, Rauch R, Klein C, Hsueh AJ. 2005 Obestatin, a peptide encoded by the ghrelin gene, opposes ghrelin's effects on food intake. Science 2005: 310:996–999.
2. Masayasu Kojima, Kenji Kangawa. Ghrelin: Structure and Function. Physiol Rev 2005; 85:495-522.

Poster No. 118

Effect of lipoic acid on steroid-induced osteonecrosis in rats

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Objective

The purpose of this study was to investigate effects of effect of lipoic acid (LA) on steroid-induced osteonecrosis (ON) in rats.

Materials and Methods

Rats were divided into 4 groups: a control group (n=7),a methylprednisolone acetate (MPA,15 mg/kg, once a week) administered group (group MPA, n=10), a lipoic acid (LA, 100 mg/kg, per day)administered group (group LA, n=7), and a group given LA and MPA group (group LA+MPA, n=10). The LA was administered at 13 weeks of age. The MPA, as a steroid, was administered at 15 weeks of age. The rats were killed when 17 weeks old.[1] Osteonecrosis was diagnosed based on histopathological examination. The plasma levels of glucose, total cholesterol (TC), low-densitylipoprotein (LDL), high-density lipoprotein (HDL),triglycerides (TG), total oxidant (TOS), total antioxidant (TAS), and oxidative stress index (OSI) were assayedat the end of the study.

Results

Osteonecrosis was observed histopathologically, osteonecrosislesions demonstrated in the MPA group and smaller amount of osteonecrosislesions were observed in the LA+MPA. The plasmaglucose, TC, LDL, HDL, TG, and HDL levels significantly increased in MPA and LA+MPA groups compared to control ($p<0.01$).TAS levels significantly decreased in the LA group compared to control and MPA groups ($p<0.01$). The TOS and OSI levels significantly increased in the MPA group compared to other groups ($p<0.01$).

Discussion

Lipoic acid can be a protective drug for the prevention ofsteroid-induced osteonecrosis in rats. Inhibited oxidative stress is a possible mechanism for this effect.

Keywords
Osteonecrosis, Lipoic acid, Oxidative stress, Experimental

References
1. Nozaki, Y., et al., Pravastatin reduces steroid-induced osteonecrosis of the femoral head in SHRSP rats. Acta Orthop, 2012. 83(1): p. 87-92.

Poster No. 119

Anti-oxidative effects of methanolic extracts from *Cladonia pocillum* and *Cladonia rangiformis* in MCF-7 human breast cancer cells

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Lichens produce a wide variety of secondary metabolites which have a potential use as anti-cancer and anti-oxidant(1). Breast cancer is still among the most common types of cancer worldwide(2). In present study, methanolic extracts from *Cladonia pocillum* and *Cladonia rangiformis* were subjected to investigate its anti-oxidative properties in MCF-7 human breast cancer cells.

MCF-7 cells were seeded and grown on. The cells were treated with various doses (0.2, 0.4, 0.6, 0.8 mg/mL) of the methanol extracts from *C. pocillum* and *C. rangiformis* for 24 h, respectively. The levels of malondialdehyde(MDA) and reduced glutathione(GSH), catalase(CAT) activity and total protein were measured in treated with the methanolic extracts of *C. pocillum* and *C. rangiformis* on MCF 7 cell. Also, the parameters were measured in two lichen species. Statistical analysis was performed using the SPSS version 21.0 program.

MDA, GSH levels and CAT activity showed significant changes in treated with methanolic extracts of *C. rangiformis* at all concentration on MCF 7 cells, respectively ($P<0.001$, $P<0.01$, $P<0.001$). The significant alterations were observed in MDA, GSH levels and CAT activity of treated with methanolic extracts from C. pocillum at all concentration of MCF 7 cells, respectively ($P<0.001$, $P<0.05$, $P<0.001$). The GSH, MDA levels and CAT activity in C. rangiformis extract are higher than in C. pocillum extract.

In conclusion, it is suggested that the anti-oxidative effects of methanolic extract from C. rangiformis is higher than *C. pocillum* on MCF-7 cells. Both of lichen species may be used as an anti-oxidant at oxidative stress state.

References
1. Kosanić MM, Ranković BR, Stanojković TP. 2012. Antioxidant, antimicrobial and anticancer activities of three Parmelia species. J Sci Food Agric 92:1909-1916.
2. Siegel R, Naishadham D, Jemal A. 2013. Cancer statistics. CA Cancer J Clin, 63:11-30.

Poster No. 120

α-lipoic acid protects liver and pancreas against corn syrup

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Aim

Excessive fructose consumption increases advanced glycation end products (AGEs) levels and rapidly converted to triglycerides and stored in adipose tissue connected to obesity, hepatic steatosis, hypertension, diabetes mellitus and vascular endothelial damage. Also consumption of long-term fructose diets, increase of uric acid is occurring and that is regarded as a risk factor for hepatic damage. This study evaluates the effect of α-Lipoic Acid (ALA) on corn syrup induced hepatic and pancreatic damage by its antioxidant property, reduces of AGEs and improves insulin sensitivity effects.

Material-Methods: Female Wistar Albino rats aged 4 months and weighing 250–300 g were randomly distributed into three groups each contains eight rats. 1-Control, 2- Corn syrup group (30% of F_{30} form) and 3- ALA (100 mg/kg/oral, last 6 weeks) treated corn syrup group (30% of F_{30} form). F_{30} (24% fructose, 28% dextrose) fructose syrup solution and given to rats in drinking water for 10 weeks. At the end of experiment, tissues

were quickly removed for histopathological examination.

Results

Hepatic steatosis occurred and caspase-3 activity increased in hepatic tissues. Corn syrup increased the single cell necrosis and caspase-3 activity, decreased insulin and glucagon synthesis activity in Langerhans islet of the pancreas. Ameliorative effect of ALA was observed on corn syrup related lesions in ALA treatment group.

Conclusion

In conclusion corn syrup increased oxidative stress by hyperuricaemia and insulin resistance, and decreased insulin and glucagon synthesis by endothelial damage of pancreas. A strong antioxidant ALA protects liver and pancreas against corn syrup induced oxidative effects.

Keywords

Hepatotoxicity, pancreatic damage, corn syrup, alpha lipoic acid

References

1. Johnson RJ, Segal MS, Sautin Y, Nakagawa T, Feig DI, Kang DH, Gersch MS, Benner S, Sánchez-Lozada LG. Potential role of sugar (fructose) in the epidemic of hypertension, obesity and the metabolic syndrome, diabetes, kidney disease, and cardiovascular disease. Am J ClinNutr 2007; 86: 899-906.
2. Nakagawa T, Hu H, Zharikov S, Tuttle KR, Short RA, Glushakova O, Ouyang X, Feig DI, Block ER, Herrera-Acosta J, Patel JM, Johnson RJ. A causal role for uric acid in fructose-induced metabolic syndrome. Am J Physiol Renal Physiol 2006; 290: F625-31.
3. Nickander KK, McPhee BR, Low PA Tritschler H. Alpha-lipoic acid: antioxidant potency against lipid peroxidationof neural tissues in vitro and implications for diabeticneuropathy. Free RadicBiol Med. 1996;21:631–639
4. Ceriello A, Motz E. Is oxidative stress the pathogenic mechanism underlying insulin resistance, diabetes, and cardiovascular disease? The common soil hypothesis revisited. Arterioscler Thromb Vasc Biol 2004;24: 816–823.

Poster No. 121

The impact of alpha-lipoic acid on amikacin induced nephrotoxicity

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Aim

Amikacin (AK) is an antibacterial drug but it has remarkable nephrotoxic and ototoxic side effects due to increase in reactive oxygen radicals. This study was established to determine the possible protective effects of alpha-lipoic acid (ALA), a powerful antioxidant, on amikacin-induced nephrotoxicity.

Material-Methods

Female Wistar rats weighing 250–300 g were distributed into three groups each contains six rats: Control group; which was applied saline oral gavage for five days; (2) AK group (1.2 g/kg AK in a single dose, intraperitoneally (i.p.)), AK + ALA group; (1.2 g/kg AK in a single dose, intraperitoneally (i.p.) + 100 mg/ kg orally ALA) 1 day before the AK for 5 days. The blood samples and both kidney tissues were collected to evaluate histopathological and biochemical examination (BUN, Urea, Creatinin, MDA, SOD, CAT, GPx).

Results

Malondialdehyde was increased as an indicator of free radical formation in amikacin-induced group and decreased with ALA treatment ($p<0.05$). While catalase activity was increased significantly ($p<0.001$), superoxide dismutase and glutathione peroxidase activities were not statistically significant increased with ALA treatment. The results showed that amikacin produced significant elevations in serum levels of urea and creatinine, blood urea nitrogen, and ALA administration was reduced them ($p<0.05$). Histopathological observations were confirmed by biochemical findings.

Discussion

In conclusion, according to our results; ALA is a powerful antioxidant agent cause of reducing levels of MDA, BUN, Creatinin and increasing antioxidant parameters which are the indicator of the damage occurring in the kidney. Based on biochemical and histopathological determinations ALA efficiently ameliorated AK induced nephrotoxicity.

Keywords

Amikacin, Nephrotoxicity, Alpha Lipoic acid, Renal failure, Oxidative damage

References

1. Parlakpinar H, Ozer MK, Sahna E, Vardi N, Cigremis Y, Acet A. Amikacin-induced acute renal injury in rats: protective role of melatonin. J Pineal Res. 2003;35(2):85-90.
2. Kang KP, Kim DH, Jung YJ et al. Alpha-lipoic acid attenuates cisplatin-induced acute kidney injury in mice by suppressing renal inflammation. Nephrol Dial Transplant. 2009;24(10):3012-3020

3. Sehirli O, Sener E, Cetinel S, Yüksel M, Gedik N, Sener G. Alpha-lipoic acid protects against renal ischaemia-reperfusion injury in rats. Clin Exp Pharmacol Physiol. 2008;35(3):249-255.

Poster No. 122

Determination of ghrelin-like immunoreactive subtances in some rutinly consumed plants affecting appetite

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Ghrelin is a 28-amino-acid peptide isolated from human and rat stomach as an endogenous ligand for the GH secretagogue receptor (GHS-R1a) (1). Ghrelin has been identified in mammals, fish, amphibians, birds, reptiles and some plants. In this study, the aim is to determine ghrelin-like immunoreactive substances in some rutinly consumed appetite requlating plants. Total proteins were extracted the plant samples using the trichloroacetic acid (TCA)/ acetone precipitation followed by SDS and phenol extraction method (2). Ghrelin-like immunoreactive substances in plant tissue was investigated using a human grelin two-site sandwich ELISA. ELISA demonstrated that a ghrelin-like subtance was present at concentrations of 2805,54, 2416,44, 2700,44, 2848,70, 2193,16, 3524,73, 2193,16, 3789, 47 and 1887,95 pg/g of wet tissue in the tissues of *Opuntia ficus-indica, Anethum graveolens, Brassica oleracea Capitata, Camellia sinensis, Vitis vinifera, Morus spp, Asparagus officinali, Zeo mays and Lepidium sativum* respectively. In the studying all plants, Asparagus officinalis and Vitis vinifera species in which ghrelin-like immunoreactive substances found to be lower than other plants. On the other hand, grelin-like immunoreactive substance level of Anethum graveolens and Camellia sinensis species were higher than oters. As a result, existence of ghrelin and ghrelin-like substances in both animal world and also plant world gives the idea that ghreline is universal. Plants contained different levels ghrelin-like substances may be contribute on weight control in human.

References

1. Kojima M, Hosoda H, Date Y, Nakazato M, Matsuo H, Kangawa K . Ghrelin is a novel growth hormone releasing acylated peptide from stomach. Nature 1999; 402:656–660
2. Wang, W., Vignani, R., Scali, M., Cresti, M. A universal and rapid protocol for protein extraction from recalcitrant plant tissues for proteomic analysis. Electrophoresis 2006; 27:2782-2786.

Poster No. 123

Effects of *Lonicera caerulea L.* extract on oxidative stress in liver and kidney of rats

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Lonicera caerulea L. is a traditional shrup used in folk medicine in northern Russia, China, and Japan. *L. caerulea* berries are a rich source of phenolic compounds such as phenolic acids as well as anthocyanins, proanthocyanidins and other flavonoids, which display potential health promoting effects. The aim of this study was to assess the influence of *L. caerulea* extract under conditions of oxidative stress induced by high-fat and high-fructose diet-fed on antioxidant and lipid peroxidation balance of selected rat tissues to generate significant scientific data to support its traditional use. For these reason Catalase, PON and SOD activities and GSH, SH and Protein Carbonyl group, MDA and FRAP Level were investigated in this study. The experiment was conducted on six groups and each group consisted of six animals. These groups were control (C), fructose (Fr), fatty (Fa), control + lonicera (CL), fructose + Lonicera (FrL) and fat + Lonicera (FtL). After five weeks of the experiment the animals were anesthetized and organs – Liver and kidney- were isolated and immediately weighed with an accuracy to 1 mg on the Sartorius basic scales. All analyses were performed using SPSS for Windows v 16.0 software. Results are expressed as mean ± SD. Normality of distribution was assessed by Kolmogorov Smirnov test. Data were analyzed by one way ANOVA followed by the posthoc Tukey multiple test. $p<0.05$ was considered statistically significant. According to this study *L. caerulea* extract decreased lipid peroxidation level and increased antioxidant statue induced by high-fat and high-fructose diet-fed rats. In conclusion *L. caerulea* is not only a rich source of phenolic compounds but also a good protective agent against to high-fat and high-fructose diet for the organism.

References

1. Smolik M, Ochmian I, Grajkowski J. Genetic variability of Polish and Russian accessions of cultivated blue honeysuckle (Lonicera caerulea). Genetika. 2010 Aug;46(8):1079-85.
2. Svarcova I, Heinrich J, Valentova K. Berry fruits as a source of biologically active compounds: the case of Lonicera caerulea. Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub. 2007 Dec;151(2):163-74.
3. Svobodová A, Rambousková J, Walterová D, Vostálová J. Protective effects of phenolic fraction of blue honeysuckle fruits against UVA-induced damage to human keratinocytes. Arch Dermatol Res. 2008 Jun;300(5):225-33. doi: 10.1007/s00403-008-0850-5. Epub 2008 Apr 11.
4. Heinrich J, Valentová K, Vacek J, Palíková I, Zatloukalová M, Kosina P, Ulrichová J, Vrbková J, Šimánek V. Metabolic profiling of phenolic acids and oxidative stress markers after consumption of Lonicera caerulea L. fruit. J Agric Food Chem. 2013 May 15;61(19):4526-32.

Poster No. 124

The study of superoxide dismutase level in woman suffering from breast cancer in stage1

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Introduction

breast cancer is one of the most prevalent and third malignancy in the world, which morbidity is increasing. In IRAN, breast cancer is also the most prevalent cancer between women. Several studies has reported the role of oxidative stress and breast cancer morbidity and also studies in this field show different results of level of superoxide dismutase(SOD) in affected patients. The aim of this study is the assessment of SOD levels in stage1 of breast cancer.

Methods and materials

SOD concentration in plasma of 15 patients suffering from breast cancer in stage1were selected as case group along with 15 healthy women were selected as control group. The SOD activity rate was measured by using tetrazolium salt reaction.

Result

experiments in both case and control groups indicated that SOD activity rate in stage1 of case decreased compared to control group. SOD activity rate was determined 0.35±0.02 u/ml for control group and 0.25±0.01 u/ml for case group. significant changes were observed. ($p<0.05$)

Conclusion and discussion

oxidative stress, resulting from the imbalance between oxidant and anti oxidant states in the body, dameges DNA, proteins, cell membranes and seems to play a role in human breast cancer. Studies reported controversial result about SOD levels in breast cancer. Our study show decrease serum SOD level in breast cancer stage1 diseases and maybe lack of SOD crucial role in breast cancer. Further study requirement in this subject for gain better result.

Poster No. 125

The study of malondialdehyde level in woman suffering from breast cancer in stage1

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Introduction

Breast cancer is one of the most prevalent women cancers in developed and developing countries, incidence rate of which is increasing. Since stress oxidative plays a carcinogenic role, thus the aim of this investigation is to study Serum level of Malondialdehyde in women breast cancer in stage 1.

Methods and materials

15 women with breast cancer in stage 1were selected as case groups and 15 healthy women were selected as control groups. The age range of all selected women was between 25-40 years. Malondialdehyde level of patients' plasma and control group was measured after sampling, using Cayman kit and reagent barbiturate, then data were analyzed by SPSS software.

Results

Data obtained from experiments indicate that Malondialdehyde amounts are 0.8 ± 0.2 µmol/L for control and 3.2 ± 0.1 µmol/L for cancer samples. This indicates a significant increase serum level of Malondialdehyde ($p<0.05$)

Discussion and conclusion

lipids' peroxidation which is the result of unsaturated fatty acid Non-enzymatic auto oxidization has different effects on biologic system. Malondialdehyde can have interactive effects with different functional groups of intercellular compositions including: Amin protein groups, nucleic acid, consequently playing role in tumor development. Results obtained from this study

confirms that increase in Malondialdehyde level of serum of patients suffering from breast cancer in stage 1 as an oxidant.

Poster No. 126

The susceptibility to oxidation of erythrocytes in during storage of blood and relationship with carbonic anhydrase activity: Effects of some phenolic compounds

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It has been reported that many variations occur in erythrocytes by the increase of oxidative stress during the blood reservoir standby. In order to delay these negative changes the idea of adding various antioxidants becomes widespread. Blood samples of 500 mL have been obtained to blood bags containing 70 mL CPDA solution. The blood samples were divided into four aliquot. 1th portion was group1 (control group). We added 30µg/per mL blood caffeic acid and resveratrol with 15µg/per mL-blood tannic acid to (respectively group2, group 3 and group 4). In all groups at baseline, 7, 14, 21 and 28th days prepared in erythrocyte packages were measured baseline and 2nd hours Malondialdehde with catalase, GSH and GSH-Px, carbonic anhydrase (CA) values. According to group 1 GSH-Px and catalase values of other groups 1 at 7, 14, 21 and 28 days was higher ($P < 0.05$). Levels of baseline MDA in group 2 at 21 and 28th days, 2nd hour MDA values in group2 and group3 were lower than the other groups ($p < 0.05$). GSH levels in group2 and 3 at 28th day were higher than group1 ($p<0.05$). CA activity of 14th day in the group 2 was higher than the other groups ($p < 0.05$). Intra-group comparisons between initial values with 28th days in group 1, 2, 3 and 4 baseline and 2th hours MDA levels are high, GSH, GSH-Px and catalase values in gorup 1 was low ($p < 0.05$). Also GSH and catalase values in group 2 and 3 were higher $p < 0.05$). We also compared difference of mean of the first day and 28th day. We determined low 2nd hour MDA levels according to group 1 in group2, 3 and 4 ($p < 0.05$). Activity of GSH, GSH-Px and catalase in group 2, 3 and 4 were higher than group1 ($p < 0.05$).

These results show that the oxidative stress increases time-depended in storage of blood, But the addition of resveratrol, tannic acid and caffeic acid to the blood reservoir increase erythrocyte antioxidant capacity which reduce the susceptibility to oxidation and it cause no change in CA activity.

References

1. Guppy M, Sabaratnam R, Devadason S,Whisson ME. Fructose formation in stored blood. Biochemistry İnternational 1990; 2: 219-224.
2. Sekeroğlu M.R., Huyut Z., Him A. The susceptibility of erythrocytes to oxidation during storage of blood: Effects of Melatonin and Propofol. Cilinical Biochemistry 2012;45: 315-319
3. Aslan R, Şekeroğlu MR, Tarakçıoğlu M, Köylü H. Investigation of malondialdehyde formation and antioxidant enzyme activity in stored blood. Haematologia 1997; 28: 233-237

Poster No. 127

Effect of Humic Acid on Lead Poisoning on Liver Tissue in Chickens

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Lead (Pb) is ubiquitous in the environment and persists indefinitely. It is characterised by high accumulation in the organs and tissues of the animals. For instance, even small amounts of Pb in the diets can cause remarkeable growth depression [1]. Humic acid (HA) is a substance of very complex structure and could bind heavy metals [2] and alleviate oxidative stress in human and animals [3]. The purpose of the present study was to investigate the effect of humic acid supplementation on oxidative status of liver in hens exposed to Pb toxication. Forty-eight cages of laying hens were assigned to 4 groups: Control (basal diet) and basal diets added with 0.15% HA, 0.3gr/kg/day Pb, or mixture of HA and Pb. At the end of 11-day treatment period, samples of liver tissue were collected to determine glutathione (GSH) and lipoxygenases (LPO) levels. HA supplementation decreased increases in GSH and LPO levels in Pb-toxicated chickens by 5.5 and 38.0%, respectively (Table 1). In conclusion, HA could reduce cell damage through binding effect in case of exposure to heavy metals.

Table 1. Effect of humic acid on oxidative status in response to exposure to lead (Pb)*

Group	GSH	LPO
Control	4.00±0.12^{c}	39.99±0.24^{d}
HA	2.76±0.08^{d}	49.05±0.13^{b}
Pb	4.57±0.04^{a}	69.76±0.16^{a}
Pb+HA	4.32±0.03^{b}	43.25±0.36^{c}

*Differents superscripts within the same column differ (P<0.05)

References

1. Trampel DW, Imerman PM, Carson TL, Kinker JA, Ensley SM. Lead contamination of chicken eggs and tissues from a small farm flock. J Vet Diagn Invest 2003;15(5):418-22.
2. Kucukersan S, Kucukersan K, Colpan I, Goncuoglu E, Reisli Z, Yesilbag D. The effects of humic acid on egg production and egg traits of laying hen. Vet Med Czech 2005; 50(9):406–410.
3. Vašková J, Veliká B, Pilátová M, Kron I, Vaško L. Effects of humic acids in vitro. In Vitro Cell Dev Biol Anim. 2011;47(5-6):376-82.

Poster No. 128

The protective effect of *Hypericum perforatum* against hydrogen peroxide toxicity in OUMS-27 cell line

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Aim

Extracts of *Hypericum perforatum* L., commonly known as St. John's wort, have been used traditionally as a remedial agent for a wide range of medical conditions. To investigate whether *Hypericum perforatum* extract possesses a protective effect against hydrogen peroxide (H2O2)-induced cytotoxicity in chondrocyte cells, DNA damage assay was performed on OUMS-27 human chondrosarcoma cells.

Materials Methods

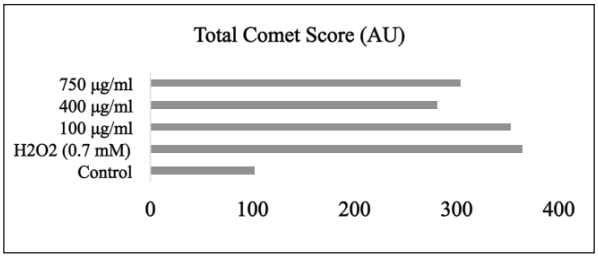
OUMS-27 cells were cultured in Dulbecco's modified Eagle' medium (DMEM) and treated with 100, 400, and 750 µg/mL *Hypericum perforatum* extract for 36 hours. Afterwards, cells were exposed to 0.7 mM H_2O_2 for 2 hours. DNA damage was studied with comet assay. Observations were made at magnification 400X using an epifluorescent microscope. 100 cells were analyzed visually from each 3 slide. Each image was classified according to nucleus scale and tail length given a value from undamaged class 0 to maximally damaged class 4. Results were expressed as arbitrary unit (AU).

Results

Cells treated with H_2O_2 exhibited serious DNA damage while those pre-treated with *Hypericum perforatum* extract inhibited H_2O_2-induced increase in DNA damage in various degrees.

Conclusion

These results suggested that *Hypericum perforatum* extract exerts protective effect, most likely via its antioxidant activity, against H2O2-induced DNA damage in human chondrosarcoma cells.



Key words

Chondrosarcoma, OUMS-27, comet assay, DNA damage, *hyperium perforatum,* hydrogen peroxide.

Poster No. 129

The viscum Album L. Extracts Induce Apoptosis Of Human Breast Cancer Mda-Mb-231 Cells

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Aim

Mistletoe (Viscum album L., VA), a semiparasitic plant of the Loranthacea family, grows on deciduous trees like the apple, oak, or on coniferous tress like pine and fir. It has been used in tradional medicine as a sedative, vasodilator, diuretic, analgesic, anti-spasmolytic, cardiotonic and anticancer agent. Commercially available extracts of VA, including Iscador (Iscar), Eurixor, Helixor, Isorel (Vysorel), Iscucin, Plenosol (Lektinol), are used often the protocols of adjuvant treatment with standart chemotherapy or radioterapy agent because of their immunomodulatory and cytotoxic properties

This work aimed to study the apoptotic effects of the mistletoe extracts Helixor A (HA), Helixor P (HP) and Helixor M (HM) on human breast cancer cell line MDA-MB-231 using Poly-ADP-Ribose-Polimerase (PARP) staining and Terminal deoxynucleotidyl transferase dUTP nick end labeling (TUNEL) assay.

Materials and Methods

MDA-MB-231 cell line was cultured in monolayer model. Cells were treated with the mistletoe extracts HA, HM and HP on 24, 48 and 72 hours incubation. Cells were not treated with the mistletoe extracts were considered as the control group. The effects of the extracts effective doses on PARP and Tunel staining were assessed by immunohistochemically.

Results

IC50 values of HA and HP in MDA-MB-231 are 500µg/ml, 50µg/ml and 5µg/ml on 24, 48 and 72 hours incubation respectively. IC50 values of HM in MDA-MB-231 are 500µg/ml on all incubations. PARP staining and Tunel assay was used together to determine the death of the cells. TUNEL positive cells and active PARP were detected after treatment in monolayer model. Dead cell count was more in the mistletoe extracts HA, HM and HP applied MDA-MB-231 cell lines in comparison to the controls ($p < 0.05$).

Conclusion

In this study, mistletoe extracts HA, HM and HP applications enhanced the TUNEL positive cells and active PARP in comparison to the controls in monolayer model.

Poster No. 130

Investigation of serum oxidative stress index and paraoxonase activity levels in colostrum period of dairy cows

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Abstract

In this study, the investigation of serum oxidative stress index (OSI), paraoxonase 1 (PON1) activity, total antioxidant (TAS) and oxidant status (TOS) levels in colostrum period of dairy cows was aimed. It was used sixteen simmental cows for blood samples as follows: within 0., 1., 2., 3. and 4. days postpartum (group I, II, III, IV and V, respectively). Serum TAS, TOS and PON1 activity levels were determined with spectrophotometric methods. The results showed that oxidative stres in group IV was higher than group I and II. PON1 activity in group V was significantly higher than other groups. In conclusion, it was determined significantly changes in terms of serum oxidative stress and PON1 activity levels.

Key words

Dairy cows, colostrum, oxidative stress, paraoxonase

Poster No. 131

Investigation of effect of ellagic acid in plasma, liver and kidney of indomethacine treated mice

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Abstract

In the present study was aimed to investigate effects on levels of nitric oxide (NO), total sialic acid (TSA), malondialdehyde (MDA) and paraoxonase 1 (PON1) activity of ellagic acid (EA) in indomethacine treated mice. *Swiss albino* mice were randomized into 5 equal groups as follows: control group (Group I) received standart chow diet and drinking water. Group II, III, IV and V received orally a single dose indomethacine (25 mg/kg), EA (10 mg/kg), indomethacine plus ellagic acid and omeprazole (30 mg/kg) for six hours, respectively. The levels of NO, TSA, MDA and PON1 activity in the plasma, liver and kidney were analyzed by using spectrophotometric methods. The results showed that EA could significantly decrease the NO, TSA and MDA levels of liver and kidney during indomethacine uptake.

Key words

Ellagic acid, indomethacine, nitric oxide, malondialdehyde, sialic acid, paraoxonase.

Poster No. 132

Wi-Fi (2.45 GHz) Electromagnetic radiation decreased antioxidant element (copper and zinc) but increased oxidant (iron) element in rat teeth

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Aim

The present study determined the effects of prenatal and postnatal exposure of Wi-Fi (2.45 GHz)-induced electromagnetic radiation (EMR) on element levels of teeth in growing rats.

Materials and methods

This study was initiated with 24 pregnant wistar albino rats after obtaining the necessary permits. Rats and their offspring were equally divided into two different groups as experiment and control. Experiment group was exposed to 2.45 GHz EMR for 2 hours/day during pregnancy (21 days) and lactation (21 days) periods with offspring of these dams. The control group was exposed to cage stress using the same protocol established for the experimental group. During the 21st days after birth, rats' incisors were collected for element analysis. The determination of calcium (Ca), iron (Fe), zinc (Zn), boron (B), copper (Cu), strontium (Sr), cadmium (Cd), potassium (K), magnesium (Mg), sodium (Na) and phosphorus (P) was performed on a model Perkin Elmer Optima 5300 DV inductively coupled plasma-optical emission spectroscopy (ICP-OES) under optimized measurement condition.

Results

Results from the element analysis showed that the Fe and Sr concentrations were increased in the Wi-Fi group although B, Cu and Zn concentrations were decreased. There were no statistically significant differences in Ca, Cd, Na, Mg, and P values between the groups.

This study determined the content and distribution of trace elements in rat teeth that were exposed to Wi-Fi. It was observed that the elemental content of teeth of rats were significantly different between the two groups. Differences in the levels of elements in teeth, especially those of oxidative stress-related elements, suggest that short-term exposure to Wi-Fi–induced EMR causes oxidative teeth injury in growing rats.

Poster No. 133

Protective effect of alpha lipoic acid against lung damage induced by methotrexate

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Objective

Methotrexate (MTX) is a folic acid antagonist cytotoxic chemotherapeutic agent used widely in leukemia and other malignancies. MTX causes oxidative stress, DNA damage, cytotoxicity and histological changes (1). The inhibitory effect of ALA, in MTX mediated oxidative stress has been observed in many studies. The ALA which is an antioxidant can be synthesized by liver, heart and kidneys in humans, unlike from the other

antioxidants it is soluble in both water and oil and can easily pass through cell membranes (2). It is known that in drug mediated diabetic rats, ALA is protective against the oxidative lung injury (3). At the same time, in some lung injury models, the preventive and curative effects of ALA have been demonstrated. However, there is not a study on the effects of ALA in MTX-mediated lung injury (4, 5). The aim of our study is to examine the effects of ALA in MTX-mediated lung injury, by histochemical and immunohistochemical methods.

Materials and Methods

28 Sprague-Dawley male rats were divided into 3 groups: Group I(Control group, n=8, 10 day average volume / day intraperitoneally saline, Group II(MTX group, n=10, 20 mg / kg single dose intraperitoneally MTX), Group III (MTX+ALA group, n=10, 20 mg / kg single dose intraperitoneally MTX+ 100 mg / kg ALA intraperitoneally 10 days). At the end of the experiment the rats were sacrificed and lung tissues were removed. Histochemical (hematoxylin and eosin) and immunohistochemical (iNOS ve TNF-α) analysis were performed on these lung tissues

Results

As a result of histochemical investigations, the injury that occurs in group II, was observed as reduced in group III but it was not very significant. In the iNOS and TNF-α immunostaining, dense staining was seen in group II; but we have seen that the intensity of staining decreased in group III.

Discussion: Based on histochemical and immunohistochemical findings, we believe that ALA has a slight protective effect in pulmonary injury caused by MTX.

References

1. Dadhania VP, Tripathi DN, Vikram A, Ramarao P, Jena GB. Intervention of alpha-lipoic acid ameliorates methotrexate-induced oxidative stress and genotoxicity: A study in rat intestine. Chemico-biological interactions. 2010 Jan 5;183(1):85-97. PubMed PMID: 19900424. Epub 2009/11/11. eng.
2. Ozbal S, Ergur BU, Erbil G, Tekmen I, Bagriyanik A, Cavdar Z. The effects of alpha-lipoic acid against testicular ischemia-reperfusion injury in Rats. TheScientificWorldJournal. 2012;2012:489248. PubMed PMID: 23193380. Pubmed Central PMCID: PMC3488399. Epub 2012/11/30. eng.
3. Hürdağ C, Uyaner İ, Gürel E, Utkusavas A, Atukeren P, Demirci C. The effect of ⇀lipoic acid on NOS dispersion in the lung of streptozotocin-induced diabetic rats. Journal of Diabetes and its Complications. 2008 1//;22(1):56-61.
4. Lin Y-C, Lai Y-S, Chou T-C. The Protective Effect of Alpha-Lipoic Acid in Lipopolysaccharide-Induced Acute Lung Injury Is Mediated by Heme Oxygenase-1. Evidence-Based Complementary and Alternative Medicine. 2013;2013:12.
5. Bulmus FG, Gursu MF, Muz MH, Yaman I, Bulmus O, Sakin F. Protective Effects of Alpha-Lipoic Acid on Oleic Acid-Induced Acute Lung Injury in Rats. Balkan Medical Journal. 2013 Sep;30(3):309-14. PubMed PMID: WOS:000324603300012. English.

Poster No. 134

Ruthenium red sensitive analgesic action of alpha-terpineol on mice.

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Alpha-terpineol is a naturally occuring compound which is found in many essential oils of several plants like the Labiatae family.

Due to traditional use of essential oils containing alpha-terpineol against diseases including pain, the aim of this study was to investigate antinociceptive actions of alpha-terpineol.

Three different doses of commercially purchased (+)-alpha-terpineol (10, 50 and 100 mg.kg-1) was used for in vivo analgesic methods including tail-clip and tail-immersion tests on mice. Naloxone.HCl and ruthenium red were used as opioid and TRP antagonists respectively. Data were evaluated using anova and Tukey's HSD for multiple comparison.

(+)-alpha-terpineol exhibited analgesic action on tail-clip but not on tail-immersion tests, which were antagonized both by naloxone and ruthenium red. Results of this study suggest the that this compound has a chance for development of new drugs for painful diseases and also showed the analgesic action of alpha-terpineol containing essential oils of ethnomedical use.

Poster No. 135

Selenium and TRPV1 channels are lacking role on calcium accumulation in trigeminal ganglion of diabetic rats: A patch-clamp study

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Abstract

Primary sensory afferents of the dorsal root (DRG) and trigeminal ganglia constantly transmit sensory information depicting the individual's physical and chemical environment to higher brain

regions. Calcium ion accumulations into cytosol of trigeminal ganglia ganglion are mean reasons in etiology of diabetic sensory neuron diseases. TRPV1 channel is a cation-permeable calcium channel found in the DRG and trigeminal ganglia. Although previous studies implicate TRPV1 channels in the generation of diabetes, suppression of diabetes by role of antioxidant selenium as TRPV1 antagonist has not yet been attempted. We tested the modulator roles of selenium and TRPV1 channel on the calcium accumulation in trigeminal ganglia of streptozotocin (STZ)-induced diabetic rats.

Rats were divided into 4 groups as follows; control, selenium, STZ and STZ+selenium. Diabetes was induced in the STZ and STZ+selenium groups by intraperitoneal injection of STZ. Native trigeminal ganglia was isolated form the rats of four groups. In the patch-clamp experiments, the stimulations of the neurons were performed by capsaicin (CAP), the hot ingredient of chili peppers. There were no effects of the TRPV1 channel agonist, CAP, diabetes (STZ) and selenium on the TRPV1 channel activation in the trigeminal ganglia.

In conclusion, current results indicated that TRPV1 channel hasn't role on diabetes-induced calcium ion accumulation in the trigeminal ganglia.

Keywords

Calcium ion; Diabetes; Trigeminal ganglia; TRPV1 channels; Patch-clamp.

Poster No. 136

Antioxidant capacity of octopamine

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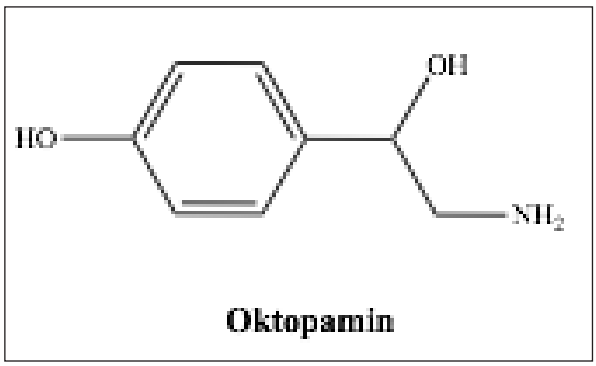
Octopamine is a biogenic amine that is involved in the central modulation of neural circuits, peripheral modulation of muscle action, and the release of complex behaviors in arthropods [1]. The biogenic monoamine octopamine has been well established as a neurotransmitter, neurohormone, and neuromodulator invarious invertebrate species [2].



Oktopamin

In this study, antioxidant and radical scavenging activities of octopamine were evaluated. In order to evaluate the antioxidant and radical scavenging activities of octopamine, different in vitro methods such as 2,2´-azino-bis(3-ethylbenzthiazoline-6-sulfonic acid) radical (ABTS•+) scavenging activity, 1,1-diphenyl-2-picryl-hydrazyl free radical (DPPH·) scavenging activity, N,N-dimethyl-p-phenylenediamine radical (DMPD•+) scavenging activity, superoxide anion radical (O2•-) scavenging activity, reducing power by potassium ferricyanide reduction method, cupric ion (Cu^{2+}) reduction capacity by Cuprac method, hydrogen peroxide scavenging activity and ferrous ions (Fe^{2+}) chelating activities using by bipyridyl reagent were performed separately. Also, α-tocopherol and trolox, a water-soluble analogue of α-tocopherol, were used as the reference antioxidant compounds. Octopamine exhibited weaker antioxidant and radical scavenging effects in all of the used methods. [3].

Referances

1. Sınakevıtch, I., Strausfeld, N.J. 2006. Comparison of Octopamine-Like Immunoreactivity in the Brains of the Fruit Fly and Blow Fly The journal of comparatıve neurology, 494:460–475
2. Axelrod, J., Saavedra, J.M., 1977. Octopamine. Nature, 265,501-504
3. Çağlayan, C., 2013. Octopamine: its antioxidant capacity and its effect on human carbonic anhydrase izoenzymes (HCA I and HCA II). Atatürk University Graduate School of Natural and Applied Sciences Department of Chemistry, Master Thesis, Erzurum.

Poster No. 137

Protective effect of sundried apricot diet on two herbicide-induced oxidative stress in liver of Rainbow trout

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Many environmental pollutants may induce the formation of reactive oxygen species (1-2). Due to their high reactivity, these species may cause damage to lipids, proteins, carbohydrates, or nucleic acids (3-4). Pollutant-induced lipid peroxidation, as in the case of herbicides, has been observed in several fish species (2,5). Variations in the activities of antioxidant enzymes have been proposed as indicators of pollutant mediated oxidative stress (1,6). Herbicides and pesticides may produce a disruption of the ecological balance causing damage to non-target organisms, such as fish (7-8). Glyphosate is abroad-spectrum non-selective herbicide used for inhibition of unwanted weeds and grasses in agricultural, industrial, urban, forestry and aquatic landscapes (9). Paraquat (PQ) has a wide usage in plant protection, and is an effective herbicide. PQ is also a potent ROS inducer (10-11). The aim of this study was to investigate protective effects of sundried apricot dietary against Glyphosate and Paraquat-induced oxidative stress in liver of Rainbow trout (Oncorhynchus mykiss, W. 1792). Fish were acclimated for 15 days. After acclimation, fish were fed with commercial fish pellets and pellets containing 8% sundried apricot for three month. And then fish were exposured to two herbicides. Kontrol group were fed with commercial fish pellets and didn't exposure herbicide. From biochemical analysis in the liver, superoxide dismutase (SOD) and catalaz (CAT) enzymes activity and level of malondialdehyde (MDA) and total glutathione (tGSH) were measured. The obtained data were evaluated statistically by One Way ANOVA. In both herbicide group, MDA levels exhibited significant increase ($p<0.05$) when herbicide group were compared to the control group, whereas apricot+herbicide group showed significant decline ($p<0.05$) was compared to the herbicide group. In addition, significant increasing ($p<0.05$) of tGSH level and SOD activity in apricot administration herbicide group is another outstanding result compared with the herbicide group. In conclusion, these results demonstrated that apricot rich diet may have a preventive role on biochemical changes caused by Glyphosate and Paraquat in Rainbow trout.

References

1. Ahmad, I.,Hamid, T., Fatima,M., Chand, H.S., Jain, S.K., Athar,M., Raisudin, S., 2000. Raisuddin, S. Induction of hepatic antioxidants in freshwater catfish (Channa punctatus Bloch) is a biomarker of paper mill effluent exposure. Biochim. Biophys. Acta 1523, 37–48.
2. Sevgiler, Y., Oruç, E.O., Üner, N., 2004. Evaluation of etoxazole toxicity in the liver of Oreochromis niloticus. Pestic. Biochem. Physiol. 78, 1-8.
3. Fraga, C.G., Cavanagh, E., Carrasquedo, F., Lotito, S., Lucesoli, F., Oteiza, P.I., 1996. Antioxidant defenses and mechanisms of protection against oxygen radicals. Physiology and Biochemistry of the Fishes of the Amazon, Manaus, pp. 323–330.
4. Parvez, S., Raisuddin, S., 2005. Protein carbonyls: novel biomarkers of exposure to oxidative stress-inducing pesticides in freshwater fish Channa punctata (Bloch). Environ. Toxicol. Pharmacol. 20, 112–117
5. Schlenk, D.,Wolford, L., Chelius, M., Steevens, J., Chan, K.M., 1997. Effect of arsenite, arsenate, and the herbicide monosodium methyl arsonate (MSMA) on hepatic metallothionein expression and lipid peroxidation in channel catfish. Comp. Biochem. Physiol. C 118, 177–183.
6. Li, W., Yin, D., Zhou, Y., Hu, S., Wang, L., 2003. 3,4-Dichloroaniline-induced oxidative stress in liver of crucian carp (Carassius auratus). Ecotoxicol. Environ. Saf. 56, 251–255
7. Oruç , , E.Ö ., Üner, N., 1999. Effects of 2,4-Diamin on some parameters of protein and carbohydrate metabolisms in the serum, muscle and liver of Cyprinus carpio. Environ. Pollut. 105, 267–272.
8. Bretaudt, S., Toutant, J.P., Saglio, P., 2000. Effects of carbofuran, diuron and nicosulfuron on acetylcholinesterase activity in Goldfish (Carassius auratus). Ecotoxicol. Environ. Safe. 47, 117–124.
9. Çavas, T., Könen, S., 2007. Detection of cytogenetic and DNA damage in peripheral erythrocytes of goldfish (Carassius auratus) exposed to a glyphosate formulation using the micronucleus test and the comet assay. Mutagenesis 22, 263–268.
10. Castello, P. R., Drechsel, D. A., Patel, M., 2007. Mitochondria are a major source of paraquat-induced reactive oxygen species production in the brain. J. Biol. Chem. 282:14186–14193.
11. Suntres, Z. E., 2002. "Role of antioxidants in paraquat toxicity," Toxicology, vol. 180, no. 1, pp. 65–77.

Poster No. 138

Serum Zinc and Cu levels in patients with HELLP syndrome

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Aim

HELLP syndrome is a disease characterized with hemolysis, elevated liver enzymes and thrombocytopenia. Recently, in studies it has been suggested that trace elements may play a role in fetal development and growth. In this study, it is

aimed to investigate the levels of serum zinc and copper in pregnant women with HELLP syndrome.

Material and Method

In this study, 20 pregnant patients diagnosed with HELLP syndrome and 20 healthy pregnant women were included in the study. 3 mL blood samples taken from patient and control groupswere centrifuged, their serums were separated and stored at -800C until the working day. The measurements of the levels of zinc and copper in all serum samples was performed by using AAS.

Results

It was detected a significant rising in the levels of Zn between patients with HELLP syndrome (HELLP: 123.70±6.31µg/dL, Control: 92.68±23.52µg/dL, p<0,05) but it was not observed a significant changing in terms of serum Cu levels.

Conclusion

It was found statistically significant relationship between HELLP syndrome and serum Zn levels; however it was not found any relationship between serum Cu levels and the disease.

Poster No. 139

Prolactin, estrogen, progesterone and offspring uterus antioxidant values are decreased in rats by mobile phone (900 and 1800 MHz) and Wi-Fi (2450 MHz)

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Exposure to high-density electromagnetic microwaves can cause detrimental effects on steroid hormones and uterus antioxidant values, and induce significant oxidant changes through thermal actions. The present study determined the effects of mobile phone (900 and 1800 MHz) and Wi-Fi (2450 MHz) induced electromagnetic radiation (EMR) exposure on oxidative stress in the uterus as well as the reproductive hormone levels in pregnant rats.

Thirty-two rats and their offspring were equally divided into 4 different groups: the control, 900 MHz, 1800 MHz and 2450 MHz groups. The 900 MHz, 1800 MHz and 2450 MHz groups were exposed to EMR for 60 min/day during pregnancy and the lactation periods. The 900 MHz, 1800 MHz and 2450 MHz groups were exposed to EMR for 60 min/day during pregnancy and neonatal development. Blood and uterus samples were taken from offspring from offspring at the 4th, 5th, and ^{6t}h weeks of the age and 6th week of adult rats after delivery, respectively.

There were no statistically significant differences in lipid peroxidation, total antioxidant status (TAS), total oxidant status (TOS), lipid peroxidation, glutathione peroxidase (GSH-Px) and reduced glutathione (GSH) and antioxidant vitamin values in uterus, plasma and erythrocytes in the 4 groups of mother rats. However, uterus lipid peroxidation and GSH-Px values 4th, 5th, and 6th weeks of the age were decreased by the 900, 1800 and 2450 MHz EMR exposures. In addition, plasma prolactin levels in mother and offspring, an progesterone and estrogen values in plasma of mother rats were lower in the 900, 1800 and 2450 MHz groups than in control. In the 900, 1800 and 2450 MHz groups, we observed 0.7-0.9 °C body temperature increase between pre and post one hour EMR exposures.

In conclusion we observed that mobile phone and Wi-Fi induced EMR considered as a cause of oxidative uterus injury in uterus of offspring. In addition the EMRs induced prolactin, progesterone and oestrogen hormone reducing effects.

Keywords

Antioxidants; Uterus; Prolactin; Pregnancy; Mobile phone; Wi-Fi.

Poster No. 140

The effect of resveratrol and serotonin hydrochloride supplementation on lipid peroxidation and oxidative DNA damage in stored blood

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Blood obtained from donors for to use in diseases such as acute blood loss and anemia can be maintained for about a month. It has been reported that many variations occur by the increase of oxidative stress during the blood reservoir standby. In order to delay these negative changes and to extend the shelf life of storage blood the idea of adding various antioxidants becomes increasingly widespread. Blood samples of 500 mL have been obtained to blood bags containing 70 mL CPDA solution. The blood samples were divided into three aliquot. 1th portion was group1 (control group). We added 60µg/per mL blood resveratrol and serotonin hidrocloride to (respectively group2, group 3). In all

groups at baseline, 7, 14, 21 and 28th days in plasma were measured malondialdehyde (MDA), CoQ10 and 8-hydroxy-2-deoxyguanosine (8-OHdG) values. Intra-group comparisons between initial values with 28th days in group 1 and 3 MDA, CoQ10 and 8-OHdG levels are high ($p < 0.05$), MDA and CoQ10 values was low in gorup 2 ($p < 0.05$). According to group 3 MDA values of other groups at 7, 14, 21 and 28 days was lower ($p<0.05$). Levels of CoQ10 in group 2 at 14, 21 and 28th days were lower than the other groups ($p < 0.05$) and were high than the other groups in group 3 ($p < 0.05$). 8-OHdG levels in group 3 at 21 and 28th days were higher than the other groups ($p<0.05$).

These results show that the oxidative stress increases time-depended in storage of blood. But the addition of resveratrol to the blood reservoir reduces lipid peroxidation and oxidized CoQ10. Also addition the serotonin hidrocloride to the blood reservoir increase lipid peroxidation and oxidative DNA damage by acting as prooksidant.

References

1. Sekeroğlu M.R., Huyut Z., Him A. The susceptibility of erythrocytes to oxidation during storage of blood: Effects of Melatonin and Propofol. Cilinical Biochemistry 2012;45: 315-319.
2. Guppy M, Sabaratnam R, Devadason S,Whisson ME. Fructose formation in stored blood. Biochemistry İnternational 1990; 2: 219-224.
3. Aslan R, Şekeroğlu MR, Tarakçıoğlu M, Köylü H. Investigation of malondialdehyde formation and antioxidant enzyme activity in stored blood. Haematologia 1997; 28: 233-237

Poster No. 141

Assessment with comet assay of induced DNA damage by Amikacin on nephrotoxicity

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Purpose

Aminoglycoside (AG) antibiotics are often used in routine clinical practice for the treatment of gram-negative infections. But it has remarkable nephrotoxic and ototoxic side effects due to increase in reactive oxygen radicals. This study was established to determine the possible protective effects of alpha-lipoic acid, a powerful antioxidant, on amikacin-induced nephrotoxicity. The aim of this study was to evaluate the levels of DNA damage, the novel marker ischemia modified albumin (IMA) and as well as its association with TAS, TOS

Material-method

Three different groups of rats (n = 6) were administered either saline (control), amikacin (1,2 g/kg, i.p.), alpha-lipoic acid (100 mg/kg, p.o.= A groups) and amikacin combination (alpha-lipoic acid 1 day before the amikacin for 5 days= ALAgroups). DNA damage, the novel marker ischemia modified albumin (IMA) and as well as its association with total antioxidant status (TAS), total oxidant status (TOS) were evaluated at the end of the experiment.

Serum levels of IMA, TAS, TOS were analyzed and Adj- IMA. DNA damage was evaluated by comet assay.

Results

The mean serum TAS, TOS and IMA levels change in the control, ALA and A ($p<0.05$ for IMA, TAS, and TOS one-way ANOVA). When the mean of TAS (0.69 ± 0.19), TOS (18.52 ± 3.19), IMA levels (0.45 ± 0.34) and DNA damage values (15 ± 6.5) of the Amikacin groups were compared with the mean of TAS (0.96 ±0.17), TOS (23.4±4.8), IMA (0.12±0.13), and DNA damage values (3.25 ± 1.38) of the control group and with TAS (1.24 ±0.18), TOS (14.62±1.40), IMA (0.05±0.03) and DNA damage values (11.25 ± 4.13) of the ALA group was found as statistically significant in respect of Comet Assay, TAS, TOS, and IMA (all values $P < 0.01$)

Discussion

Recent findings indicate that ALA, an antioxidant, exerts a protective role against the development of diabetic nephropathy, and the underlying mechanism may involve effective suppression of the generation of oxidants, reduction of DNA damage.

References

1. Yurtcu E, Kasapoğlu E, Şahin Fİ. Protective effects of β-carotene and silymarin on human lymphocytes. Turk J Biol, 2012; 36: 47–52.
2. Erel O. A novel automated direct measurement method for total antioxidant capacity using a new generation, more stable ABTS radical cation. Clin Biochem. 2004 ; 37:277-85.
3. Erel Ö. A new automated colorimetric method for measuring total oxidant status. Clin Biochem. 2005; 38:1103–11.
4. Bar-Or D, Curtis G, Rao N, Bampos N, Lau E. Characterization of the Co(2+) and Ni(2+) binding amino-acid residues of the N-terminus of human albumin. An insight into the mechanism of a new assay for myocardial ischemia Eur J Biochem. 2001; 268:42-7.

5. Dwivedi N, Flora G, Kushwaha P, Flora SJ. Alpha-lipoic acid protects oxidative stress, changes in cholinergic system and tissue histopathology during co-exposure to arsenic-dichlorvos in rats. Environ Toxicol Pharmacol. 2014;37(1):7-23.
6. Feng B, Yan XF, Xue JL, Xu L, Wang H. The Protective Effects of α-Lipoic Acid on Kidneys in Type 2 Diabetic Goto-Kakisaki Rats via Reducing Oxidative Stress. Int J Mol Sci. 2013;14(4):6746-6756.

Poster No. 142

Biochemistry of lycopene

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Lycopene is a carotenoid found in foods such as tomatoes, tomato products, watermelon, pink grapefruit and guava. Lycopene provides health benefits by being absorbed into body tissues and mounting a defense against damaging free radicals that if left unchecked, create oxidative damage to cells. This leads to conditions such as cancer, heart disease, macular degeneration, diabetes, joint deterioration and accelerated aging. The body obtains antioxidants from many of the foods that comprise a healthy diet however many people fail to eat enough of these recommended foods. In addition, the city environments are overloaded with extra free radicals courtesy of sources like industrial pollution, motor vehicles and smoking. Hence, there is a need to increase the dietary intake of an effective antioxidant such as lycopene. All antioxidants have shown a role in destroying free radicals and thereby reducing the damage to all cells in the body.

Lycopene inhibits free radical damage to LDL cholesterol with its antioxidant action preventing oxidation to LDL cholesterol. Oxidation of cholesterol is a process that can cause a great deal of cell damage. Lycopeneboosts the body's natural antioxidant defences and protects against DNA damage thus promotes heart health. Numerous epidemiological studies have linked diets that are high in lycopene intake with a reduced risk of cancer and degenerative diseases.

This study summarizes the information about lycopene and presents the current knowledge with respect to its role in human health and disease.

Poster No. 143

Protective Effects Of Melatonin On Monosodium Glutamate-Induced Oxidative Stress In Rats

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Commonly used as flavor enhancers in foods ready Monosodium Glutamate (MSG) can induce cytotoxicity in various organs and systems. On the other hand erythrocytes in the blood that carries oxygen to the tissues constantly exposed to oxidative damage is a known fact. Therefore, in erythrocytes and toxicity of MSG is one of the most affected tissue is likely to cause oxidative damage in the liver. İn the present study; MSG-induced oxidative stres in erythrocytes and liver tissue against oxidative damage, which is a powerful antioxidant known is to examine the effects of melatonin.

Fifty female Sprague Dawley rats, that were 4-5 months old and weighed, on average, 225±17 grams were used in the study. The rats were divided in to five experimental groups, each consisting of ten rats. The control group was administrated 0.9% serum physiologic orally treated, MSG groups was administrated (4 mg/kg and 8 mg/kg), Melatonin was administrated intraperitoneal injections(10 mg/kg) for fourteen days. As a pprotective agents, Melatonin was iniated one day before the administration of MSG. The following parameters were analyzed in the collected blood specimens: hematological parameters [erythrocyte count, hematocrit value, hemoglobin amount, MCV,MCH,MCHC. Total antioxidant status (TAS), total oxidant status (TOS) and Oxidative Stress Index (OSI) were measured by Erel method.

The groups that treated MSG, erythrocyte count, hemoglobin and MHC values decreased, MCV and MCH values increased. MSG administrated caused significant increased levels of the both TAS and TOS.

İncrease of TAS, TOS and OSI levels indicates that MSG causes oxidative damage in erythrocyte and liver tissue. Melatonin, known as a potent antioxidant, MSG-induced oxidative damage is effective as a preservative in. As a result of taking melatonin in MSG toxicity used in reducing oxidative damage.

This study was supported by ERU-BAP Project No: TYL-2013-4412

Keywords
MSG, Oxidative stress, Erythrocyte, Liver

Poster No. 144

Protective effect of propolis on erythrocyte rheology in experimental mercury intoxication in rats

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Mercury, in addition to being an environmental pollutant, is a heavy metal that can have toxic effects on all body systems, particularly on the central nervous system and the liver. Oxygen-carrying erythrocytes in the circulating blood are also likely to be affected by mercury toxicity. In the present study, changes in erythrocyte rheology in association with mercury toxicity and the protective role of propolis, which is known to have beneficial effects on mercury toxicity, were analyzed.

Forty male Wistar-Albino rats, that were 4-5 months old and weighed, on average, 230 ±40 grams, were used in the study. The rats were divided into four experimental groups, each consisting of ten rats. The control group was administered 0.9% serum physiologic intraperitoneal(ip) injections; the mercury chloride group was administered HgCl2 (4 mg/kg, ip); the propolis group was administered propolis (200 mg/kg, by gavage); and the HgCl2 + propolis group was administered HgCl2 (4 mg/kg, ip) + propolis (200 mg/kg, by gavage) for three days. As a protective agent, propolis was initiated one day before the administration of HgCl2, and propolis administration continued during the administration of HgCl2 for three days. The following parameters were analyzed in the collected blood specimens: hematological parameters [erythrocyte count, hematocrit value, hemoglobin amount, mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC), Leukocytes, and Platelets (PLT)], plasma potassium(K) levels, methemoglobin, 2,3-DPG, erythrocyte deformability, and hemolysis as a percentage (%).

The number of red blood cells showed a statistically insignificant increase in the rats exposed to mercury chloride compared to the control animals. On the other hand, leukocyte count significantly increased, and a significant decline occurred in the platelet count. Serum K+, MetHb, 2, 3-DPG, and hemolysis percentage significantly increased in the rats exposed to mercury. However, the values of rats administered only with propolis were close to the values of the control group and the changes were avoided by the administration of propolis as protection in the rats exposed to mercury chloride. This study was supported by ERU-BAP Project No: TSY-11-3814

Keywords
Mercury, propolis, intoxication

Poster No. 145

Late - onset delusional type psychosis associated with hyperthyroidism : A case report

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Abstract

Hyperthyroidism is related to psychiatric symptoms and disorders such as insomnia, agitation, anxiety, mania, impairment in concentration and memory. There are rare cases of hyperthyroidism associated with psychosis. We present the case of aged man without prior psychiatric admissions who was brought by his family to our clinic because of his delusions of persecution.A 61-years-old, male, retired teacher with a 1 month history of psychotic symptoms agressive behaviours to his wife, avoiding to a leave his house , delusions of persecution. He expressed weight loss, excessive sweating at nights, insomnia, and tremor. He did not have history or a family history of psychosis or other psychiatric disorders . Results of the laboratory and radiological examination (cranial MRI) showed no pathology except thyroid function abnormalities. Patient was consulted to a endocrinology specialist. Patient was recommended to go to a control examination after one month. He was prescribed risperidone 2 mg daily. In the second week, his delusions became significantly less remarkable, at the end of four weeks he showed dramatic recovery. His blood levels of fT4 and TSH were determined within normal range. In hıs follow-up examinations they didn't express any psychıatrıc symptoms with 2 mg /d risperidone treatment and his blood levels of thyroid associated hormons continued to stay within range.

Keywords
hyperthyroidism, psychosis

Introduction

Hyperthyroidism is related to psychiatric symptoms and disorders such as insomnia, agitation, anxiety, mania, impairment in concentration and memory.There are rare cases of hyperthyroidism associated with psychosis. (1,2)

We present the case of aged man without prior psychiatric admissions who was brought by his family to our clinic because of his delusions of persecution.

Case

A 61-years-old, male, retired teacher without prior psychiatric admissions was brought to our clinic after difficultly persuaded by his wife and brother. He was presented with weight loss, excessive sweating at nights, insomnia, tremor, irritability, agressive behaviours to his wife, avoiding to a leave his house , refusing to eat because of fear of being poisoned, and thoughts of a conspiracy against him, for the last month. These thoughts included that he was being followed by plainclothes police, therefore he should try to hide his golden coins by depositing them on a bank, and when he tried to deposit, his wife and a bank employee -who he claimed to be another plainclothes police officer- conspired against him to put him jail.

In mental examination; he was cooperative and oriented. His attention and concentration were reduced. His affect was anxious. Perceptive pathology was not observed. There were persecutive delusions in his thought contents. The patient lacked insight.He did not have history or a family history of psychosis or other psychiatric disorders . Results of the laboratory and radiological examination (cranıal MRI) showed no pathology except thyroid function abnormalities.His blood level of fT4 was 1,19 ng/dl (0,61-1,1) and TSH was 0,2 uIU/ml (0,34-4,2). Patient was consulted to a endocrinology specialist. After thorough examination and a scintigraphy of thyroid, patient was recommended to go to a control examination after one month. His relatives were informed about the disorder. He was prescribed risperidone 2 mg daily. In the second week, his delusions became significantly less remarkable, at the end of four weeks he showed dramatic recovery. His blood levels of fT4 and TSH were determined within normal range. In hıs follow-up examinations they didn't express any psychıatrıc symptoms with 2 mg /d risperidone treatment and his blood levels of thyroid associated hormons continued to stay within range.

Discussion

Medical evaluation to rule out underlying causes of psychosis (substance-induced psychotic disorder, psychotic disorder secondary to general medical condition, mood disorder with psychotic features, psychosis associated with personality disorders, epilepsy, Ganser syndrome) is an important part of the initial assessment. (3)İn our case late-onset of the psychotic symptoms such as delusions of persecution and lack of family history of sciphzoprenia or delusional disorder led us to investigate underlying causes of psychosis.

Results of the laboratory and radiological examination (cranıal MRI) showed no pathology except thyroid function abnormalities . The pathogenesis of hyperthyroidism associated psychosis is not clear. Simultaneous occurrence of thyroid function abnormalities and psychotic disorders suggests a mutual biochemical abnormality. It is not clear if they have cause and effect relationship, and even if they have one it is not clear which is cause and which is effect. More research is required to understand the true mechanism behind this association.

References

1. Gagliardi JP, Clary GL. Treatment of Thyrotoxicosis – Induced Psychosis. Psychopharmacol 2002;36:7-13.
2. PC Whybrow, M. Bauer. Behavioural and psychiatric aspects of thyrotoxicosis. In: Braverman, RD Utiger (Editors), Werner & Ingbar's The Thyroid, A fundamental and clinical text, Ninth edition, LE Lippincott Williams and Wilkins 2005; 644-50.
3. Amerikan Psikiyatri Birliği, Ruhsal Bozuklukların Tanısal ve Sayımsal Elkitabı, Beşinci Baskı (DSM-5), Tanı Ölçütleri Başvuru Elkitabı'ndan, çev. Köroğlu E, Hekimler Yayın Birliği, Ankara, 2013 :43-62
4. Placidi GP. Boldirini M. Patronelli A et al.Prevelance of psychiatric disorders in thyroid diseased patients.Neuropsychobiology 1998: 38 (4):222-5.

Poster No. 146

The Individual and Combined Effects of CTLA4-Cd28 variants and oxidant-antioxidant status on the development of colorectal Cancer

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Poster No. 147

Doxycycline and Caffeic Acid Phenetyl Ester synergistically reduces oxidative stress status and apoptosis levels in experimentally induced periodontitis model of rats

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Low-dose doxycycline (LDD) have been widely used to treat periodontal diseases with the aim of enzymatic inhibition and its related anti-inflammatory properties. Caffeic acid phenethyl ester (CAPE) is one of the bioactive compound of propolis extract. Nowadays there are increasing numbers of literature search which elaborate that CAPE possesses antioxidant, antimicrobial and anti-inflammatory properties.

The basic aim of the present study is to verify the possible effects of LDD and CAPE on experimentally induced periodontitis model in rats. This model will help us to clarify their effects against oxidative stress in relation to periodontal tissue loss associated with ligature-induced experimental periodontal disease in rats.

Forty-eight adult Wistar Albino rats were divided into five study groups as follows: 1) group 1 = Control; 2) group 2 = CAPE; 3) group 3 = DOX; 4) group 4 = Periodontitis; and 5) group 5 = CAPE + DOX + Periodontitis.

We evaluated GSH, GSH-Px and LP values from the serum samples of rats and also apoptosis levels in periodontal tissue. When we evaluated LP levels, we determined significant decrease in CAPE and DOX group for all of oxidative stress parameters ($p<0.001$). We also determined increased GSH and GSH-Px levels. We determined that CAPE has the strongest protective effect for apoptosis levels. CAPE + DOX combination also reduced apoptosis levels comparing to the Periodontitis group. Histopathological findings that we obtained from the current study demonstrates that CAPE is more efficient than DOX administration. Histomorphometric results overlap with the findings written above. The most bone loss was determined in periodontitis group, however CAPE and DOX administration reversed this situation.

The general findings of the current study clearly demonstrate that DOX and CAPE are an effective therapeutic agents against periodontitis induced oxidative stress model in rats. Their combination is also contribute for protection.

Poster No. 148

Doxycycline and Caffeic Acid Phenetyl Ester regulates total Antioxidant Status (TAS) and total Oxidant Status (TOS) in experimentally induced periodontitis model of rats

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Periodontitis is defined as inflammation around the tooth characterized with soft tissue and bone damage. Oxidants are also produced under physiological conditions and human body's defense mechanisms try to scavenge these harmful products. Oxidative stress condition is formed when the balance will shift to oxidants.

The main idea of the current study is to evaluate the TAS and TOS levels from brain, heart, kidney, liver and plasma samples. We also evaluated histomorphometrical changes in alveolar bone of rats.

Forty-eight adult Wistar Albino rats were divided into five study groups as follows: 1) group 1 = Control; 2) group 2 = CAPE; 3) group 3 = DOX; 4) group 4 = Periodontitis; and 5) group 5 = CAPE + DOX + Periodontitis.

We determined the lowest TAS levels in periodontitis group. However CAPE administration increased TAS levels significantly in brain, kidney, liver and plasma samples. TOS results also support our findings. CAPE reduces oxidative stress products in heart, kidney, liver and plasma samples. DOX group has some positive effects but not as strong as CAPE. Histomorphometric evaluation results also support our oxidative stress index results. DOX and CAPE have better signs of improvement against periodontitis. But CAPE is more effective than DOX.

Our findings clearly demonstrate that CAPE has powerful protection effect against periodontitis induced oxidative stress model in rats. CAPE administration can tolerate oxidative stress better than DOX administration by its phenolic compounds.

Poster No. 149

Do korean red ginseng and Acetyl-L-Carnitin have protective effects against oxidative stress in cohlear cells?

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Aims

Noise induced hearing loss and drug induced ototoxicity mechanism is related to generation of reactive oxygen species. Antioxidants such as Acetyl-L-Carnitin (ALC) and Korean Red Ginseng (KRG) have protective effects on ototoxicity. The aim of this study was to investigate protective effect of KRG and ALC against Hydrogen peroxide (H_2O_2) induced ototoxicity in cohlear cells.

Material and Methods

Mouse House Ear Institute-Organ Corti 1 cells (HEI-OC1) were grown with DMEM at 33°C and 10 % CO_2 conditions. H_2O_2 was used for oxidative stress model of ototoxicty in this study. The cells were treated with 5 mM and 10 mM H_2O_2, 50 µM ALC, 1 mg/L KRG and their combinations at 24, 48, and 72 hours. The cell viability was evaluated with WST-1. Mann-Whitney-U test was perfomed.

Results

H_2O_2 (5 mM) decreased the cell viability about 28% at 72 hours. KRG (1mg/mL) prevented H_2O_2 induced cell death about 72%. ALC (50 µM) was not protected from H_2O_2 induced cell death. KRG and ALC combinations reduced cell death about 82% against H_2O_2 induced cell death.

Conclusion

KRG is mainly shown to have protective effect against H_2O_2 induced ototoxicity in cohlear cells.

Poster No. 150

Effects of prenatal exposure to artificial food colourings on total antioxidant status (TAS), total oxidant status (TOS) levels and oxidative stress index (OSI) of hippocampus

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Introduction

Artificial food colourings and additives (AFCAs) are commonly used in global food industry for preserve or enhance the colour or improve attraction and stability of foods. Many researches suggested that AFCAs adversely affect the learning, memory and behavior which are mainly functions of hippocampus. In this study we aimed to asses possible effects of AFCAs on hippocampal oxidative stress parameters which could be related to functions of hippocampus.

Material and Methods

Total of 30 female rats are divided as an experiment group (n=15) which was given a mixture of nine artificial food colourings (erythrosine, ponceau 4R, allura red AC, sunset yellow FCF, tartrazine, amaranth, brilliant blue, azorubine and indigotin) at No Observable Adverse Effect Levels (NOAELs) dose and control group (n=15) which was administered water beginning from one week prior to pregnancy till delivery. When the offspring have become adults, 24 offspring of artificial food colour mixture administered rats were allocated as male and female experiment groups and 24 offspring of water administered group; as male and female control groups. When the offspring became 3 months old, they were sacrified and hippocampi were extracted. TAS and TOS levels were measured by Rel Assay Diagnostics kits and OSI was calculated.

Results

Data are assessed by Kruskall Wallis test and for further analyze Mann Whitney U test was used. TAS and TOS levels of male experiment group was significantly increased when compared to male control group ($p<0.05$) while OSI between groups showed no significant difference ($p>0.05$). Also no significant difference was found in TAS, TOS levels and OSI in female groups.

Discussion

In lightning of our findings AFCAs' effects on

different parameters may be different between genders. Although intrauterine exposure to AFCAs could increase oxidant status in male hippocampi, that may lead to compensatory increasement in antioxidant status as well, which could balance the OSI values. Several possible negative effects of AFCAs on learning, memory and neurobehavioral process may be originated from increased oxidant status in hippocampi. Also the dose and the combination of AFCAs could be related with oxidant status and studies with different doses should be usefull to understand possible relations between AFCAs and oxidative stress.

Poster No. 151

The effects of lichen extracts on liver in streptozotocin-induced type 1 diabetic rats

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In this study, the effects of lichen specie, *Cetraria islandica* was firstly investigated on streptozotosin (STZ)-induced diabetic rat liver tissue. Six groups Sprague-Dawley male rats were used (n=7) for this purpose. The diabetes model was developed by the injection of 50 mg/kg single intraperitoneal dose of STZ on the three groups except for control and lichen diet alone. Following the formation of diabetes, water extracts of lichen from 5 to 500 mg/kg dose range were given to rats by intraperitoneal injection for fourteen days. Duration trial, body weight of animals, food and water consumption and blood sugar levels were determined. At the end of these processes, the animals were sacrificed and liver tissue were excised by dissection. The cellular damage were evaluated by using histological methods. The liver tissues was stained with Haematoxylin-Eosin (HE), Periodic Acid Schiff (PAS), Reticulin and Sudan black B for histological changes. It was observed that body weight significantly decreased in diabetic group and water and feed consumption levels and blood sugar levels were increased significantly in comparison to that the control group. In this group, it was shown that significant histopathologic findings were identified in liver tissue: sinusoidal dilatations, apoptosis, lymphocyte infilitration, congestion, increased kupffer cells, non-homogenous stain in tissue, decreased glycogen content, lipid accumulation in hepatocytes and fibrosis. Different doses of the lichen extracts alone did not demostrate negative effect on the studied parameters. As a result, it was concluded that CISE has no enough therapeutic feature on diabetic animals and their liver tissue.

Poster No. 152

Can the antioxidant alpha lipoic acid (ALA) be an alternative treatment against the unfavourable metabolic effects of high fructose corn syrup (HFCS) in rat dental tissues?

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Increasing the amount of sucrose in the diet associated with a high intake of HFCS as a widely used food additive, not only enhance caries process but also affect the metabolism of the pulp-dentin complex. Rapidly metabolized by the body, fructose has been shown to cause a variety of metabolic effects. Above all, HFCS causes vascular dysfunction by simultaneous decreases in vasoprotective factors while oxidative stress increases. However, antioxidants have been shown to have beneficial effects on oxidative stress parameters in various tissues but little is known about the antioxidant system in the dental tissues. Therefore, the aim of the study was first, to assess the oxidative and vascular effects of HFCS in dental tissues of rats; second, to assess the antioxidant enzymatic defenses of ALA in dental tissues of rats subjected to HFCS intake.

24 rats randomly divided into three groups; intact rats with standard diet (control group), HFCS induced rats (CS group) and HFCS induced rats with ALA treatment (ALA group). Rats were euthanized by cervical dislocation. The mandibula was removed and then the tissues fixed in 10% neutral-buffered formalin and prepared for the examination.

According to the results from histologic and immunohistochemical evaluations, some distinct pathologic changes were observed in HFCS group without the presence of any dental caries. ALA treatment decreased the symptoms in treated rats.

Consequently, HFCS can cause some vascular

and pulpal tissue alterations but these can be tolerated by the the ALA treatment.

References

1. Ruane-O'Hora T, Edge D, Shortt CM, Markos F, Noble M I M. Responses of iliac conduit artery and hindlimb resistance vessels to luminal hyperfructosemia in the anaesthetized pig. Acta Physiol 2013; 209:254–261.
2. Valikangas L, Pekkala E, Larmas M, Risteli J, Salo T, Tjaderhane L. The effects of high levels of glucose and insulin on type I collagen synthesis in mature human odontoblasts and pulp tissue in vitro. Adv Dent Res, 2001; 15:72-75.
3. Kim HJ, Chang EJ, Kim HM, Lee SB, Kim HD, Kim GS, Kim HH. Antioxidant α-lipoic acid inhibits osteoclast differentiation by reducing nuclear factor-κB DNA binding and prevents in vivo bone resorption induced by receptor activator of nuclear factor-κB ligand and tumor necrosis factor-α. Free Radical Biology & Medicine 2006; 40:1483–1493.

Poster No. 153

To Examine the effects of the thymoquinone on human breast cancer MDA-MB-231 cells

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Aim

Thymoquinone (TQ), phytochemical compound extracted from the plant Nigella sativa or black cumin, exhibits medicinal effects, including anti-bacterial, anti-fungal, anti-viral, anti-inflammatory, immunomodulatory, and anti-cancer properties. Furthermore, TQ inhibits human cancer-cell proliferation and induces apoptosis.

This work aimed to study the effects of the on human breast cancer cell line MDA-MB-231 using Poly-ADP-Ribose-Polimerase (PARP) staining and Terminal deoxynucleotidyl transferase dUTP nick end labeling (TUNEL) assay.

Materials and Methods

MDA-MB-231 cell line was cultured in monolayer model. Cells were treated with the TQ on 24, 48 and 72 hours incubation. Cells were not treated with the TQ were considered as the control group. The effects of the TQ effective doses on PARP and Tunel staining were assessed by immunohistochemically.

Results

IC50 values of TQ in MDA-MB-231 are 200μM on 24, 48 and 72 hours incubation. PARP staining and Tunel assay was used together to determine the death of the cells. TUNEL positive cells and active PARP were detected after treatment in monolayer model. Dead cell count was more in TQ applied MDA-MB-231 cell lines in comparison to the controls ($p < 0.05$).

Conclusion

In this study, Nigella sativa applications enhanced the TUNEL positive cells and active PARP in comparison to the controls in monolayer model.

Poster No. 154

To examine the effects of the silibinin on human breast cancer Mda-Mb-231 cells

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Aim

Silibinin, is a bioactive flavonolignan extracted from milk thistle, Silybum marianum. Silibinin exerts strong anti-proliferative, pro-apoptotic and anti-inflammatory effects. Many studies have shown that silibinin inhibits experimentally induced malignancies of the liver, prostate, skin, and colon as well as inhibition of proliferation of cancer cell lines in vitro.

This work aimed to study the effects of the Silibinin on human breast cancer cell line MDA-MB-231 using Poly-ADP-Ribose-Polimerase (PARP) staining and Terminal deoxynucleotidyl transferase dUTP nick end labeling (TUNEL) assay.

Materials and Methods

MDA-MB-231 cell line was cultured in monolayer model. Cells were treated with the Silibinin on 24, 48 and 72 hours incubation. Cells were not treated with the Silibinin were considered as the control group. The effects of the Silibinin effective dose on PARP and Tunel staining were assessed by immunohistochemically.

Results

IC50 values of TQ in MDA-MB-231 is 100μM, 50μM and 50μM on 24, 48 and 72 hours incubation respectively. PARP staining and Tunel assay was

used together to determine the death of the cells. TUNEL positive cells and active PARP were detected after treatment in monolayer model. Dead cell count was more in Silibinin applied MDA-MB-231 cell lines in comparison to the controls ($p < 0.05$).

Conclusion

In this study, Silibinin applications enhanced the TUNEL positive cells and active PARP in comparison to the controls in monolayer model.

Poster No. 155

Conformatıon of apoptotic effect of the Viscum Album L. extracts on human breast cancer MCF-7 cells with TUNEL assay

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Aim

Mistletoe (Viscum album L., VA) is a semi-parasitic plant that grows on various trees and has a variety of biological compounds lectins, viscotoxins, alkaloids, triterpenes, and oligo- and polysaccharides with antitumoral (cytotoxic, antiangiogenic) as well as immunomodulating properties. Besides, it has a significant antitumor activity including inhibitory effects on tumor formation, growth, invasion, metastasis and antiangiogenesis.

This work aimed to confirme the apoptotic effects of the mistletoe extracts Helixor A (HA), Helixor P (HP) and Helixor M (HM) on human breast cancer cell line MCF-7 using Terminal deoxynucleotidyl transferase dUTP nick end labeling (TUNEL) assay.

Materials and Methods

MCF-7 cell line was cultured in multicellular spheroid model. Cells were treated with the mistletoe extracts HA, HM and HP on 24, 48 and 72 hours incubation. Cells were not treated with the mistletoe extracts were considered as the control group. Tunel staining were assessed by immunohistochemically.

Results

IC50 values of HP in MCF-7 are 500µg/ml, 50µg/ml and 50µg/ml on 24, 48 and 72 hours incubation respectively. IC50 values of HA and HM in MCF-7 are 500µg/ml on all incubations. Tunel assay was used to determine the death of the cells. TUNEL positive cells were detected after treatment in multicellular spheroid model. Dead cell count was more in the mistletoe extracts HA, HM and HP applied MCF-7 cell lines in comparison to the controls ($p < 0.05$).

Conclusion

Spheroids are known to be in vivo-like tissue-culture representatives and the most adapted model to keep the in vitro resistance properties of cells. Due to these characteristics, spheroids quite realistically represent the results of the drug effects by including limitations in penetration, distribution, and feedback mechanisms in cell signaling In this study, mistletoe extracts HA, HM and HP applications enhanced the TUNEL positive cells in comparison to the controls in multicellular spheroid model.

Poster No. 156

Modulator role of melatonin and selenium on oxidative stress in lens of diabetic rats

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Abstract

Hyperglycemia plays a critical role in the development and progression of diabetic brain injury via the increased oxidative stress. Senile cataract, a major cause of blindness worldwide, is an age-associated condition commonly prevalent in patients with diabetes mellitus. Oxidative damage to the constituents of the eye lens is considered to be the foremost mechanism in the development of cataract. Melatonin and selenium have been considered a potent antioxidant that detoxifies a variety of reactive oxygen species in many eye diseases. The aim of this study was to evaluate modulator roles of melatonin and selenium on oxidative stress levels in lens of streptozotocin (STZ)-induced diabetic rats.

Sixty rats were randomly divided into four groups. First group was used as control. Second (STZ) group used as diabetic. Third and fourth groups received

selenium and melatonin, respectively. Melatonin and selenium were intraperitonealy given to diabetic rats constituting the fifth (STZ+melatonin) and sixth (STZ+Se) group. Diabetes was induced using a single dose of intraperitoneal STZ. On 14th day of lens samples were taken from all animals.

Lipid peroxidation and total oxidant status (TOS) were increased in STZ although they were decreased by melatonin and selenium treatments. Glutathione peroxidase (GSH-Px) activities and total antioxidant status (TAS) concentrations were lower in STZ group than in control. However, the GSH-Px and TAS values were recovered by melatonin and selenium treatments.

In conclusion, we observed those melatonin and selenium administrations supplementations are beneficial on oxidative stress level in the lens of diabetic rats by modulating lipid peroxidation, TOS, TAS and GSH-Px values.

Keywords
Diabetes, Cataract; Erythrocytes; Oxidative stress; Lens; Antioxidants.

Poster No. 157

Antioxidative effects of statins in periodontal disease

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Periodontal disease is one of the most common oral diseases. The progression of the disease is dependent on the response of the host to pathogens that colonize the tooth surface (1). Increased levels of reactive oxygen species leading to oxidative stress are involved in the pathogenesis of periodontitis (2). New strategies for periodontal disease management have been emerging as more is learned about the role of host response.

Studies on the antioxidant effects of drugs have become substantially significant, as oxidative stress is regarded as the underlying cause of several diseases. Statins generally have been widely used to reduce cholesterol levels, and recently, they have attracted even more attention due to their antioxidant effects (3-5).

The present study was conducted to discuss the effects of several statins in the management of periodontal disease with their antioxidative effects.

Possibly in the future, drugs which can intervene in host modulation, like statins, could be used for the management of periodontal disease even as an additive treatment. Further large longitudinal randomized controlled studies for each statin separately are required to confirm this hypothesis.

References

1. Kornman KS, Page RC, Tonetti MS. 1997. The host response to the microbial challenge in periodontitis: assembling the players. Periodontol 2000 14:33-53.
2. Dhotre PS, Suryakar AN, Bhogade RB. 2012. Oxidative Stress in Periodontitis. Eur J Gen Med 9:81-84.
3. Dalcico R, de Menezes AM, Deocleciano OB, Oriá RB, Vale ML, Ribeiro RA, Brito GA. 2013. Protective mechanisms of simvastatin in experimental periodontal disease. J Periodontol 84:1145-1157.
4. de Araújo Júnior RF, Souza TO, de Moura LM, Torres KP, de Souza LB, Alves Mdo S, Rocha HO, de Araújo AA. 2013. Atorvastatin decreases bone loss, inflammation and oxidative stress in experimental periodontitis. PLoS One 10:e75322.
5. Ersoy A, Koc ER, Sahin S, Duzgun U, Acar B, Ilhan A. 2014. Possible effects of rosuvastatin on noise-induced oxidative stress in rat brain. Noise Health 16:18-25.

Poster No. 158

Evaluation of the effect of wireless internet systems on the seminiferous tubule morphology in rat testis: A stereological study

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Effects of the electromagnetic waves exposed from wireless communication devices on the living tissues have been disputed. Nowadays, WLAN and WI-FI internet systems are prevalently used internet connection devices. Thermal and non-thermal effects of 2.45 GHz electromagnetic radiation exposed from these devices are investigated. Some researches suggest that 2.45 GHz electromagnetic radiation may be has different effects on tissues by way of oxidative stress. In the present study, we proposed to evaluate the effect of electromagnetic waves emitted from WLAN systems on the rat testis weight and volume, seminiferous tubule diameter (STD) and germinal epithelium height (GEH) using stereological techniques. A total of thirty-two (n=24) male Wistar albino rats 8-10 weeks old represented this study's material. Animals were randomly divided into three groups as control (C, n=8), sham (Sh, n=8) and modem (M, n=8). The rats in the M group were exposed to 2.45 GHz electromagnetic field radiated from the WLAN systems during 10 weeks and 24h/day. The same duration and conditions were composed for S group by switched off WLAN system on the same experimental design. Testis volume was determined by the help of a computer-assisted stereological analyses device that uses a special software called Stereo Investigator (Version

8.0, MicroBrightField, USA) by Cavalieri's principle. The STD and GEH were measured on tubules sampled in the unbiased counting frame. A decline observed in the testis weights of the M groups than the Sh and C groups ($p<0.05$). The testis volume of M groups was less than the testis volume of C and Sh groups ($p<0.05$). STD and GEH were also decreased in M groups than Sh and C groups ($p<0.05$). In conclusion, morphologic alterations were determined in rat testis weight, volume, STD and GEH by the effect of electromagnetic fields exposed from wireless internet systems. Possible effects of the oxidative stress parameters might be result of loss of testis weight, volume, STD and GEH, and the further studies should be conducted on the damages of the oxidative stress.

References

1. Gannes FP, Billaudel B, Haro E, Taxile M, Montagner L, Hurtier A, Aissa SA, Masuda H, Percherancier Y, Ruffie G, Dufour P, Veyret B, Lagroye I. 2013. Rat fertility and embryo fetal development: Influence of exposure to the Wi-Fi signal. Reproductive Toxicology 36:1-5.
2. Atasoy HI, Gunal MY, Atasoy P, Elgun S, Bugdayci G. 2013. Immunohistopathologic demonstration of deleterious effects on growing rat testes of radiofrequency waves emitted from conventional Wi-Fi devices. Journal of Pediatric Urology 9:223-229.
3. Gannes FP, Haro E, Hurtier A, Taxile M, Athane A, Aissa SA, Masuda H, Percherancier Y, Ruffi´e G, Billaudel B, Dufour P, Veyret B, Lagroye I. 2012. Effect of in utero Wi-Fi exposure on the pre and postnatal development of rats. Birth Defects Research 95:130-136.
4. Saygın M, Çalışkan S, Köylü H. 2008. Kablosuz ağ ve testisler. S.D.Ü. Tıp Fak. Derg. 18(3):110-115.
5. Kesari KK, Kumar S, Behari J. 2011. Effects of rediofrequency electromagnetic wave exposure from cellular phones on the reproductive pattern in male wistar rats. Appl. Biochem. Biotechnol. 164:546- 559.

Poster No. 159

The antioxidant effects of alpha lipoic acid against high fructose corn syrup-induced oxidative stress in rat's salivary gland

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There has been much concern regarding the role of dietary HFCS in the development of metabolic diseases. One of the negative effects of a high sucrose is observed on parotid functions. Damage of the parotid glands are caused by radical oxygen species (ROS) as by-products of oxygen metabolism. Oxidative stres, a consequence of excessive production of ROS, is a major risk factor, which induces dysfunction of several tissues and organs of the body and a factor in the development of many diseases. However, an alternative approach to address the effects induced by oxidative stress is to provide an adequate diet accompanied by regular antioxidant supplementation. The aim of the study was, to explore the effects of a high fructose corn syrup on salivary gland in rats and to clarify the antioxidant effect of alpha lipoic acid on the damaged tissues caused by a high-sucrose diet.

24 rats randomly divided into three groups; intact rats with standard diet (control group), HFCS induced rats (CS group) and HFCS induced rats with ALA treatment (ALA group). Rats were euthanized by cervical dislocation. The parotid gland ducts were surgically exposed bilaterally. Then the tissues fixed in 10% neutral-buffered formalin and prepared for the histologic and immunohistochemical evaluations.

As a result, sialadenitis characterized by severe inflammatory reaction was observed in CS group. The most of the inflammatory cells belong the mononuclear cells especially lymphocytes. After the ALA treatment degenerative changes were decreased, the gland recovered an essentially normal appearance. The contour of nuclei became rounded and the vesicular appearance returned. Consequently, ALA has a protective potential against the harmful consequences of HFCS consumption.

References

1. Nebbioso M, Pranno F &PescosolidoN. Lipoic acid in animal models and clinical use in diabetic retinopathy. Expert Opin. Pharmacother 2013; 14(13):1829-1838.
2. Mata A,Marques D, Martı´nez-Burgos MA, Silveira J, Marques J, Mesquita MF, Pariente JA, Salido GM, Singh J. Effect of hydrogen peroxide on secretory response, calcium mobilization and caspase-3 activity in the isolated rat parotid gland. Mol Cell Biochem 2008; 319:23–31.
3. Kütter MT, Romano LA, Ventura-Lima J, Tesser MB, Monserrat JM. Antioxidant and toxicological effects elicited by alpha-lipoic acid in aquatic organisms. Comparative Biochemistry and Physiology 2014; 162:70–76.

Poster No. 160

Comparison of plasma nitric oxide concentrations in healthy and metabolic syndrome induced rats

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Nitric oxide is addressed as Endogen Derived Releasing Factor, as well. Nitric oxide especially is synthesized in phagocytic cells and vascular

endothelial cells in the body. It is play a very important role in the physiological functions including vascular relaxing, trombocyte aggregation, regulation of blood pressure etc. Concentrations of nitric oxide levels changes in some diseases such as disease, pulmoner and diabetes mellitus (Türköz and Özerol 1997, Kılıç and Yıldız 1998, Inan et al 2005). The aim of the current research was to evaluate the levels of nitric oxide in the healthy and metabolic syndrome induced rats. Sixteen male Wistar Albino rats were divided two equal groups. Group 1 was served as control group, whereas metabolic syndrome was induced in Group 2 rats (Gelmez et al 2012). End of the experimental period, blood samples were obtained from cardiac puncture under anesthesia. Plasma samples were gained and plasma nitric oxide concentrations were determined by commercially available ELISA kits. Plasma nitric oxide level of metabolic syndrome induced rats (16.8 µM) was statistically significantly ($P<0.008$) higher than healthy group (3.54 µM). In has been stated that level of nitric oxide is accepted as an endothelial dysfunction marker before developing metabolic syndrome (Anonym 2014). In conclusion, nitric oxide may play a role in the developing and/or diagnosing of metabolic syndrome.

References

1. Anonym 2014. http://turkendokrin.org/files/pdf/metabolik_sendrom.pdf, Accessed at: 06.07.2014
2. Türköz Y, Özerol E, 1997. Nitrik oksitin etkileri ve patolojik rolleri. Journal of Turgut Özal Medical Center, 4(4), 453-461.
3. Kılıç H, Yıldız L, 1998. Hastalık ve sağlıkta nitric oksit. AÜTD, 30,75-80.
4. İnan ÜÜ, Serteser M, Ermiş SS, Demir S, Köken T, Öztürk F, 2005. Diyabetik retinopatili hastalarda serum vasküler endotelyal büyüme fakötrü ve nitrik oksit düzeyleri. T Oft Gaz, 35, 496-503.
5. Gelmez MY, Kasapoğlu P, Adaş ÇU, Tahralı İ, Gazioğlu SB, Çevik A, Deniz A, 2012. Metabolik Sendromda Deneysel Hayvan Modelleri. Deneysel Tıp A. Ens. Dergisi. 2(4):15-21.

Poster No. 161

Can Hypericum perforatum extract be used as a remedial agent against hydrogen peroxide-induced oxidative damage in chondrocytes: the importance of caspase-1 and ADAMTS

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Aim

Hypericum perforatum Linn (HPL) has been used for healing several pathologies with few side-effects. The purpose of this study was to examine the effects of HPL extract on cell viability, apoptosis and ADAMTS proteins of chondrocytes induced by hydrogen peroxide (H_2O_2), as a model of chondrocytes subjected to reactive oxygen species (ROS) attack in rheumatoid arthritis (RA) and osteoarthritis (OS).

Materials Methods

OUMS-27 cells were cultured in Dulbecco's modified Eagle' medium (DMEM) and treated with 100, 400, and 750 µg/mL HPL for 36 hours. Afterwards, cells were exposed to 0.7 mM H_2O_2 for 2 hours. Cell viability was detected by trypan blue and Caspase-1, ADAMTS5, ADAMTS9, and GAPDH proteins were detected by Western blot technique.

Results

In vitro H_2O_2 supplementation decreased OUMS-27 cell viability. H_2O_2 application to the cells led to a slight increase in Caspase-1 amount, which shows no apoptosis. The most prominent increase in Caspase-1 level was shown in cells treated with 400 µg/ml HPL. There was a decrease in ADAMTS5 level and an increase in ADAMTS9 level upon H2O2 administration. Pretreatment with HPL led to more decrease in ADAMT5 level which show the protection of extracellular matrix attacking from this proteinases in cartilage tissue.

Conclusion

HPL has a potential to reverse the negative effects induced by H_2O_2 in OUMS-27 cells giving a strong possibility that it can protect the surrounding cartilage area of chondrocytes from oxidative damage, which is suggested to be one of the main factors accused for progression of RA and OA.

Poster No. 162

The structural profile of epithelial cells in genital Candidiasis: Micronucleus frequency and nuclear/ cytoplasmic ratio of exfoliated cervical epithelial cells

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Abstract

Candida is the most common cause of fungal infections. The aim of this study, therefore, was to fill the gaps in the current data both on the frequencies of micronuclei and nuclear anomalies, and the nuclear/ cytoplasmic ratio in genital Candidiasis. A total of 94 Pap-stained cervical smears, comprised of only Candida spp. (n=44), Candida spp. + abnormal squamous cell of undetermined significance (n=3), Candida spp + Human papilloma virus + atypical squamous cells of undetermined significance, a high-grade squamous intraepithelial lesion (n=1), Candida spp + Human papilloma virus + low grade squamous intraepithelial lesions (n=1), Candida + low grade squamous intraepithelial lesions (n=1) and control cases with no infection agent (n=44) were studied. The micronucleated, binucleated, karyorrhectic, karyolytic, karyopyknotic and nuclear buds' cells and cells with perinuclear halos per 1000 epithelial cells were counted. In cytomorphometric analysis, nuclear area and cellular area were evaluated in each smear using image analysis software in 400x magnification. We demonstrated that the frequencies of micronucleus ($p<0.001$), binucleated cell ($p=0.001$), cells with perinuclear halos ($p<0.05$) and the nuclear /cytoplasmic ratio ($p= 0.002$) of epithelial cells in only *Candida* infected group were higher than the control values and the difference was found to be statistically significant. Genital Candidiasis is able to induce significant changes in the size and shape of the cervical epithelial cells, detectable by microscopy and cytomorphometry. The nuclear/cytoplasmic ratio and the frequency of micronucleus may reflect genotoxic damages in cervical epithelium in Candidiasis. Micronucleus scoring on the epithelial cells of cervix could be used to screen the structural profile of epithelial cells in genital Candidiasis.

Key Words

Candida; micronucleus; cytomorphometry; nucleus: exfoliative cytology

Poster No. 163

Effects of enzymatic antioxidant parameters of boric acid application in ovariectomized rats

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In this study, the effects of boric acid application in ovariectomized rats were investigated in glutathione (GSH), glutathione S-transferase (GST), glutahione peroxidase (GSH-Px), catalase (CAT) enzymes and malondialdehyde (MDA) as an lipid peroxidation indicator. In study 60 Wistar albino female rats were divided into 6 groups as; control, 5 mg boric acid, 10 mg boric acid, ovariectomized, ovariectomized+5 mg boric acid, ovariectomized+10 mg boric acid. After 60 days from ovariectomized application, rats were started to given boric acid and were given boric acid during 20 days by oral gavage. At the end of the 20 th day, liver, kidney and brain samples were taken. Liver GSH and GSH-Px levels in ovariectomized group were determined to increase meaningfuly in comparision with control group whereas were decreased in the groups that were applied ovariectomized+5 mg boric acid and ovariectomized+10 mg boric acid. While liver GST and brain GSH levels in ovariectomized group were determined to decrease meaningfuly in comparision with control group these levels were increased in groups that were applied 5 mg boric acid, ovariectomized+10 mg boric acid. Kidney GSH, CAT and MDA levels in ovariectomized applied group were determined to decrease in comparision with control group in contrast were increased in ovariectomized+5 mg boric acid applied group. It was observed that boric acid application in ovariectomized rats were created positive effect on the enzymatic antioxidants.

References

1. Choi MK, Kang MH. Effects of boron supplementation on lipid profiles and antioxidant capacities in the ovariectomized rats.Korean J Nutr 2005; 38: 698-705.

Poster No. 164

CAPE Could be a Promising Treatment in Steroid-induced Osteonecrosis

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Objective

The aim of this study was to examine effects of caffeic acid phenethyl ester (CAPE) on steroid-induced osteonecrosis (SIO) in rats.

Materials and Methods

Rats were divided into 4 groups: a control group (n=7), a methylprednisolone acetate (MPA, 15 mg/kg, once a week) administered group (group MPA, n=8), a CAPE (10 µmol/kg, per day) administered group (group CAPE, n=7), and a group given CAPE and MPA group (group CAPE+MPA, n=8). The CAPE was administered at 13 weeks of age. The MPA, as a steroid, was administered at 15 weeks of age. The rats were killed when 17 weeks old.[1] Osteonecrosis was diagnosed based on histopathological examination. Total oxidant (TOS), total antioxidant (TAS), and oxidative stress index (OSI) were assayed at the end of the study.

Results

Osteonecrosis was observed histopathologically, osteonecrosis lesions demonstrated in the MPA group and a lesser amount of osteonecrosis lesions were observed in the CAPE+MPA. TAS levels significantly decreased in the CAPE group compared to control and MPA groups ($p<0.01$). The TOS and OSI levels significantly increased in the MPA group compared to other groups ($p<0.001$).

Discussion

Caffeic acid phenethyl ester (CAPE) could be a promising for protection against steroid-induced osteonecrosis in rats. It is probably that inhibited oxidative stress play a protective role on the mechanism for this effect.

References

1. Miyata, N., et al., Pentosan reduces osteonecrosis of femoral head in SHRSP. Clin Exp Hypertens, 2010. 32(8): p. 511-6.

Keywords

Osteonecrosis, CAPE, Oxidative stress, Experimental study

Poster No. 165

Effect of Cardiac Surgery on Serum Procalcitonin and C-Reactive Protein

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Cardiac surgery leads to inflammatory response characterized by some clinical changes. This systemic inflammatory response syndrome (SIRS) is resulted from some conditions such as myocardial ischemia-reperfusion, endotoxin releasing, surgical trauma and interaction between blood and non-physiological surfaces. Procalcitonin (PCT) is used as a biomarker for infectious and systemic inflammatory diseases such as severe trauma, burns and sunstroke.

We aimed to investigate the effect of different cardiac surgical procedures on serum procalcitonin and C-Reactive Protein (CRP) levels. A total of 30 patients were included the study. Cardiac valve replacement (CPG, n=10), coronary artery bypass grafting with cardiopulmonary bypass (CABG, n=10) and coronary artery bypass grafting with beating heart surgery (CABG, n=10) were performed to the patients. Blood samples were taken before operation (T0) and 1(T1), 4(T2), 24(T3) and 48(T4) hours after the administration of protamine. Serum samples were stored at -20 oC after centrifugation. Serum PCT levels were measured with immunoluminometric and CRP levels with turbidimetric method. We observed that CRP levels increased significantly 24 hours after operation and beginning to decrease after 48 hours (T0: 0,074±0,122, T1: 0,779±0,265, T2: 1,295±1,740, T3: 2,98±0,95, T4: 1,36±0,22 ng/ml). CRP levels increased significantly 24 hours after operation (T0: 6,616±0,973, T1: 6,566±5,186, T2: 8,75±1,479, T3: 139,933±9,925, T4:

160,68±7,40 mg/dl) . The highest PCT levels were observed after valve replacement surgery (6,964 + 2,462 ng/ml). There was no significant correlation between CRP and PCT levels.

We can speculate that procalcitonin is a sensitive biomarker and can be used for evaluating inflammatory response after cardiac surgery especially when using non-physiological techniques.

Poster No. 166

Characterization and simulation of the effect of Ca^{2+} influx on Ca^{2+} oscillations in primary mesothelial cells

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Short-lived changes in the Ca^{2+} concentration in the cytosol as well as in cell organelles including the endoplasmic reticulum (ER) serve as specific signals for various physiological processes (1). In mesothelial cells, squamous cells that line the surface of internal organs and the walls of body cavities, a re-entry in the cell cycle (G_0-G_1 transition) evoked by serum re-administration induces long-lasting Ca^{2+} oscillations with a slowly decreasing frequency. Ca^{2+} responses in individual mesothelial cells show a wide range of different oscillatory patterns within a single, supposedly homogenous cell population. Whilst cytoplasmic Ca^{2+} concentration (c_{cyt}) shows a baseline oscillatory pattern i.e., discrete Ca^{2+} transients from a constant basal ccyt level, ER Ca^{2+} concentration (c_{ER}) represent saw-tooth–like oscillations at a semi-depleted ER state. We found that Ca^{2+} influx across the plasma membrane plays a critical role in the process of Ca^{2+} oscillations. SKF 96365, a compound that blocks both store-operated Ca^{2+} channels (SOCs) and diacyl glycerol-activated TRPC channels either completely blocked or strongly decreased the oscillation frequency. Because the existing mathematical models for Ca^{2+} oscillations cannot cope with the fact that the interspike period can vary in a very broad time range and moreover that during this period the basal c_{cyt} remains constant (2), we developed a new model based on -and fitted to- Ca^{2+} recordings of c_{cyt} and c_{ER} in primary mesothelial cells.

References

1. Berridge MJ, Lipp P, Bootman MD. The versatility and universality of calcium signalling. Nat Rev Mol Cell Biol. 2000 Oct;1(1):11-21. Review.
2. Dupont G, Combettes L, Bird GS, Putney JW. Calcium oscillations. Cold Spring Harb Perspect Biol. 2011 Mar 1;3(3). Review.

Poster No. 167

Contribution of licofelone to the apoptosis and lipid peroxidation in hypoxic ischemic newborn rat model

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Objective

Although there are new improvements in hypoxic ischemic encephalopathy (HIE) treatments, mortality and morbidity rates related with HIE are still quite high in newborn (1,2). The single use of cyclooxygenase (COX) inhibitors or Lipoxygenase (LOX) inhibitors could fail to reduce HIE. The aim of this study is to evaluate the dual effects of licofelone which is both COX and LOX inhibitor, in the treatment of HIE.

Material and Methods

Seven days old newborn Wistar family rats were performed and there were 7 rats in each group. Experimental animals were divided into 4 groups. All rats in the hypoxic-ischemic groups (Group 2, Group 3, Group 4) were exposed to hypoxia by applying carotid ligation. Rats in Group 3 received licofelone, rats in Group 4 received licofelone + allopurinol and rats in Group 1 received saline. At the end of experiment, all groups of rats were decapitated under anesthesia. TUNEL assay was applied to investigate apoptotic cell death. Moreover, malondialdehyde (MDA), which is a lipid peroxidation marker and antioxidant system marker, reduced glutathione (GSH) were evaluated.

Results

In this study, licofelone reduced apoptosis and MDA levels compared to HIE group ($p<0,05$). GSH content decreased in both licofelone and allopürinol+licofelone groups ($p<0,05$) compared to sham group.

Conclusion

Our results demonstrated that licofelone administration, after hypoxic-ischemia reduces apoptosis and lipid peroxidation and we propose that licofelone may be a potential choice of treatment for HİE.

References

1. Taskin, E., Ozcan, K., Canacankatan, N., Satar, M., Yapicioglu, H., Erdogan, YS. The effects of indomethacin on caspases, glutathione level and lipid peroxidation in the newborn rats with hypoxic-ischemic cerebral injury, *Brain Research* 2009; 1289:118-23.
2. Ozcan, K., Satar, M., Canacankatan, N., Taşkın E.,Dağlıoğlu K. Allopurinol's effect on caspase-3 and caspase-8 activity in hypoxic-ischemic newborn rats. *Turk Arch Ped* 2013; 48: 48-52.

Poster No. 168

Cytological and histopathologic examination of the effect of long-term application of atomoxetine in terms of antioxidant system and lipid peroxidation in the rat brain

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Attention Deficit Hyperactivity Disorder (ADHD) is the most common psychiatric disorder. It was found that long-term use of antipsychotic drugs used to treat ADHD has toxic effects on the brain. There is not enough research on the neurotoxic effects of the drug on brain. In this study, non-stimulant atomoxetine as an alternative to stimulant type drugs used in therapy was administered to rats for a long time. The toxic effects of drug were investigated by measuring antioxidant system and lipid peroxidation parameters and histopathologic examination of brain tissue

The rats (n=25) were divided into 4 groups: group1 (control), group2, grup3 and group4 (groups receiving atomoxetine). Group1 received orally 1 ml/day of isotonic saline whereas group2, group3 and group4 received orally 0.5 mg/kg, 1 mg/kg and 2 mg/kg of atomoxetine, respectively (a single dose/day for 6 weeks). After 6 weeks, brain tissue samples were obtained and biochemical procedures were performed. For biochemical analysis, SOD, GSH and MDA, indicator of lipid peroxidation, levels were measured spectrophotometrically. The brain tissue was also histopathologically examined. One-way ANOVA was used for statistical analysis of the data.

There was no significant difference between the groups in terms of biochemical parameters ($p>0.05$). However, the groups differed statistically in terms of histopathologic findings ($p<0.05$).

In brain tissue, long-term application of atomoxetine did not affect on antioxidant system and lipid peroxidation in terms of SOD, GSH and MDA but pathological effect in cellular level on the tissue was observed.

References

1. Ercan ES, Çetin FÇ, Mukaddes NM ve Yazgan Y. Dikkat eksikliği hiperaktivite bozukluğu tedavisinde atomoksetin. Çocuk ve Gençlik Ruh Sağlığı Dergisi. 2009; 16: 113-118.
2. Akgün GM, Tufan AE, Yurteri N and Erdoğan A. Genetic basis of attention deficit hyperactivity disorder. Current approaches in psychiatry. 2011; 3: 15-48.
3. Ellison G, EisonMS, Huberman HS and Daniel F. Long-term changes in dopaminergic innervation of caudate nucleus after continuous amphetamine administration. Science 1978; 201: 276-278.
4. Barkley RA. Attention Deficit Hyperactivity Disorder: A Handbook for Diagnosis and Treatment. New York,Guilford Press, 2006.

Poster No. 169

The effect of stem cell on the oxidative stress and apoptosis of the reproductive organs

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Background / Aim

Infertitility is considered as a major health problem of recent century. Importance of stem cell is increasing so it is searched new features and supposed to be involved in the infertitility treatment where oxidative stress and apoptosis play importany role. We aimed to investigate the beneficial effect of the stem cells related to free radicals and cell death on testis and ovary.

Materials and Methods

Biopcy model of wound healing was created in the rat testis and ovary where stem cells were delivered by injection. Oxidative stress and apoptosis were investigated by imunocytochemistry by NOS and TUNEL kit. Tissues were analysed for these statining by a semi-quantitative scoring system.

Results

The stem cells produced better wound healing by the decrease of oxidative stress for eNOS and iNOS with reduce in TUNEL staining for apoptosis.

Conclusion

These findings suggest that transplantation of the mesenchymal stem cells may help to promote better enviroment for the reproductive organs by the effect on oxidative stress and apoptosis.

MSCs transplantation can promote the recovery of the immunological injury of the ovary in mice, the

mechanism of which may involve reduced apoptosis of the GCs.

Key words
Infertility, mesenchymal stem cells, testis, ovary, oxidative stress, apoptosis.

Poster No. 170

Arachnoid Cyst and Psychotic Disorder: A Case Report

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Abstract

The aim of this report was the presentation of the rare case of the arachnoid cyst of the brain, with only psychiatric manifestation.

A 19-year-old female presented with 6 weeks history of the auditory and visual hallucinations, perspective delusions. This was her first psychotic episode. She did not have any diseases in her medical history. Endocrine system and EEG, routine biochemical laboratory screening was found normally. An arachnoid cyst in the left temporal region of brain was determined by MRI (Magnetic Resonance Imaging). Neurological examination was normal. The patients haven't got neurological signs or loss of strength. Patient was consulted to a neurosurgery specialist. Patient was recommended to go to a control examination. Her psychotic symptoms were suspected to be induced by the arachnoid cyst. She was prescribed risperidone 2 mg daily. During her first control visit at 3 weeks, her psychiatric symptoms became significantly less remarkable. İt may show an etiologic link, but longer follow up period is necessary.

Poster No. 171

Thymoquinone enhances cisplatin-induced neprotoxicity in high dose

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Abstract

Background

Cisplatin-induced nephrotoxicity is an important problem of the cancer treatments. The major bioactive component of Nigella sativa,thymoquinone (TQ) might limit the nephrotoxic effect of cisplatin in low doses. However it is not clear how it can affect the kidney as an anti-cytotoxic agent when administered in higher doses or in cisplatin co-treatment. Therefore, we examined the in vivo interactions between cisplatin and TQ by measuring serum cystatin C (cys C), creatinine and neutrophil gelatinase-associated lipocalin (NGAL) levels and analyzing the expression status of p53 and NGAL by immunohistochemistry.

Methods

Wistar rats were divided into four groups: Control, TQ treatment (group II; 40 mg/kg i.p. for 5 days), cisplatin treatment (group III; 7 mg/kg, i.p. for at day 3) and TQ and cisplatin co-treatment (group IV). Results:Administration of 40 mg/kg TQ had no effect on serum kidney parameters. In cisplatin received group's serum creatinine level was insignificant, but serum Csy C and NGAL levels were significantly increased. All serum creatinine, NGAL and Cys C levels were increased in co-treatment of cisplatin and TQ. Additionally, in this group, renal tubular damage was found significantly higher than both control and only cisplatin-treated groups. The kidney immunohistochemistry staining of NGAL and p53 were significantly more intense in group IV rather than the others.

Conclusions

This study showed that the administration of cisplatin and high dose of TQ act synergistically to produce nephrotoxicity and the involvement of

apoptotic pathway and proximal tubule damage might be the leading cause of on this effect.

Keywords
Cisplatin, Nephrotoxicity, Thymoquinone, Apoptosis, Rat

Poster No. 172

The role of oxidative stress and antioxidants in the allergic rhinitis

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Oxidative stress might occur in several allergic diseases. Endogenous antioxidants are the primary defence mechanism against the oxygen free radicals. The enzymatic antioxidants include superoxide dismutase(SOD), catalase, glutathione peroxidase(GSH-Px), glutathione S-transferase and thioredoxin. The non-enzymatic antioxidants include glutathione, ascorbic acid, urate, alfa-tocopherol, bilirubin and lipoic acid1. The in vivo differences in the defense mechanisms of allergic individuals against free radicals are evidences of the important role of antioxidant detoxification mechanisms in the allergic disorders2. It has been reported that reduced dietary intake of antioxidants in the increased incidence of allergic rhinitis1. In one study have reported higher malondialdehyde(MDA) levels in patients with allergic rhinitis compared to the control group. However, myeloperoxidase, vitamin A, vitamin E levels and total antioxidant capacity was reported to be lower in patients with allergic rhinitis3. In the other study have reported lower SOD activity in allergic individuals compared to those of controls. Similarly MDA levels and GSH-Px activity was reported when compared to those of controls4. In one study have shown higher levels of advanced glycation end products in patients with allergic rhinitis than in healthy individuals, although the levels of advanced oxidation protein products(AOPP) in patients were similar to those of healthy individuals5. In the other study have reported higher AOPP levels in patients with allergic rhinitis compared to the control group6. Oxidative stress plays an important role in the pathogenesis of allergic rhinitis. However, allergic diseases are multifactorial. Therefore, the role of oxidative stress and antioxidants in allergic diseases requires further study.

Key words
oxidative stress; antioxidants; allergic rhinitis

References

1. Bowler RP, Crapo JD. Oxidative stress in allergic respiratory diseases. 2002. J Allergy Clin Immunol 110:349-56.
2. Matés JM, Segura JM, Pérez-Gómez C, Rosado R, Olalla L, Blanca M, et al. Antioxidant enzymatic activities in human blood cells after an allergic reaction to pollen or house dust mite. 1999. Blood Cells Mol Dis 25:103-9.
3. Akbay E, H Arbağ, Y Uyar, K Oztürk. Oxidative stress and antioxidant factors in pathophysiology of allergic rhinitis. 2007. Journal of ear, nose, and throat 17(4): 189-196.
4. Sagdic A, Sener O, Bulucu F, Karadurmus N, Özel H E, Yamanel L, et al. Oxidative stress status and plasma trace elements in patients with asthma or allergic rhinitis. 2011. Allergologia et immunopathologia 39(4): 200-205.
5. Lorenzo G Di, Minciullo PL, Leto-Barone MS, et al. Differences in the behavior of advanced glycation end products and advanced oxidation protein products in patients with allergic rhinitis. 2013. J Investig Allergol Clin Immunol 23(2): 101-106.
6. Aksoy F, Demirhan H, Veyseller B, Yıldırım Y S, Ozturan O, Basınoğlu F. Advanced oxidation protein products as an oxidative stress marker in allergic rhinitis. 2009. Journal of ear, nose, and throat 19(6): 279-284.

Poster No. 173

Cellular effects of Aflatoxins

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Aflatoxin is a group that has been most studied mycotoxins, , shows strong hepatotoxic effects. Aflatoxin synthesis by the Aspergillus flavus, A. parasiticus, A. nomius, A. pseudotamaris and A. bombycis. There are four main fraction of aflatoxins that entitled B1, B2, G1 and G2. AB1 is known to exhibit high toxic effect in terms of human health and group which most commonly found. We aimed to investigate the effect of mechanisms at the cellular aspects of AB1.

Aflatoxins show toxic effect as a result of metabolized by microsomal and cytoplasmic oxygenase enzyme systems. This enzyme systems, mainly located in the endoplasmic reticulum on the liver cells, are a complex organization together with enzymes associated with cytochrome O_2 and NADPH-dependent enzymes and catalyse the oxidative metabolism of aflatoxin B1. The product of this catalysis discloses genotoxic effects of aflatoxin B1 via binding covalently to the nucleophilic region of DNA, RNA and protein molecules.

İn the studies we examined aflatoxins show their effect on many cellular pathways.

References

1. Smela M., Currier S., Bailey A., Essigman J., The chemistry and biology of aflatoxin B1: from mutational spectrometry to carcinogenesis. Carcinogenesis, 2001:22; 535-545.
2. Kew MC. Aflatoxins as a cause of hepatocellular carcinoma. J Gastrointestin Liver Dis. 2013;22(3):305-10.
3. Groopman, J.D. and Kensler, T.W., Aflatoxin Exposure in Human Populations: Measurements and Relationship to Cancer, CRC Critical Review in Toxicology, 1988;19(2):113-145.

Poster No. 174

Investigation of association with bladder cancer and Ku 70/80 polymorphism

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Bladder cancer is the 7th most common cancer among men 17th most common among women and 9th most common in general around the world. Polymorphisms of DNA repair genes may lead changes in expression levels and functions of these genes thereby causing cancer.

Breaking of phosphodiester bonds in both chains of DNA causes DNA double strand breaks. The two major ways of double chain repair mecanisims are homologus recombination (HR) and Non-Homolog end Joining (NHEJ).

Ku is a heterodimeric protein expressed by XRCC gene family and consist of two subunits as Ku70 and Ku80, which plays role in NHEJ and HR repair mechanisims.

We aimed to investigate polymorphisms of Ku70 and Ku80 genes among patients with bladder cancer. We obtained tumoreus, adjacent healthy bladder tissues and blood samples from 38 bladder cancer patients diagnosed by Suleyman Demirel University, Uroloji Department. We examined the association between the genetic polymorphisms Ku70 -1310C/G and Ku80 -1401G/T from isolated DNA samples from three sources via PCR-RFLP method.

Our study, which is performed for the first time in Turkish population, showed no association between the Ku70 -1310C/G and Ku80 -1401G/T polymorphisms and bladder cancer. We concluded our results are scientificly immoptant because of the elimination of two factors which can play role in bladder cancer. We think there could be relations between other polymorphisms and mutations of DNA repair mechenisms and cancer.

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