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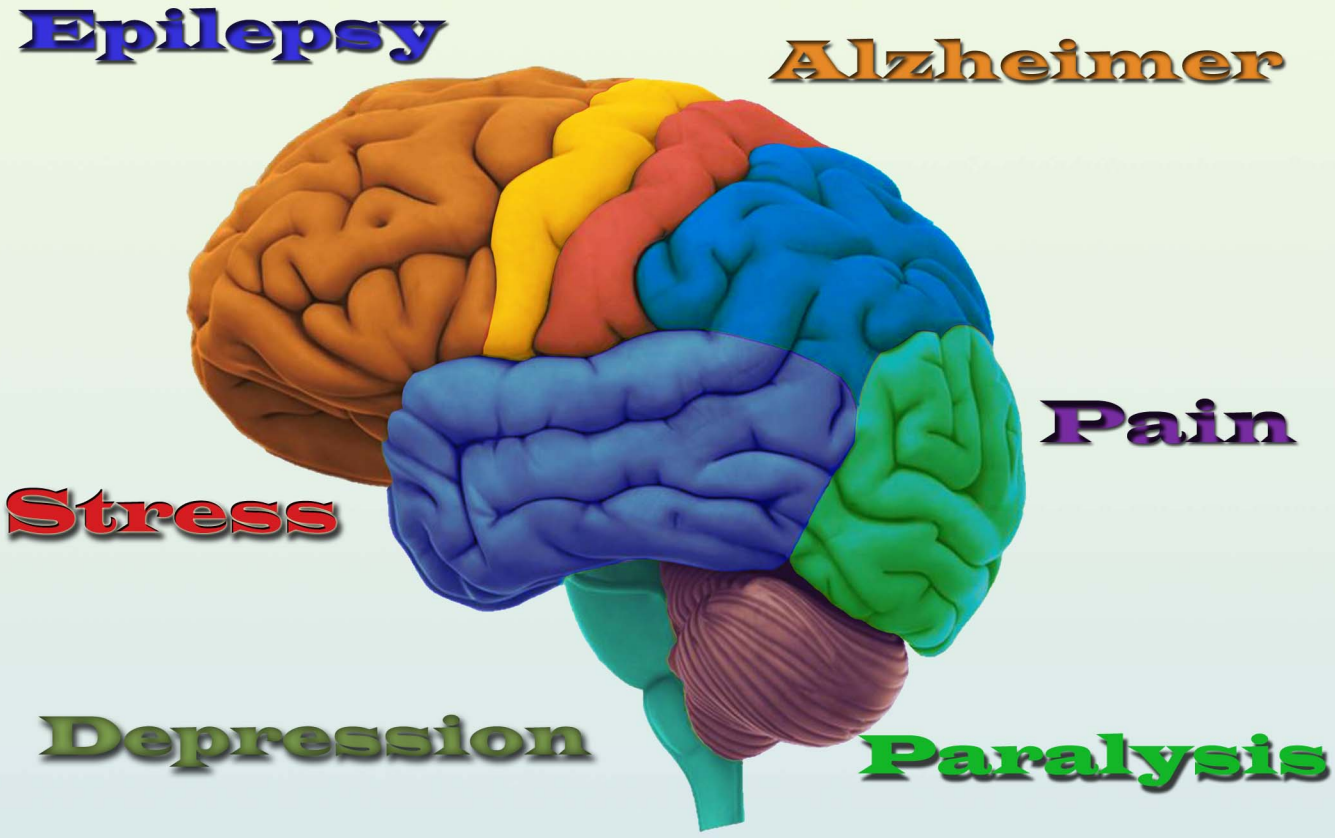

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AIM AND SCOPES
Journal of Cellular Neuroscience and Oxidative Stress is an online journal that publishes original research articles, reviews and short reviews on the molecular basis of biophysical, physiological and pharmacological processes that regulate 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)

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.

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with collaboration of

BSN Health Analyses, Innovation, Consultancy, Organization, Industry and Trade Limited Company

& Neuroscience Research Center, Süleyman Demirel University

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Speakers

SPEAKERS

Speak No. 1

Calcium signaling, TRP channels and intracellular Ca^{2+} measurement in neurons

Mustafa NAZIROĞLU
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Calcium ion (Ca^{2+}) has several physiological and pathophysiological functions such as communication, cell death and development in neurons. Normally, Ca^{2+} concentration is too high in out of the neurons (1-3 mM) as compared to the inside of the neurons (50-100 nM). Ca^{2+} passes the cell membranes through passive and active channels. Passive channels are leak channels. Well known active channels are including several channels such as voltage gated channels, chemical channels, store operated channels and mechanical channels (Kumar et al. 2014). In addition, Ca^{2+} is released from intracellular organelles to cytosol by activation IP_3 and ryanodine receptors. Apart from the well-known cell membrane Ca^{2+} channels, transient receptor potential (TRP) channels were discovered within the last decades. The TRP channels have 28 members within the 6 subgroups in mammalian. Activation and inhibition mechanisms of the TRP channels are very different from the well-known Ca^{2+} channels. For example, TRP vanilloid 1 (TRPV1) channel is activated by hot chili pepper component (capsaicin), acidic pH, high temperature and the vanilloids (Caterina et al. 1997). TRP melastatin 2 (TRPM2) channel is activated by ADP-Ribose and NAD^+. TRPM2 and TRPV1 channels are also activated by oxidative stress (Nazıroğlu and Braidy, 2017). In several neuronal diseases such as epilepsy and Alzheimer's disease, intracellular free Ca^{2+} concentration is increased by the oxidative stress. Hence, measurement of intracellular free Ca^{2+} concentration is very important for discovering new calcium channel blocker drugs. In the cytosol of neurons, intracellular free Ca^{2+} concentration was measured by using Ca^{2+} indicators.

There are two main classes of calcium indicators namely chemical indicators and genetically encoded calcium indicators. Chemical indicators of free intracellular Ca^{2+} are Fura-2, Fluo-3, Fluo-4 and Rhod2. These dyes are often used with acetoxymethyl esters, in order to render the molecule lyphophlilic and to allow easy entrance into the cell. Genetically encoded indicators do not need to be loaded into cells, instead the genes encoding for these proteins can be easily transfected to cells. These indicators are fluorescent proteins derived from green fluorescent protein (GFP). In this presentation, I will summarize Ca^{2+} signaling and using the fluorescent dyes for Ca^{2+} imaging.

In conclusion, intracellular free Ca^{2+} concentration can be measured by using the indicators. In the measurement techniques, laser confocal microscopy seems best technique.

Keywords; Calcium signaling, TRP channels; Calcium fluorescent indicator dyes; Neurons; Apoptosis.

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