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Cell Membranes and Free Radical Research

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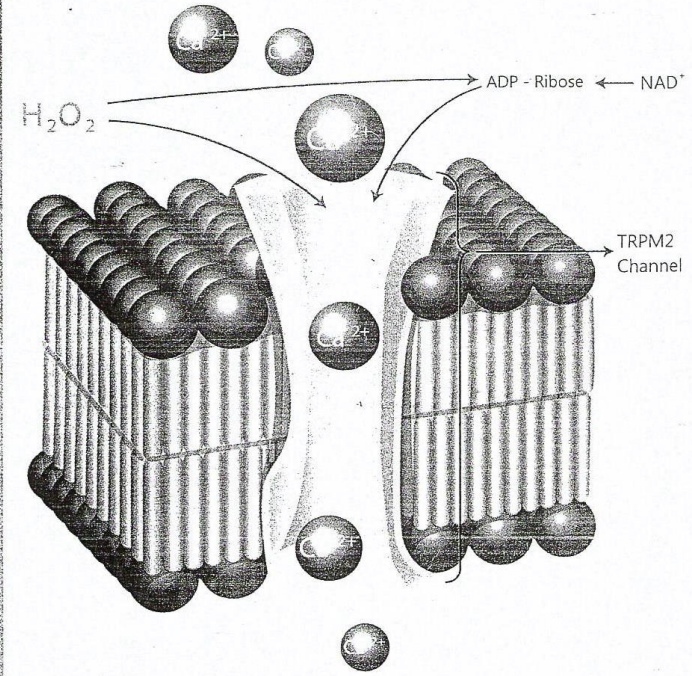

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Abstract Book of 3rd International Congress on Cell Membranes and Oxidative Stress: Focus on Calcium Signaling and TRP Channels 22-27 June 2010 Isparta, Turkey

by

Süleyman Demirel University Medical Faculty Department of Biophysics

Cell Membranes and Free Radical Research

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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, the biophysics of the radicals which springed up from oxygen),

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)

READERSHIP

Biophysics
Biochemistry
Biology
Biomedical Engineering
Pharmacology
Physiology
Genetics
Cardiology
Neurology
Oncology
Psychiatry
Neuroscience

KEYWORDS

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

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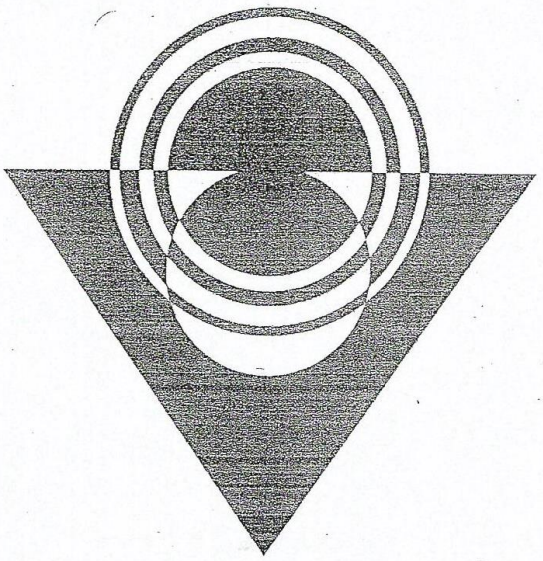

TÜBİTAK

3rd International Congress on Cell Membranes and Oxidative Stress: Focus on Calcium Signaling and TRP Channels was supported by The Scientific and Technological Research Council of Turkey.

The Abstract book of the congress is published in this issue.

Ram semen contains sufficient quantities of superoxide dismutase (SOD) and much lower concentrations of glutathione peroxidase (GSH-Px) and catalase (CAT) to prevent oxidative damage. The anti-oxidant capacity of the sperm cell is limited, due to a small cytoplasmic component, which contains these anti-oxidants to scavenge the oxidants. However, the concentration of these anti-oxidants may decrease considerably by the dilution of the semen. The aim of the present work was to study the effect of two anti-oxidants, namely, glutamine and an amino acid solution (BME) in a Tris-based extender on ram sperm parameters, lipid peroxidation and anti-oxidant capacity after the cryopreservation/thawing process. Ejaculates collected from 4 Akkaraman rams were evaluated and pooled at 37°C. Semen samples which were diluted with the tris-based extender containing glutamine (2.5 or 5 mM), BME (13 or 26%), and no anti-oxidants (control) were cooled to 5°C and frozen in 0.25-ml French straws and stored in liquid nitrogen. Frozen straws were thawed individually at 37°C for 20 s in a water bath for evaluation. The freezing extender supplemented with 5mM glutamine led to higher motility rate (68.0±4.4%) and hypo-osmotic swelling test (HOST) (64.1±5.5%), when compared to glutamine (2.5 mM) and BME (13 and 26%) ($p< 0.05$). No significant differences were observed regarding sperm motility and HOST, following the supplementation of the freezing extender with glutamine 2.5 mM and BME (13 and 26%) after thawing. CAT activity remained significantly higher following the addition of glutamine 5mM (6.4±0.9 kU/g protein), compared to the other treatments ($p< 0.01$). The anti-oxidants at different levels were not effective in the elimination of malondialdehyde (MDA) formation and maintenance of SOD activities, when compared to the control ($p< 0.05$). Findings showed that glutamine (5 mM) supplementation in semen extenders, was of greater benefit to frozen–thawed ram sperm. Future efforts are needed to find the appropriate anti-oxidants and their effective concentrations to improve post-thaw sperm parameters (e.g. motility, membrane integrity, fertility) and anti-oxidant activities when frozen–thawed ram sperm is used.

with a Tris-based extender containing additives including glutamine (2.5; 5mM) and hyaluronan (500; 1000 µl/ml), and an extender containing no antioxidants (control) were cooled to 5 °C and frozen in 0.25 ml French straws and stored in liquid nitrogen. Frozen straws were thawed individually (37 °C) for 20 s in a water bath for microscopic evaluation. Freezing extenders supplemented with 2.5 and 5mM glutamine led to higher sperm motility and hypo-osmotic swelling test (HOST) values compared to the control ($p<0.05$) following the freeze–thawing process. The addition of 500 µl l/ml hyaluronan resulted in a higher HOST percentage, compared to the addition of 1000 µl/ml hyaluronan and the control ($p< 0.001$). No significant difference was recorded in the percentage acrosome and total sperm abnormalities, following supplementation with antioxidants. The addition of antioxidants did not prevent malondialdehyde (MDA) formation. Antioxidant treatment however decreased ($p< 0.01$) the superoxide dismutase activity. The maintenance of catalase activity was demonstrated to be insignificant following addition of antioxidants. Further studies are required to obtain more repeatable results regarding the characterization of the enzymatic and non-enzymatic antioxidant systems in cryopreserved goat sperm.

Oral Presentation 8

Comparison of the effects of glutamine and an amino acid solution on post-thawed ram sperm parameters, lipid peroxidation and anti-oxidant activities

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