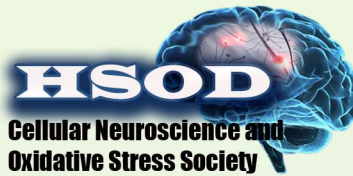


# Journal Cellular Neuroscience and Oxidative Stress

<http://dergipark.gov.tr/jcnos>

Former name; Cell Membranes and Free Radical Research



**Epilepsy**

**Alzheimer**

**Stress**

**Pain**

**Depression**

**Paralysis**

**Brain Research School**

OPEN ACCESS and  
NO PUBLICATION FEE

Editor in Chief  
Prof.Dr. Mustafa NAZIROĞLU

Volume 10, Number 3, 2018

---

# Journal of Cellular Neuroscience and Oxidative Stress

<http://dergipark.gov.tr/jcnos>

An Official Journal of the Cellular Neuroscience and Oxidative Stress Society

<http://hsord.org.tr/en/>

**Formerly known as:**

Cell Membranes and Free Radical Research (2008 - 2014)

---

Volume 10, Number 3, 2018

# 3<sup>rd</sup> International Brain Research School

25 June – 1 July 2018 Isparta /TURKEY  
[2018.brs.org.tr](http://2018.brs.org.tr)

#### EDITOR IN CHIEF

Prof. Dr. Mustafa Naziroğlu,  
Department of Biophysics and Neurosciences,  
Medical Faculty, Suleyman Demirel University,  
Isparta, Turkey.  
Phone: +90 246 211 36 41, Fax: +90 246 237 11 65  
E-mail: mustafanaziroglu@sdu.edu.tr

#### Managing Editors

Kenan Yıldızhan and Yener Yazgan  
Department of Biophysics, Medical Faculty,  
Suleyman Demirel University, Isparta, Turkey.  
E-mail: biophysics@sdu.edu.tr

#### Editorial Board

##### Neuronal Membranes, Calcium Signaling and TRP Channels

Alexei Tepikin, University of Liverpool, UK.  
Jose A. Pariente, University of Extremadura,  
Badajoz, Spain.  
James W. Putney, Jr. NIEHS, NC, USA.  
Laszlo Pecze, University of Fribourg, Switzerland.  
Stephan M. Huber, Eberhard-Karls University,  
Tubingen, Germany.

##### Neuroscience and Cell Signaling

Denis Rousseau, Joseph Fourier, University,  
Grenoble, France.  
Makoto Tominaga, National Institute for Physiological  
Sciences (NIPS) Okazaki, Japan.  
Ömer Çelik, Suleyman Demirel University, Turkey.  
Ramazan Bal, Gaziantep University, Turkey.  
Saeed Semnanian, Tarbiat Modares University,  
Tehran, Iran.  
Yasuo Mori, Kyoto University, Kyoto, Japan.

##### Antioxidant and Neuronal Diseases

Suresh Yenugu, Osmania University, Hyderabad, India.  
Suleyman Kaplan, Ondokuz Mayıs University,  
Samsun, Turkey.  
Özcan Erel, Yıldırım Beyazıt University,  
Ankara, Turkey.  
Xingen G. Lei, Cornell University, Ithaca, NY, USA.  
Valerian E. Kagan, University of Pittsburg, USA.

##### Antioxidant Nutrition, Melatonin and Neuroscience

Ana B. Rodriguez Moratinos, University of  
Extremadura, Badajoz, Spain.  
Cem Ekmekcioglu, University of Vienna, Austria.  
Peter J. Butterworth, King's College London, UK.  
Sergio Paredes Department of Physiology, Madrid  
Complutense University, Spain.

#### 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** ( $\text{Na}^+$ -  $\text{K}^+$  Channels,  $\text{Cl}^-$  channels,  $\text{Ca}^{2+}$  channels, ADP-Ribose and metabolism of  $\text{NAD}^+$ , 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  $\text{NAD}^+$  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)

#### READERSHIP

Biophysics	Biochemistry
Biology	Biomedical Engineering
Pharmacology	PhysiologyGenetics
Cardiology	Neurology
Oncology	Psychiatry
Neuroscience	Neuropharmacology

#### 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.

# 3<sup>rd</sup> International Brain Research School

The congress organization committee wishes thanks to the sponsors below



3<sup>rd</sup> International Brain Research School

# Abstract Book

of

3<sup>rd</sup> International Brain  
Research School

25 June – 1 July 2018

Isparta, Turkey

with collaboration of  
Cellular Neuroscience  
and Oxidative Stress Society  
& Neuroscience Research Center,  
Süleyman Demirel University

# 3<sup>rd</sup> International Brain Research School

## [ Organization Committee ]

### **Organization Chairman**

**Prof. Dr. Mustafa NAZIROĞLU**

*Department of Biophysics, School of Medicine  
Suleyman Demirel University, Isparta, Turkey*

### **Organization Vice Chairman**

**Assoc. Prof. Dr. Ömer ÇELİK**

*Department of Biophysics, School of Medicine  
Suleyman Demirel University, Isparta, Turkey*

### **Organization Secretariat**

**Ahmi ÖZ & Bilal ÇİĞ & Ramazan ÇINAR**

*Department of Biophysics, School of Medicine  
Suleyman Demirel University, Isparta, Turkey*

### **Accountant**

**Kenan YILDIZHAN &**

**Yener YAZĞAN (Graphic Designer & Webmaster)**

*Department of Biophysics, School of Medicine  
Suleyman Demirel University, Isparta, Turkey*

# 3<sup>rd</sup> International Brain Research School

## [ Scientific Committee ]

**Prof. Dr. Ana B. Rodríguez**

*Department of Physiology, Neuroimmunophysiology  
and Chrononutrition Research Group,  
Faculty of Science, University of Extremadura,  
Badajoz, Spain*

**Prof. Dr. Peter McNaughton**

*Wolfson Centre for Age-Related Diseases,  
King's College London, London, UK*

**Prof. Dr. İlker Y. Eyüpoğlu**

*Department of Neurosurgery,  
University of Erlangen-Nuremberg  
Erlangen, Germany*

**Prof. Dr. Hülya Bayır**

*Center for Free Radical and Antioxidant Health,  
Department of Environmental Health, University of Pittsburgh  
Pittsburg, USA*

**Prof. Dr. Mustafa Nazıroğlu**

*Department of Biophysics, School of Medicine  
Suleyman Demirel University, Isparta, Turkey*

**Prof. Dr. Peter W. Reeh**

*Institute of Physiology and Pathophysiology,  
Friedrich-Alexander-University Erlangen-Nuernberg,  
Erlangen, Germany*

**Prof. Dr. Makoto Tominaga**

*Division of Cell Signaling, Okazaki Institute for Integrative Bioscience  
(National Institute for Physiological Sciences),  
Okazaki, Japan*

**Prof. Dr. Ismail Laher**

*Department of Anesthesiology, Pharmacology and Therapeutics,  
The University of British Columbia,  
Vancouver, Canada*

**Prof. Dr. Yasuo Mori**

*Department of Synthetic Chemistry and Biological Chemistry,  
Graduate School of Engineering, Kyoto University  
Kyoto, Japan*



# 3<sup>rd</sup> International Brain Research School

## [ Scientific Committee ]

**Prof. Dr. Jose A. Pariente**

*Department of Physiology, Neuroimmunophysiology  
and Chrononutrition Research Group,  
Faculty of Science, University of Extremadura,  
Badajoz, Spain*

**Prof. Dr. Anirban BASU**

*National Brain Research Centre  
Haryana, India*

**Prof. Dr. Paolo Bernardi**

*Padova University  
Padova, Italy*

**Assist. Prof. Dr. M. Cemal Kahya**

*İzmir Katip Çelebi University  
İzmir, Turkey*

**Assist Prof. Dr. Sergio D. Paredes**

*Madrid Complutense University  
Madrid, Spain*

**Assist Prof. Dr. Denis Rousseau**

*Applied and Fundamental Bioenergetic laboratory  
Joseph Fourier University  
Grenoble Cedex, France*

**Assist. Prof. Dr. Isabella Hininger-Favier**

*Joseph Fourier University  
Grenoble, France*

**Dr. Simon Hebeisen**

*B'SYS Analytics GmbH.  
Binningen, Switzerland*

**Dr. Sandra Derouiche**

*National Inst for Physiol. Sci.  
Okazaki, Japan*

**Dr. Nady Braidy**

*Centre for Healthy Brain Ageing, School of Psychiatry,  
University of New South Wales, Australia*

# 3<sup>rd</sup> International Brain Research School

## [ CONTENTS ]

### Speakers

- Speak No. 1.** Pathophysiology of cation channels in pain: Focus on TRP Channels.  
*Mustafa NAZIROĞLU*.....776
- Speak No. 2.** Calcium imaging techniques in cell lines.  
*Laszlo PECZE*.....777
- Speak No. 3.** Western-blot, PCR and immunofluorescence analysis in mitochondrial biogenesis studies.  
*Denis ROUSSEAU*.....778
- Speak No. 4.** Intravenous NAD<sup>+</sup> effectively increased the NAD metabolome, reduced oxidative stress and inflammation, and increased expression of longevity genes safely in elderly humans.  
*Nady BRAIDY, James CLEMENT, John STURGES, Yue LIU, Anne POLJAK, Perminder SACHDEV*.....779
- Speak No. 5.** Voltage gated sodium channels and epilepsy.  
*Simon HEBEISEN* .....780

# 3<sup>rd</sup> International Brain Research School

## Oral Presentations

- Oral Presentation 1.** Traumatic brain injury models in rats.  
*Kemal ERTİLAV* .....781
- Oral Presentation 2.** Neurodegenerative disease and microbiota.  
*Mustafa GÜZEL, Doğan AKDOĞAN, Orhan AKPINAR*.....782
- Oral Presentation 3.** The gut-brain axis: interactions between microbiota and nervous systems.  
*Orhan AKPINAR*.....783
- Oral Presentation 4.** Roles of dexmedetomidine and calcium signaling in cerebral ischemia: Focus TRP channels  
*Haci Ömer OSMANLIOĞLU* .....784
- Oral Presentation 5.** Depression models in experimental animals.  
*Arif DEMİRDAŞ* .....785
- Oral Presentation 6.** TRPV1 channel is a potential drug discovery channel for epilepsy.  
*Ahmet ÖZŞİMŞEK* .....786
- Oral Presentation 7.** Cerebral ischemia models in rats.  
*Zeki Serdar ATAİZİ* .....787
- Oral Presentation 8.** Involvement of TRP channels on fibromyalgia-induced pain.  
*Atalay DOĞRU*.....788
- Oral Presentation 9.** Involvement of Thermo TRP channels on chemotherapeutic agents-induced peripheral pain.  
*Mustafa Kemal YILDIRIM*.....789
- Oral Presentation 10.** Role of desflurane on oxidative stress in neuroscience.  
*Mustafa KÜTÜK, Gökçen GÖKÇE*.....790
- Oral Presentation 11.** Effects of cell phone (900 and 1800 MHz) and Wi-Fi (2450 MHz) frequencies on oxidative stress in laryngeal mucosa.  
*Sinem GÖKÇE KÜTÜK* .....791
- Oral Presentation 12.** Role of melatonin on oxidative stress in traumatic brain injury.  
*Yener AKYUVA* .....792

# 3<sup>rd</sup> International Brain Research School

## Poster Presentations

- Poster No. 1.** Dysbiosis of gut microbiota and Alzheimer's Disease.  
*Orhan AKPINAR* .....793
- Poster No. 2.** Human gut microbiota and Parkinson Disease.  
*Mustafa GÜZEL, Orhan AKPINAR*.....794
- Poster No. 3.** Experimental Parkinson's disease models.  
*Eda Duygu IPEK, Hulki BASALOGLU* .....795
- Poster No. 4.** Effects of alpha lipoic acid on TRPV1 cation channel in dorsal root ganglion.  
of diabetes-induced rats  
*Betül YAZĞAN, Yener YAZĞAN, Mustafa NAZIROĞLU*.....796

 **Poster No. 4**
**Effects of alpha lipoic acid on TRPV1 cation channel in dorsal root ganglion of diabetes-induced rats**

**Betül YAZĞAN<sup>1</sup>, Yener YAZĞAN<sup>2</sup>, Mustafa NAZIROĞLU<sup>2,3</sup>**

<sup>1</sup>Department of Physiology, Medical Faculty, Adiyaman University, Adiyaman, Turkey.

<sup>2</sup>Department of Neuroscience, Medical Faculty, Suleyman Demirel University, Isparta, Turkey.

<sup>3</sup>Neuroscience Research Center, Suleyman Demirel University, Isparta, Turkey.

Diabetes is a common chronic metabolic disease worldwide. It causes diabetes, tissue degenerations, cell death and associated functional disability. Diabetes also causes the development of common diseases such as cardiovascular and nervous diseases. The most important pathophysiological mechanisms that are accepted in describing diabetic degenerative processes are oxidative stress damage (El-Refaei et al. 2014). Neuropathic pain is induced by several factors including inflammation, excessive Ca<sup>2+</sup> influx, oxidative stress and tissue degeneration. Inflammatory reactions in destroying neurons lead to the activation of the pain molecular pathway. In addition, destruction cell membranes induce excessive Ca<sup>2+</sup> entry in the neurons, because the Ca<sup>2+</sup> concentration is about 10.000 times higher in out of the neurons than in the inside of the neuron. Overload Ca<sup>2+</sup> influx into cytosol and it leads to excessive production of ROS in the neurons. Alpha lipoic acid (ALA) is an important member of the thiol cycle because it is containing the sulfur groups. It is powerful antioxidant substance and it can prevent the complications of diabetes (Ghibu et al. 2009). Transient receptor potential (TRP) channels have six subfamilies and 28 members in human. Most of these channels are responsible in dorsal root ganglia (DRG) neurons for the Ca<sup>2+</sup> permeation especially in neuronal cells. Expression level of the TRPV1 channels is high in the DRG neurons and they show oxidative stress dependent activation. The TRPV1 channel expression levels in the DRG increased in different types of pain.

Forty female rats were divided into four groups:

First group was used as control. Second group used as diabetic. Third and fourth groups received ALA and STZ+ALA, respectively. Diabetes was induced using a single dose of intraperitoneal STZ. On 14th day of DRG samples were freshly taken from all animals. In plate reader analyses, we observed modulator role of ALA on apoptosis, caspase 3, caspase 9, mitochondrial depolarization and cytosolic ROS production values on TRPV1 channel in the DRG neurons. In addition, we observed modulator role of ALA on intracellular Ca<sup>2+</sup> concentration through inhibition of TRPV1 in neuropathic pain-induced rats.

In conclusion, in our diabetes experimental model, oxidative stress are involved in the Ca<sup>2+</sup> entry-induced neuronal death, and modulation of this channel activity by ALA pretreatment may account for their neuroprotective activity against apoptosis.

**Keywords:** Apoptosis; Oxidative stress; Alpha lipoic acid; Diabetes.

**Acknowledgement:** The study was supported by BSN Health, Analysis and Innovation Ltd. Inc. Teknokent, Isparta, Turkey (Project No: 2018-02)

### References

- El-Refaei MF, Abduljawad SH, Alghamdi AH. 2014. Alternative medicine in diabetes - Role of angiogenesis, oxidative stress, and chronic inflammation. *Rev Diabet Stud.* Fall-Winter;11:231-44.
- Ghibu S, Richard C, Vergely C, Zeller M, Cottin Y, Rochette L. 2009. Antioxidant properties of an endogenous thiol: Alpha-lipoic acid, useful in the prevention of cardiovascular diseases. *J Cardiovasc Pharmacol.* 54:391-8.