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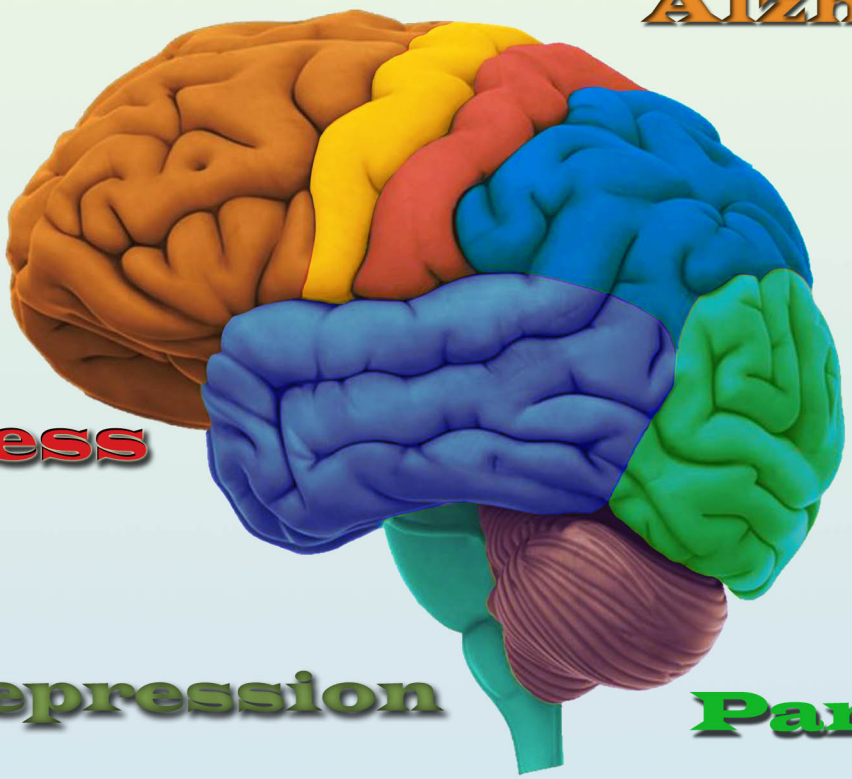

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AIM AND SCOPES
Journal of Cellular Neuroscience and Oxidative Stress is an online journal that publishes original research articles, reviews and short reviews on the molecular basis of biophysical, physiological and pharmacological processes that regulate 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 in Neuroscience
(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 in neurodegenerative diseases such Parkinson's and Alzheimer's diseases)

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, ageing, antioxidants, neuropathy, traumatic brain injury, pain, spinal cord injury, Alzheimer's Disease, Parkinson's Disease.

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CONFERENCE

Conference No. 1

Use of Electrophysiology in Diagnosing Neurobehavioral Disorders

Serpil Demirci

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Cognitive-behavioral disorders (or dementias) is one of the leading problem in the elderly. It is not difficult for clinicians to recognize moderate to severe dementia, however this may not be an easy task in the early phases because of the heterogenity and the partial overlap of clinical presentations. Sensitive and specific biomarkers have utmost importance for early and differential diagnosis of dementia since identification and therapeutic interventions have the greatest benefit in this period.

Evaluation of brain activity (EEG, qEEG and evoked potentials) may provide useful clues to diagnose and differentite different types of dementias. On EEG and qEEG general slowing, alpha frequency decline, delta and teta frequency increase, reduced complexity and perturbed synchrony have been demonstrated to correspond cognitive function changes. ERPs are useful measures for studying mind and brain functions. They are time-locked signals to cognitive, motor and sensory processing and give a direct estimate of what a significant part of the brain is doing just before, during, or after an event of interest. Latency and amplitude changes of the ERP waveforms have been used in diagnose and follow-up dementia.

Keywords: Dementia, cognition, electrophysiology, EEG, event-related potentials

Conference No. 2

Ca^{2+} Measurements in Neurons and Cell Lines

Laszlo Pecze

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Calcium ion (Ca^{2+})**, a** universal signaling molecule, is widely recognized to play a fundamental role in the regulation of various biological processes including muscle contraction, fertilization, neurotransmitter release, cell division, learning, gene expression, enzyme activation, apoptosis, etc. Therefore, each cell possesses sophisticated mechanisms for the precise regulation of cytoplasmic ($[Ca^{2+}]_{cyt}$), endoplasmic reticulum luminal ($[Ca^{2+}]_{ER}$) and mitochondrial matrix ($[Ca^{2+}]_{mito}$) Ca^{2+} concentrations. Dysregulation of Ca^{2+} signaling **is** associated with a wide variety of diseases. Agonist-evoked Ca^{2+} signals usually are manifested as rhythmic changes in $[Ca^{2+}]_{cyt}$ called Ca^{2+} oscillations. The development of techniques allowing the measurement of changes in free (unbound) Ca^{2+} levels has contributed substantially to our understanding of normal and abnormal cellular functions. Epifluorescence microscopy, confocal laser scanning microscopy, and more recently multiphoton microscopy have allowed the precise spatiotemporal analysis of intracellular Ca^{2+} concentrations at the cellular and subcellular levels. A very successful approach to studying the role of Ca^{2+}, in a specific cellular process is the use of fluorescent Ca^{2+} indicators. These indicators exhibit altered fluorescent properties when bound with Ca^{2+}. There are generally two classes of Ca^{2+} indicators: genetically encoded Ca^{2+} indicators[1] and chemically engineered fluorophores[2]. Historically, the continuous improvement of Ca^{2+} indicators ran parallel with the development of the appropriate instrumentation. Recent technical advances permit *in vivo* Ca^{2+} measurements as well. There are a number of characteristics for each indicator that must be considered by the researcher to obtain relevant data.

Keywords: Ca^{2+} signaling, Ca^{2+} indicators, FRET, microscopy;

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Conference No. 3

The Role of Genetics in the Detection of Neurological Diseases: PCR and Cell Culture

Pınar ASLAN KOŞAR

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The neurogenetics is research of genes that cause neurological disorders and their molecular mechanisms. A clear genetic basis of the most common neuro genetic disorders including some forms of epilepsy, movement disorders, mental retardation, muscular dystrophies and peripheral neuropathies has been established. With the development of new technologies in the field of molecular genetics, our approach to diagnosis and treatment methods of diseases have improved considerably. It is essential that these techniques can be used in the diagnosis and treatment of neurogenetic diseases. These advances in molecular biology have identified more than 200 genes that have contributed to neurological diseases to date. One of the methods used to diagnose neurogenetic diseases is the polymerase chain reaction (PCR).

PCR is a common laboratory technique used to make many copies of a particular region of DNA. It is very precise and can be used to amplify, or copy, a specific DNA target from a mixture of DNA molecules. PCR is based on using the ability of DNA polymerase to synthesize new strand of DNA complementary to the offered template strand. Because DNA polymerase can add a nucleotide only onto a preexisting 3'-OH group, it needs a primer to which it can add the first nucleotide. Then, to perform PCR, the DNA template that contains the target is added to a tube that contains primers, free nucleotides, DNA polymerase, and the mixture is placed in a PCR machine. This requirement makes it possible to delineate a specific region of template sequence that the researcher wants to amplify. At the end of the PCR reaction, the specific sequence will be amplificated in billions of copies of times. The resulting PCR products are visualized by agarose gel electrophoresis.

Agarose gel electrophoresis is the most effective way of separating DNA fragments of varying sizes ranging from 100 bp to 25 kb and for visualization and purification. To separate DNA using agarose gel electrophoresis. DNA is loaded into pre-cast wells in the gel and a current applied. The phosphate backbone of the DNA (and RNA) molecule is negatively charged, therefore when placed in an electric field, DNA fragments will migrate to the positively charged anode. the negatively charged DNA through an agarose gel matrix toward a positive electrode. Shorter DNA fragments migrate through the gel more quickly than longer ones. Thus, the approximate length of a DNA fragment can be determined by running it on an agarose gel. A suitable voltage for separation of the DNA fragments and ethidium bromide are used to visualize the separated DNA fragments

Another method that is used to understand the molecular mechanisms of neurogenetic diseases is cell culture. Cell culture refers to the removal of cells from an animal or plant and their subsequent growth in a favorable artificial environment. The cells may be removed from the tissue directly and disaggregated by enzymatic or mechanical means before cultivation, or they may be derived from a cell line or cell strain that has already been established.

Cell culture is one of the major tools used in cellular and molecular biology, providing excellent model systems for studying the normal physiology and biochemistry of cells (e.g., metabolic studies, aging), the effects of drugs and toxic compounds on the cells, and mutagenesis and carcinogenesis. The major advantage of using cell culture for any of these applications is the consistency and reproducibility of results that can be obtained from using a batch of clonal cells.

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Conference No. 4

Sleep-Wake Neural Dynamics from Neurobiobehavioral, Electrophysiology and Cognitive Perspectives

Mohammad Nami

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The study of sleep and sleep disorders nests within the spectrum encompassing cellular molecular, electrophysiological, applied and clinical perspectives. Neurobehavioral sleep disorders have often been modeled in laboratory animals including zebrafish, rodents and primates. This enables interpolating many neurotechnological tools in the study of sleep of which some may not be applicable in human subjects. Much of the obtained insights from neurosomnology find their ways in applied neuroscience and result in clinical applications in the practice of sleep medicine and neurology. In clinical setting, the overnight polysomnography (PSG) with simultaneous video recording can confirm a variety of neurobehavioral sleep-related disorders such as REM sleep behavior disorder and is particularly useful for the documentation of unusual movements and behaviors during the night time sleep in patients with parasomnias and nocturnal seizures. PSG results are scored and interpreted by a certified clinical expert in the field of sleep medicine and optimal therapeutic approach is suggested accordingly. Portable-sleep Monitoring is an abbreviated approach which needs further validation before promoted for extensive use. This communication highlights evidence and insights on sleep-wake neural dynamics through neurobehavioral, electrophysiology and cognitive viewpoints.

Keywords: Polysomnography, Sleep disorders, Clinical evaluation

Conference No. 5

Patch Clamp Experiments in Brain Slices

Ramazan Bal

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The patch clamp technique is an advanced electrophysiological technique used to study ionic currents and the electrical properties of whole living cells or patches of cell membrane. The technique is commonly applied in the study of excitable cells such as neuronal cells, cardiac myocytes, smooth and skeletal muscle fibers. The recording can be performed in different types of preparations, including cell cultures, isolated neurons, neurons in brain slices, and in living animals (in vivo).

Patch clamping can be performed using current clamp configuration, for which the amplitude of the current injected into the cell is controlled by the experimenter and the resulting voltages are recorded or the voltage clamp configurations, for which the of the cell membrane is controlled by the experimenter and the resulting currents are recorded. Brain slice preparation has the advantage of recording from neurons in relatively intact brain circuits.

This presentation will cover preparation of electrodes, pipette and perfusion solutions and brain slices, visualization of living cells in a slice, differentiation of living cells and dead cells, majör problem to do with the techniqu including noise and space clamp and individual components of the patch clamp techniques and their cost.

Conference No. 6

Calcium Signaling TRP Channels in Neuroscience

Mustafa Nazıroğlu

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Calcium ion (Ca^{2+}) overload plays an important role. Ca^{2+} enters into cells by different ways including cation channels such as voltage gated calcium channels (VGCC) and chemical channels and second messengers such as protein kinase C and inositol triphosphates (IP3). Apart from the well-known channels and second messengers, the transient receptor potential (TRP) superfamily was recently discovered in eye cells of drosophila flyers. Today, the TRP superfamily in mammalian cells contains 28 channels with 7 different subgroups. Reactive oxygen species (ROS) are produced in physiological levels as part of normal mitochondrial function and phagocytic activity. TRPM2 and TRPV1 subgroups of TRP superfamily are also sensitive Ca^{2+}-permeable channels in neurons and they are activated by different stimuli including ROS. In this presentation, I summarized the potential role of the TRPM2 and TRPV1 channels as novel targets for treating neurological diseases such as dementia and neuropathic pain.

Keywords: Apoptosis; Calcium signaling; Neurological disease; Oxidative stress; TRPM2; TRPV1.

Poster Presentations

Poster No. 1

Investigation of possible protective role of boric acid on oxidative stress in traumatic brain injury-induced rats

Serdar Ataizi[1], Mete Özkoç[1], Güngör Kanbak[1], Hadi Karimkhani[1], Dilek Burukoğlu Dönmez[1], Növber Üstünışık[1], Buket Öztürk[1]

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Oxidative stress occurs in a cell due to irreversible damage resulting from some pathophysiological incidents such as a traumatic brain injury (TBI). Free oxygen radicals, which cause the formation of oxidative stress and lipid peroxidation, also leads to neurotoxicity. Protective role of boric acid on the brain in several animal models except TBI was reported (1,2). In this study, we investigated the biochemical and histological changes in damaged brain tissues from rats exposed to a closed TBI. Also, we evaluated neuroprotective role of boric acid on oxidative stress levels which were analyzed in the brain by the levels of malondialdehyde (MDA), one of the end products of lipid peroxidation, and the TBI caused an increase in MDA levels and CAT activity. However, administration of boric acid as a pre-treatment induced an important neuroprotective role by protecting the cell from lipid peroxidation following TBI and allowing the catalase activity to remain close to the control group. We observed similar protective effects of boric acid on histological analyses of brain in the TBI-induced rats. In conclusion, we observed protective effects of boric acid on oxidative stress in the brain of TBI-induced rats. Therefore, using boric acid may useful TBI-induced oxidative stress in rats.

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Poster No. 2

Effects of alpha-lipoic acid and cisplatin on levels of apoptosis, oxidative stress and TRPV1 channel activation in MCF-7 breast cancer cells

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Alpha-lipoic acid (ALA) has both antioxidant and oxidant properties. However, ALA has also potent prooxidant role through activation several molecular pathways. Involvement of Ca^{2+} influx through TRPV1 activation on cancer cell proliferation in several cells was recently reported. Cisplatin (Cisp) is an oldest and effective chemotherapeutical agent for treating the breast cancer which has apoptotic and oxidant effects in cells and patients with breast cancers. However, resistance of Cisp on apoptosis, caspase and oxidative stress pathways was reported in several cells, because role of Cisp on the pathways in the treatment of breast cancer cells has not been fully clarified yet. Therefore, the high mortality rate of breast cancer can be partly attributed to the unknown molecular pathways of cisplatin resistance. Thus, the relationship between changes in ALA, Cisp and TRPV1 activation should be clarified in the MCF-7 cells. The aim of this study was to evaluate if a combination therapy of ALA with cisplatin (Cisp) can alter the effect of this chemotherapy drug in the MCF-7 breast cancer cells.

The MCF-7 cells were divided into four treatment groups as control, Cisp (0.025 mM), ALA (0.05 mM), and Cisp+ALA. Apoptosis, mitochondrial membrane depolarization, reactive oxygen species (ROS) production, lipid peroxidation, PARP1, caspase 3 and 9

expression levels are increased through activating TRPV1 in the cells by the Cisp and ALA treatments, although cell viability, reduced glutathione and glutathione peroxidase (GPx) values were decreased by the treatments. The Cisp and ALA-induced increase of intracellular free Ca^{2+} concentration was decreased with the TRPV1 blocker, capsazepine.

In conclusion, apoptosis and oxidant effects of Cisp were increased by activation of TRPV1 channels, but its action on the values was further increased by the ALA treatment. Combination therapy of ALA and Cisp could be used as an effective strategy in the treatment of breast cancer.

Keywords: Apoptosis; Breast cancer; Cisplatin; α-Lipoik acid, Prooxidant; TRPV1.

Poster No. 3

Calorie restriction decreases apoptosis, mitochondrial oxidative stress and calcium signaling molecular pathways through inhibition of TRPV1 channel in hippocampus and dorsal root ganglion of rats

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TRPV1 channel is activated by capsaicin, oxidative stress, acidic pH and heat factors and the factors are reduced by calorie restriction (CR). Antioxidant effects of CR may modulate TRPV1 activity and apoptosis. To our knowledge, notification is not available on the effects the frequency of meals and CR on oxidative stress and apoptotic pathways of TRP cation channel-mediated Ca^{2+} entry in rats. In the current study, we investigated the involvement of FF and CR in apoptosis, mitochondrial oxidative stress and antioxidant levels through TRPV1 activation in rat.

The rats were assigned to control, FF and FF+CR groups. A fix amount of food as ad libitum and two periods were supplemented to the control and FF groups for 20 weeks, respectively. FF+CR group fed a same amount food of control but 20% less calories in same periods. TRPV1 currents, intracellular Ca^{2+}, apoptosis, reactive oxygen species, and mitochondrial depolarization, PARP-1, caspase 3 and 9 activity and expression values were increased in the hippocampal (HIPPON) and dorsal root ganglion neuron (DRGN) by the FF treatment, although the values were decreased by FF+FR treatment. The FF-induced decrease in cell viability and glutathione peroxidase in the HIPPO, DRGN, plasma and kidney were increased by FF+DR treatment, although lipid peroxidation in the samples were decreased.

In conclusion, FF-induced increase of oxidative stress, apoptosis and Ca^{2+} entry through TRPV1 in the HIPPON and DRGN were decreased by FF+FR treatment. Our findings may be relevant to the etiology and treatment of obesity by the FR treatment.

Keywords: Apoptosis; Calorie restriction, Food frequency; Neuron; Oxidative stress; TRPV1 channel.

Poster No. 4

Hot or cold? Thermosensation explained from the proteins to the brain.

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In our well established but oscillating atmosphere, organisms have to detect and respond efficiently to

temperature in order to survive and perpetuate species. Organisms need to maintain within a specific temperature range in order to preserve their bodily functions. Therefore, a temperature sensing mechanism is required. In this review, we provide a traced and detailed description of the physiological and anatomical features of the thermosensation system.

We begin by identifying and defining Transient Receptor Potential ion channels (TRPs). These proteins are found in the neurons' membrane and they transduce internal and external thermal information. De- and hyper-polarisation of these neurons are prompted by the opening or closure of these channels, which are dependent on temperature changes and the intrinsic voltage. There are hot- and cold- sensitive thermoTRPs. Similarly, primary afferent neurons contain either cold and hot receptors, being the innocuous information transmitted separately to the CNS. Noxious thermal information is transduced by multimodal sensory neurons. After reaching the thalamus, projections are sent to the orbitofrontal cortex, the hypothalamus, the anterior cingulate cortex and the insular cortex. In these areas, thermal information is integrated to trigger behavioural or homeostatic responses.

Finally, we briefly comment on the implications that the nature and arrangement of the thermosensory components have on the development of concepts; particularly, on heat and temperature. Our research group is studying how neurophysiology shapes and constraints the creation of concepts.

Keywords: temperature; thermosensation; thermoreceptors; transient receptor potential ion channels (TRPs), hot and cold.

Poster No. 5

Protective effect of indomethacin, lacidipine and oxcarbazepine on glutamate toxicity in rat olfactory bulb: An in vitro study

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Glutamate is the main excitatory neurotransmitter in the mammalian central nervous system and it is also essential for synaptic plasticity (1). When glutamate remains in synaptic cleft for a long time cortical neurons in culture induces high mortality through activation of NMDA and non-NMDA glutamate receptor. We investigated indomethacin (COX inhibitor), lacidipine (L type Ca^{2+} channel blocker) and oxcarbazepine (Na^{+} channel blocker) against 10^{-5} mM glutamate toxicity (2). Olfactory cortex culture obtained from rats. The olfactory neurons were rapidly dissected and centrifuged for 5 minute. The cells were seeded into 96 well plates. After 10 days, 10^{-5} mM glutamate were added to each well plate for inducing excitotoxicity. Indomethacin (0.5, 1 and 1.5 µM), lacidipine (10, 20 and 40 µM) and oxcarbazepine (10, 20 and 40 µM) were added 5 minute after the glutamate incubation. MTT assay was performed at 48 hours of the incubations. Positive control group survival rate was 52% but highest viability rate (98%) among treatment groups was found in indomethacin + lacidipine group. However, only lacidipine incubation did not induced significant effect on the cell viability level in the neurons. In conclusion, we observed that the treatment with combination of indomethacin and lacidipine increased cellular viability rate in rat olfactory bulb.

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Poster No. 6

Anticancer and anti-apoptotic mechanisms of Zn^{2+} loaded Fe_3O_4-SiO_2-NH_2- (Zinpyr-1) nanocomposite in SH-SY5Y neuroblastoma cells

Gulsah Gundogdu[1], Yavuz Dodurga[2], Fatma Demirkaya Miloglu[3], Mucahit Secme[2], Betul Cicek[1], Elmas Polatdemir[3], Onder Metin[4]

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Zinc ion (Zn^{2+}) is an essential bioelement for vital functions of organisms and involved in many metabolic events in the central nervous system (1). Neuroblastoma is one of the most common types of pediatric tumors that can spread quickly in neuronal tissues (2). Exploring the chemical, synthetic or natural and biologically effective compounds in treatments of many cancer types becomes one of the most popular research topics. The aim of the study was to determine the therapeutic effects of magnetic and fluorescent Fe_3O_4-SiO_2-NH_2-Zn(Zinpyr-1) on cell proliferation, apoptotic mechanisms in SH-SY5Y neuroblastoma cell line. 1.4, 6.8 and 34 mg/L concentrations of each compounds (Fe_3O_4-SiO_2–NH_2-(Zinpyr-1), Fe_3O_4-SiO_2–NH_2-Zn (Zinpyr-1) and Zn^{+2}) were investigated in this study. The cytotoxic effect of these compounds on SH-SY5Y neuroblastoma cells were determined using XTT method depending on time and concentration. Total RNA was isolated with Tri-Reagent and cDNA was synthesized subsequently. Apoptosis related genes such as *Bax, Bcl-2, Bcl-XL, Bid, caspase-3, caspase-8, caspase-9, caspase-10, p53* and *FADD* expressions were evaluated by RT-PCR. IC_{50} value of Fe_3O_4-SiO_2–NH_2-(Zinpyr-1), Fe_3O_4-SiO_2–NH_2-Zn(Zinpyr-1) and Zn^{2+} in SH-SY5Y cells was detected as 34 mg/L at 24 hours. Zn^{2+} is most effective on cell viability within the three compounds. Zn^{2+} and Fe_3O_4-SiO_2–NH_2-Zn(Zinpyr-1) induced apoptosis through up regulation of casp-3, cap-10 and p53 but down regulation of Bcl-2 and Bcl-XL gene expressions. In conclusion, the study demonstrated that high concentrations (6.8 and 34 mg/l) of Zn^{2+} and magnetic Fe_3O_4-SiO_2–NH_2-Zn(Zinpyr-1) induced neurotoxicity in the SH-SY5Y cells and it also altered apoptosis gene expression. These results showed that Fe_3O_4-SiO_2–NH_2-Zn (Zinpyr-1) nanocomposite can be nano-cancer therapeutic agent for the treatment of neuroblastoma.

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Poster No. 7

Protective effects of selenium on oxaliplatin-induced neuropathic pain: Involvement of TRPA1 and TRPV1 cation channels.

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Neuropathic pain through excessive calcium ion entry (Ca^{2+}) can occur for a variety of reasons, including chemotherapeutic agent treatment. Todays, neuropathic pain with chemotherapeutic agents has become an important health problem. Oxaliplatin, one of the chemotherapeutic agents, enhances sensitization of TRP (Transient Receptor Potential) cation channels, especially TRPV1 (Vanilloid 1) and TRPA1 (Ankyrin 1). Aim of the current study was to investigate whether the selenium through inhibition of TRPV1 and TRPA1 is capable of inhibiting on the oxaliplatin induced neuropathic pain, oxidative stress, Ca^{2+} signaling and apoptosis in dorsal rat ganglion (DRG), sciatic nerve

neurons and glioblastoma (DBTRG) cells. In in-vivo and in-vitro groups were formed as 4 groups: Control, selenium (Se), oxaliplatin (OX), oxaliplatin + selenium (OX+Se). Oxaliplatin (twice a week, 4 mg/kg) and Se (every other day, 1,5mg/kg) were intraperitoneally administered to the rats for a totally 4 weeks. In the DBTRG cell culture, the cells were incubated with oxaliplatin (35 µM) and Se (200 nm) for 24 hours Oxaliplatin-induced peripheral pain on nociceptive nerves was tested by Von Frey and hot plate tests. Oxaliplatin treatment in rats enhanced the pain intensity level, although its level was decreased by Se treatment. Oxaliplatin-induced increase of apoptosis, TRPV1 currents, intracellular Ca^{2+} concentration and oxidative stress levels in the DRG and sciatic nerve were also decreased by Se treatment. In the DBTRG cells, increases of TRPA1 currents were further increased by Se treatment and the results of Se is important for killing the neuroblastoma cancer cells. The results of this study may help to develop new treatment strategies by contributing to the role of oxidative stress, calcium signaling and apoptosis in the pathogenesis of oxaliplatin-induced neuropathic pain and to elucidating the effects of selenium.

Keywords; TRPV1; TRPA1; Chemotherapy; Neuropathic pain; Oxidative stress; Dorsal root ganglion (DRG).

Poster No. 8

The Oxidative and antioxidative status of Sperm after freezing and freezing-thawing process

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The aim of this study is to investigate change of oxidative stress parameters during equilibration, freezing and thawing in sperm.

For this study, three rams were used. Ejaculates of the rams were obtained by using an artificial vagina. The ejaculates were mixed and used. As freezing medium, Tris-citrate based extender (contained 27.0 g/l tris(hydroxymethyl)aminomethane, 14.0 g/ l citric acid, 10.0 g/l fructose, 0.75 M cryoprotectan and 10% centrifuged egg yolk) was used. The pH and osmolality of each extender was adjusted to approximately 7.4 and 300–400mOsm, respectively. 200 µl sperm samples were diluted with 2 ml the diluents (final concentration of approximately $200x10^6$ /ml) in 10 ml glass tubes. After dilution, the sperm suspension was loaded in straw (each 0.25 ml). Sperm straws were incubated for 2 hours at +4 °C for equilibration and then frozen for 15 minutes in liquid nitrogen vapor. The frozen straws were stored in liquid nitrogen. The study consisted of 10 trials. After equilibration and post-thaw, oxidative and antioxidative parameters were evaluated. Four this purpose, lipid peroxidation (LOOH), total oxidant status (TOS), oxidative stress index (OSI) and total antioxidant status (TAS) were analyzed. Oxidative and antioxidative parameters were measured in the semen samples using the Aeroset automated analyzer (Abbott, IL, USA) and a spectrophotometer (Cecil 3000, Cambridge, UK). The lipid peroxidation status was evaluated by the fluorometric method based on the reaction between malondialdehyde (MDA) and thiobarbituric acid.

As a results, equilibration, freezing-thawing process did not change oxidative and antioxidative parameters. Role of oxidative stress in freezing and equilibration were found limited.

Keywords: Cryopreservation, equilibration, sperm, oxidative and antioxidative status

Poster No. 9

Change of Oxidants Level in Short Term Storage of Sperm

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The greatest difficulty in liquid storage is the 10 to 35% loss of sperm fertility if storage time is over 24

hours periods. Even though sperm can remain motile for up to a week, their fertility capacity can decrease. Spermatozoa ageing and oxidative stress can act a part in the decline of fertility. The aim of this study was to illustrate role of oxidative stress parameters in the short term storage of sperm.

In this study, ejaculates from 3 rams were used. Ejaculates were taken by artificial vagina twice a week during the mating season. The semen was pooled and used. The semen specimens were diluted by extenders at 37°C as 400 X 10^6/ml. Examples of dilutions were stored at 4°C for up to 48 hours and were evaluated for oxidative [lipid hydroperoxide (LOOH), total oxidant status (TOS), oxidative stress index (OSI)] and antioxidative (total antioxidative status) parameters. Oxidative and antioxidative parameters were measured in the sperm samples using the Aeroset automated analyzer (Abbott, IL, USA) and a spectrophotometer (Cecil 3000, Cambridge, UK). The lipid hydroperoxide level (LOOH) was evaluated by the fluorometric method.

The storage time did not affect the total antioxidant status (TAS) and OSI, but lipid peroxidation and total oxidant status were extremely affected. As expected, the total antioxidant status was similar in all groups. While lipid peroxidation and total oxidant values were increased up to 24 hours storage, LOOH and TOS value were the same between 24 and 48 hours storage.

Keywords: Short term storage, sperm, ram, oxidative stress

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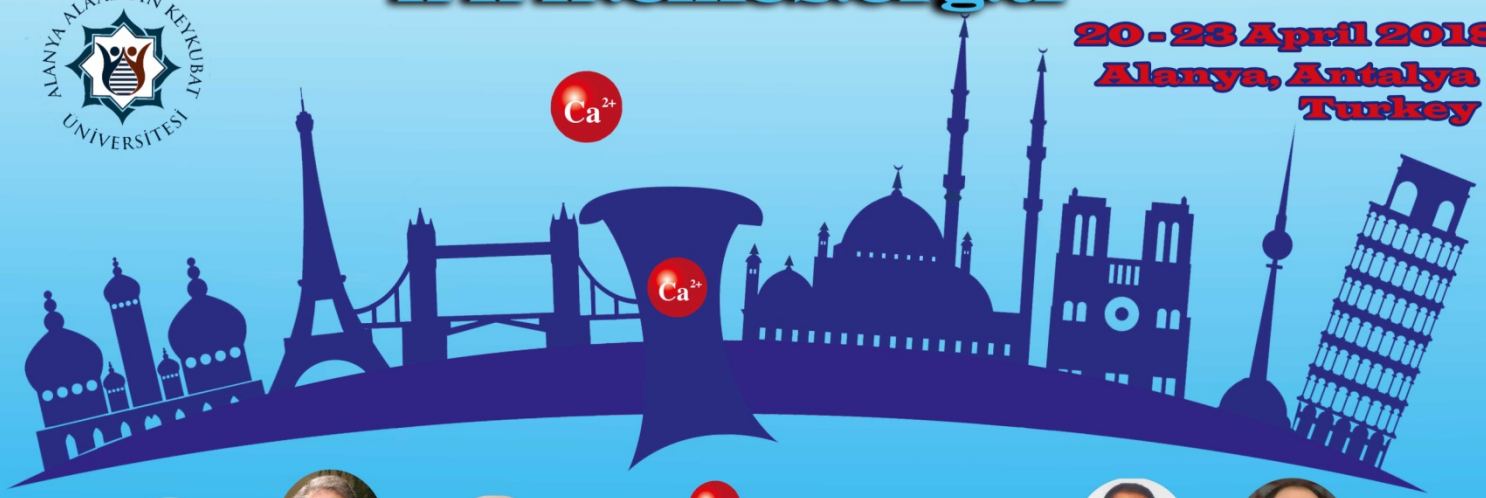


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