

Institute of Molecular Biology and Genetics
NAS of Ukraine



**ALL-UKRAINIAN CONFERENCE
ON MOLECULAR AND CELL BIOLOGY
WITH INTERNATIONAL PARTICIPATION**

*dedicated to the heroic struggle
of the Ukrainian people against russian invaders*

June 15-17, 2022



CONFERENCE PROCEEDINGS

Edited by:

**Mankovska O., Papuga O., Nesterenko Ye., Sobolevskiy M.,
Antonenko S.**

Organizing committee:

Oksana Mankovska
Inessa Skrypkina
Oksana Piven
Maksym Sobolevskyi
Dmytro Gerasymchuk
Svitlana Antonenko
Oleksandr Papuga

Contacts:

e-mail: rmv.imbg@gmail.com
postal address:
Institute of Molecular Biology and Genetics
NAS of Ukraine
150, Akademika Zabolotnogo Str.,
Kyiv, Ukraine, 03143
Web-site: www.imbg.org.ua

24 th February 2022 Russia invaded Ukraine and this terrible war with destruction of civil infrastructure, including cultural, educational, and scientific objects interrupted the scientific work in our country. A lot of scientists were displaced within Ukraine or abroad. Our foreign colleagues immediately demonstrated great support and created a lot of opportunities for Ukrainian scientists in their countries. Despite this, most scientists stayed in Ukraine, some of them even in temporary occupied territories. Therefore, Young Scientist Council and in the Scientific Council of the Institute of Molecular Biology and Genetics NAS of Ukraine created the idea of All-Ukrainian conference with international participation with the aims to encourage Ukrainian scientists, to give the opportunity to colleagues from abroad to demonstrate their staunch support to Ukraine and to keep scientific process ongoing even on the background of the war.

The All-Ukrainian Conference on Molecular and Cell Biology with international participation was held as an online event on Zoom platform, from 15 th to 17 th of June 2022.

KEYNOTE SPEAKERS**Pernilla Wittung-Stafshede**

Chalmers University of Technology,
Gothenburg, Sweden

Cecilia Lanny Winata

International Institute of Molecular and Cell
Biology, Warsaw, Poland

Petr Svoboda

Institute of Molecular Genetics ASCR,
Prague, Czech Republic

Michał Komorowski

Institute of Fundamental Technological
Research, Polish Academy of Sciences,
Warsaw, Poland

Volodymyr Berest

V.N.Karazin Kharkiv National University,
Kharkiv, Ukraine

Andrii Domanskyi

University of Helsinki, Finland,
Orion Pharma, Turku, Finland

Anton Nekrutenko

Penn State University, PA, USA

Andreas Ladurner

Ludwig-Maximilians-Universität

Munich, Germany,

Eisbach Bio GmbH

Planegg/Martinsried, Germany

Jan Barciszewski

Adam Mickiewicz University,
Institute of Bioorganic Chemistry, Polish
Academy of Sciences, Poznan, Poland

Mikko Airavaara

University of Helsinki, Helsinki, Finland

And Vitaly Kordium (Institute of Molecular Biology and Genetics, NAS of Ukraine, Kyiv, Ukraine) with special lecture

TABLE OF CONTENT

PROGRAM of All-Ukrainian Conference on Molecular and Cell Biology with international participation.....	13
OPTIMIZATION OF APPLICATION OF SPR BIOSENSORS FOR DETECTION OF OLIGONUCLEOTIDE SEQUENCES OF THE PHILADELPHIA CHROMOSOME Sobolevskiy M.S., Rachkov A.E., Samoylov A.V., Ushenin Yu.V., Soldatkin A.P.....	21
MOLECULAR EPIDEMIOLOGY OF CARBAPENEMASE-PRODUCING HOSPITAL-ACQUIRED KLEBSIELLA PNEUMONIAE IN UKRAINE Rudnieva K.L., Baranovskiy T.P., Potochilova V.V., Iungin O.S., Pokholenko Ia.O., Spiers A.J., Moshynets O.V.....	22
GENETICALLY MODIFIED FODDER CROPS EXPRESSING THE COLICIN M GENE Shcherbak N.L., Lystvan K.V., Nifantova S.M., Kuchuk M.V.....	23
THE EFFECT OF PENTAFLUOROETHOXYBENZOIC ACID DERIVATIVES ON MUSHROOM TYROSINASE Shesterenko Yu.A., Romanovska I.I., Shesterenko Ye.A.....	24
THE INFLUENCE OF TRIVALENT METAL IONS ON LCC-CHANNELS OF THE NUCLEAR MEMBRANE OF THE CEREBELLAR PURKINJE NEURONS Kotyk O.A., Yuryshynets I.V., Tarnopolska O.V., Marchenko S.M., Kotliarova A.B.....	25
PROPERTIES OF MITOCHONDRIAL NO-SYNTASE ACTIVITY IN SMOOTH MUSCLE Danylovykh Yu.V., Danylovykh H.V.....	27
THE EFFECT OF LOW CONCENTRATIONS OF PHARMACEUTICALS ON THE MOLECULAR RESPONSES OF STRESS IN DANIO RERIO Poznanskiy D.V., Soroka O.V., Nimko Kh.I., Kasianchuk N.M., Bodnar O.I., Horyn O.I.....	28
MOLECULAR TARGETS OF ENDOGENOUS PLANT PEPTIDES IN REGULATING PLANT DEFENSE SIGNALING Pokotylo I.V., Bulava S.O., Kravets V.S.....	29
STRUCTURE OF POLYVINYL ALCOHOL CRYOGELS BY OPTICAL MICROSCOPY Hovorova Yu.S., Naumenko Y.O., Kovalenko I.F., Narozhnyi S.V., Nardid O.A.....	30
MOLECULAR ORGANIZATION OF 5S RDNA IN <i>CUPIDO ARGIADES</i> (<i>LYCAENIDAE</i>) Hlopina K-H.D., Roshka N.M., Volkov R.A.....	31
APPLICATION OF THE PRINCIPLE OF CLUSTER ORGANIZATION OF A CELL POPULATION IN AGENT-BASED MODELING OF HUMAN SKIN FIBROBLAST GROWTH <i>IN VITRO</i> Nizheradze K.O., Haiova L.V.....	32

THE EFFECT OF LOW CONCENTRATIONS OF PHARMACEUTICALS ON THE MOLECULAR RESPONSES OF STRESS IN DANIO RERIO

Poznanskyi D.V., Soroka O.V., Nimko Kh.I., Kasianchuk N.M., Bodnar O.I., Horyn O.I.

Department of Human Health, Physical Rehabilitation and Vital Activity Safety, Faculty of Physical Education, Ternopil Volodymyr Hnatiuk National Pedagogical University, Ternopil, Ukraine

horynoi@tnpu.edu.ua

Background. In recent decades pharmaceuticals and personal care products have been determined as the hazardous pollutants because their increasing background concentrations in water bodies and potentials to adversely affect aquatic life. For example, being conveyed in water bodies with runoff and municipal effluents, ibuprofen was found in water bodies within the concentration range 0.648.7 $\mu\text{g L}^{-1}$. It is expected that such therapeutic concentrations may affect key molecular and cellular events in non-target organisms, but the appropriate information is limited.

To address these knowledge gaps, the **aim** of our research was to study the effect of the common pharmaceuticals in the environmentally relevant concentrations on oxidative stress, electron transport chain, and cytotoxicity in fish.

Methods. The study of the effect of common pharmaceuticals was performed on zebrafish *Danio rerio* as the model. Three groups were settled, one control and two experimental. In the water in which the animals of the experimental groups were kept, the studied pharmaceuticals were added: 1) gemfibrozil (GF) at the concentration of 1 $\mu\text{g L}^{-1}$, and 2) ibuprofen (IBU) at the concentration of 25 $\mu\text{g L}^{-1}$ which corresponded to the average level of these substances in wastewater.

Results. Gemfibrozil caused a decrease in glutathione and glutathione transferase and an increase in catalase but had no effect on lipid peroxidation and protein carbonylation in zebrafish liver. Ibuprofen affects antioxidant defense system and caused oxidative damage to proteins in zebrafish liver, but also increased vitellogenin-like protein in blood. Lactate dehydrogenase in blood was also found to be higher in the both studied groups. Ibuprofen affects zebrafish health status more profound than gemfibrozil.

Conclusions. Our results showed that pharmaceuticals even in low environmentally realistic concentrations induced profound changes in the stress-responsive systems of zebrafish. This study's results reveal a rather negative effect of both ibuprofen and gemfibrozil on antioxidants, however, only ibuprofen stimulated protein carbonylation. Furthermore, ibuprofen is claimed to be the endocrine disruptor and cytotoxic agent to zebrafish. Ibuprofen and mostly gemfibrozil had the positive effects on lysosomal biogenesis. All mentioned issues raise concerns about the adverse effects of pharmaceutical effluents on life processes of aquatic organisms.

ALPHABETICAL LIST OF AUTHORS

Surname and initials	Page(s)
Airavaara M.	48
Andriiash G.S.	104
Antonenko S.V.	116
Aristova D.I.	117
Babsky A.M.	44
Bakhmat V.A.	115
Baran M.M.	108
Baranovskyi T.P.	22, 53, 61, 118
Barshteyn V.Yu.	39
Bayliak M.M.	35, 52, 100, 101, 105
Bdzhola V.G.	87, 143
Beiko N.E.	104
Belan P.V.	60
Beregova T.V.	133, 142
Berezovskyi V.V.	105
Berketa K.O.	120
Beschasnyi S.P.	107
Bida I.O.	89
Bidnyk M.Yu.	65
Biliai D.V.	121
Bobrova O.M.	46, 96
Bodnar O.I.	28, 128
Bohdanovych T.A.	109
Bondar D.V.	86
Borzova N.V.	110
Bozhkov A.I.	71
Brieieva O.V.	63
Brovarets V.S	51
Brovko O.O.	83
Bryantseva B-M.I.	143
Bubnovska L.M.	76
Budakva Ye.O.	93