

YOUNG SCIENTISTS CONFERENCE MODERN ASPECTS OF BIOCHEMISTRY AND BIOTECHNOLOGY – 2019

Palladin Institute of Biochemistry, National Academy of Sciences of Ukraine
21-22 March, 2019, Kyiv, Ukraine

On March 21-22, 2019 the regular annual young scientists Conference “*Modern Aspects of Biochemistry and Biotechnology*” was successfully held in Palladin Institute of Biochemistry. The Conference was organized by the Young Scientists Council of Palladin Institute of Biochemistry with the support of ALT Ukraine Ltd –advanced laboratory technologies Company. Young scientists from Kyiv, Dnipro, Kharkiv, Chernivtsi, Ternopil, Poltava took part in the Conference as oral speakers. The scientific program of the Conference included the following sections: Translational Studies; Biochemistry; Biotechnology; Molecular Biology; Medical Biochemistry; Biochemical mechanisms of resistance to adverse environmental conditions. The workshops devoted to computer analysis of biological images; methods of biological experimental data statistical analysis; quantitative polymerase chain reaction for gene expression estimation; spectrofluorometry as a rainbow force for biochemists service were organized to broaden the research skills of young scientists.

Conference was opened by the new section ‘Translational Studies’. So many reports were focused on the efforts to build on basic scientific research to create new therapies, medical procedures, or diagnostics. The members of Scientific Committee specially acknowledged those young scientists who presented data about long way from idea, it’s *in vitro* approval to the *in vivo* testing and application.

The honorary awards for the best oral presentation were given to *Anna Myronova* (“CRISPRa-mediated direct cardiac reprogramming of embryonic rat fibroblasts”), Institute of Molecular Biology and Genetics, NAS of Ukraine, Kyiv; *Yevgen Stohnii* (“Epitope determination of novel fibrinogen-specific antibody by limited proteolysis”), Palladin Institute of Biochemistry, NAS of Ukraine, Kyiv; *Anton Tkachenko* (“Fascin is upregulated in nasal mucosa in chronic rhinosinusitis with nasal polyps”), Kharkiv National Medical University, Kharkiv.

The honourable mention prizes for interesting scientific reports were presented to *Vira Borshchovetska* (Yuriy Fedkovych Chernivtsi National University, Chernivtsi), *Olga Revka* and *Valerija Zhovannyk* (Palladin Institute of Biochemistry, Kyiv), *Maxym Skrypnyk* (Ukrainian medical stomatological academy, Poltava).

The meeting was held in a creative and friendly atmosphere with constructive and helpful discussions. The abstracts of the oral presentations of participants will be published in the “*Ukrainian Biochemical Journal*”.

The Head of the Conference Competition Commission, D. Sc., prof. Olga MATYSHEVSKA

The Head of the Young Scientists Council of Palladin Institute of Biochemistry, PhD Tetjana JATSENKO



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BIOCHEMICAL RESPONSES OF BIVALVE MOLLUSKS TO THE COMBINE EFFECT OF PHARMACEUTICALS, HERBICIDE AND HEATING

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Introduction. The toxicity of pharmaceuticals for the untargeted organisms attracts the growing concern. Although these substances are introducing in the environment at low concentrations (ng- μ g per l), their combined impact jointly with the climate changes can induce unpredicted changes in the metabolic activity and its regulation in the wildlife. The aim of this study was to evaluate the specificity of the biochemical responses in the aquatic sentinel organism under the single and combine exposures to typical stressors.

Methods. Freshwater mussels *Unio tumidus* were treated with drugs diclofenac (Dc, 600 ng·l⁻¹), nifedipine (Nf, 700 ng·l⁻¹), or herbicide glyphosate (Gl, 33.8 μ g·l⁻¹) separately at the 18°C and jointly at the 18 °C (DcNfGl) and 25 °C (DcNfGIT) during 14 days. The utilised concentrations were corresponding to the environmentally realistic levels. The indices of stress and apoptotic activities were evaluated in the digestive gland, and lysosomal membrane stability and nuclear abnormalities - in hemocytes.

Results. The most common response was the down-regulation of glutathione S-transferase activity. It decreased in all exposures (up to 3 times). In the combine exposures, the total level of glutathione (GSH) increased. However, the concentration of oxidized glutathione (GSSG) and GSH/GSSG ratio did not differ from the control value in any exposure. The level of metal-keeping and stress-related protein metallothionein enhanced in all exposures, except Nf. The cholinesterase activity decreased in the

exposures to Gl and DcNfGl, detecting the typical effect of the phosphonate. However, heating diminished this response. The activity of the main executor apoptotic enzyme, caspase-3, was increased in the co-exposures, particularly, to DcNfGl+T (up to 2 times). The activity of cathepsin D in the lysosomes increased by the exposure to Dc, but decreased by the Nf and Gl (up to 4 times). The efflux of Cathepsin D from the lysosomes in digestive gland was magnified in the co-exposure to DcNfGl+T by 2 times. The determining of the lysosomal membrane permeability in hemocytes detected its elevation by Nf and co-exposures. However, the level of hemocytes with the micronuclei and other nuclear abnormalities was not changed in all exposures.

Discussion. These changes attest the promoting of apoptosis induced both by cytosolic and lysosomal signals by the heating. Importantly, the response to Nf in the applied in this study low concentration and under the effect of micromolar concentration, studied in mollusk earlier, differed substantially.

Conclusions. To summarize, the heating had the most disturbing effect on the responses of stress and biotransformation of the xenobiotics and distorted the specific responses for the single compounds in the studied model organism.

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