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FROM MOLECULES TO CELLS AND BACK

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POSTERS

Table of Contents

Monday 11 September

104 Synthetic Biology
108 DNA Damage and Repair
118 Proteomic Approaches in Cell Biology
120 Molecular Basis of Diseases
150 Signaling Across Membranes: Receptors, Channels and Transporters
165 CRISPR and RNA Processing and Regulation
174 Mechanisms for Protein Homeostasis
177 Organelle Biogenesis and Dynamics
179 Integrated Structural Biology for Innovative Translational Research
180 Education, Training, and Career Planning in Molecular Life Sciences

Tuesday 12 September

180 Protein Dynamics and Interactions
205 Molecular Machines in Action
211 Protein Folding and Misfolding
218 Chromatin Structure and Epigenetic Modifications
228 Redox Regulation of Biological Activities
234 Systems Biology
241 Molecular Neuroscience

Wednesday 13 September

254 Cancer Biology
293 Translational Control and mRNA Localization
297 Protein Degradation
305 Autophagy
307 Structural Computational Biology
320 The Structural Organization of the Cell

Thursday 14 September

321 Intrinsically Disordered Proteins
322 Medicinal Chemistry
345 The Human Microbiome
347 Metabolism and Signaling
373 Miscellaneous

Abstracts submitted for the main call for abstracts to the 42nd FEBS Congress (Jerusalem, Israel; September 10–14, 2017) and accepted by the Congress Organizing Committee, as well as abstracts from invited speakers for the event, are published in this Supplement to *The FEBS Journal*. Late-breaking abstracts are not included in this supplement.

About these abstracts

Abstracts submitted to the Congress are **not peer-reviewed**. In addition, abstracts are published as submitted and are **not copyedited** prior to publication.

We are unable to make **corrections of any kind** to the abstracts once they are published.

Indexing

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NADPH indicates that although hypericin binds to the GSSG site it is a huge molecule and it also affects the binding of NADPH because GSSG and NADPH sites are close to each other.

P.3.3.A-009
Antidepressant fluoxetine inhibits baker's yeast glutathione reductase

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Glutathione reductase (E.C. 1.6.4.2) has a central role in detoxification due to the fact that its ability to regenerate the reduced glutathione (GSH) which is a central antioxidant molecule from oxidized glutathione (GSSG) by using NADPH. GSH scavenges and eliminates superoxide and hydroxyl radicals non enzymatically or functions as an electron donor to several enzymes. Fluoxetine is an antidepressant drug and is known to carry out its action as a selective serotonin re-uptake inhibitor (SSRI) by blocking serotonin transporter. In this study, we investigated the interaction of fluoxetine with glutathione reductase (GR) purified from baker's yeast. The optimum temperature, optimum pH and energy of activation were determined to characterize the enzyme. The purity of the enzyme was also confirmed by electrophoresis. In the presence of fluoxetine, GR activity was followed at fixed 1 mM [GSSG]-variable [NADPH] and fixed 0.1 mM [NADPH]-variable [GSSG]. Single protein and activity bands were obtained on native PAGE. GR also gave single band on SDS-PAGE with a Mr of 49 kDa. Optimum pH, optimum temperature, activation energy and Q_{10} were found as 7.65, 57°C, 3,544 calories and 1.26, respectively. GR was inhibited by fluoxetine in a dose dependent manner and from Hill plot IC_{50} was calculated as 0.88 mM. When the variable substrate was GSSG, linear-mixed type competitive inhibition was observed with fluoxetine. K_s, K_i and α values were calculated as 111 ± 5 μM, 279 ± 32 μM and 5.48 ± 1.29, respectively. On the other hand, at variable NADPH, the inhibition type was noncompetitive, K_m and K_i values were 13.4 ± 0.8 μM and 879 ± 82 μM, respectively. Linear-mixed type competitive and noncompetitive inhibitions suggest that fluoxetine binds to a site between GSSG and NADPH binding sites but much closer to the GSSG site. Thus, it competes with GSSG binding but then noncompetitive inhibition with variable NADPH can be explained by the conformational change of the enzyme.

P.3.3.A-010
The effect of biologically active substances from *Inula britannica* and *Limonium gmelinii* on the antioxidant status in liver tissue of laboratory mice

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Most environmental pollutants have toxic and mutagenic effects on organisms as a result of activation of free radical formation and inhibition of DNA repair system. The increased formation of free radicals leads to an increase in lipid peroxidation (LPO). In this regard, search for protectors from the effects of xenobiotics is becoming urgent challenge. Many biologically active substances (BAS) of natural origin are potential antioxidants and can increase resistance to toxic and mutagenic effects of a wide range of pollutants. The aim of the research was to study the antioxidant potential of BAS from medicinal plants *Inula britannica* (Compositae) and *Limonium gmelinii* (Plumbaginaceae). The oxidant and antioxidant potential of plant extracts were determined by lipid hydroperoxides (LHP) and malondialdehyde (MDA) content in mice liver by the extraction-spectrophotometric method. Unsymmetrical dimethylhydrazine (UDMH) was used as an oxidant, known for its toxic and genotoxic effects. It was found that UDMH statistically significantly enhanced LPO in intoxicated animals compared to intact animals. The LHP and MDA content with single intraperitoneal exposure to UDMH at dose of 6.6 mg/kg increased by 3.55 ($P < 0.01$) and 1.84 ($P < 0.05$) times, respectively. The LHP and MDA content with long-term (10-day) exposure were higher of 4.02 ($P < 0.01$) and 2.07 times ($P < 0.01$), respectively. In mice taking BAS from *I. britannica* and *L. gmelinii* at doses of 50.0; 100.0 and 150.0 mg/kg, the content of LPO products were at the control level. It indicates that the BAS at the used doses had no oxidant activity. The combined effect of BAS and UDMH on mice showed statistically significant decrease of the LPO level, induced by UDMH, to the control level. Thus, the extracts from *I. britannica* and *L. gmelinii* have antioxidant activity in labotatory mice. Currently, the plant extracts are being tested for antigenotoxic activity.

The work was done within the framework of the MES project (No.GR 0115RK00378).

P.3.3.A-011
The use of redox active natural substances in the treatment of deoxynivalenol poisoning

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It is evident from our recent in vivo study (10-week experiment on the toxicity of lead acetate (1/30 LD50), that humic acids at a dose 0.5 and 1% are either efficient in lowering oxidative stress load as seen in decrease in superoxide dismutase activity, or in the mechanisms of reversing the adverse peroxidation effect of lead and effort to eliminate this metal by chelation in cooperation with reduced glutathione. The occurance of mycotoxins produced by spp. Fusarium (mostly deoxynivalenol, DON) in food and feed ranges from 43–74% in EU countries. The aim was to investigate the possibility of preventing and treating poisoning with DON by applying these natural substances permitted by the EMEA, and monitoring the selected oxidative stress markers in plasma, liver, heart, kidney tissue. The experiment (Ro-2559/16-221) included a total of 72 Sprague Dawley male rats, and lasted for 4 weeks. The animals were divided into 6 groups thus allowing to monitor the effects of the administered compounds. DON was fed in the feed mixture at doses exceeding 100% and 200% limiting values, and humic acid at 1%. DON intoxication led to a significant decrease in the levels of reduced glutathione, more in the heart than liver but also in kidney, and almost as well for both dosages. The activity of glutathione peroxidase also declined markedly. We found increased glutathione reductase activity in the heart and kidneys at a 100%, but low at 200% DON overdose. In plasma, the values of the above parameters were not significantly altered except for superoxide dismutase. The activities of glutathione-transferase, associated with resistance to apoptosis and carcinogenesis, were increased most significantly. Histochemical detection of Hsp 70 is currently under way. Concomitant administration of humic acids led to the approximation of enzyme activities to those in the control group. The correction was less noticeable in 200% DON overdose. The study was supported by VEGA 1/0782/15.