Serbian Biochemical Society Thirteenth Conference

"Amplifying Biochemistry Concepts"

Proceedings

Serbian Biochemical Society

Proceedings

Editor: Dragana Robajac
Technical support: Vladimir Mihailović
Cover design: Zoran Beloševac
Publisher: Faculty of Chemistry, Serbian Biochemical Society, Belgrade
Year: 2024
Printed by: Colorgrafx, Belgrade
Number of printed copies: 100

ISBN 978-86-7220-141-3

Serbian Biochemical Society
Thirteenth Conference

International Scientific Meeting

September 19-20, 2024, Kragujevac, Serbia

“Amplifying Biochemistry Concepts”

FOREWORD

Dear Colleagues,

Welcome to the 13th Conference of the Serbian Biochemical Society, entitled “Amplifying Biochemistry Concepts”.

I would like to express my gratitude to all the participants who chose to present their valuable work at the conference and share their results with auditorium.

On behalf of the Organizing Committee, I would like to dedicate this year conference to our colleague and friend, and above all a great biochemist and scientist, proffessor Mihajlo Spasić.

On behalf of the Organizing Committee
Editor of the Proceedings
Dragana Robajac

Serbian Biochemical Society
Thirteenth Conference

International Scientific Meeting

September 19-20, 2024, Kragujevac, Serbia

“Amplifying Biochemistry Concepts”

P101 Aleksandar Ivanov
The potential of R-phycocyanin as an albumin substitute for cell growth in meat cultivation

P102 Ana Budimirović
Optimization of spectrofluorimetric assay for screening of opine dehydrogenase mutant libraries

P103 Ana Stanojević
Isolation of Ara h 1 from raw and roasted peanuts, evaluation of immunoreactivity, and monitoring allergen binding to THP-1 macrophages

P104 Anđelo Beletić
The agreement between spectrophotometric and ELISA assay for haptoglobin concentration in cow milk

P105 Anja Stošić
Effect of crosslinking cations on the activity of *T. versicolor* laccase immobilized within alginate hydrogel beads

P106 Anka Todosijević
Antimicrobial activity of 2-(2-ferrocenyl-4-oxothiazolidin-3-yl)acetic acid and its ethyl derivative

P107 Azra Guzonjić
Evaluation of GSH/GSSG and CyS/CySS as oxidative stress markers in small cell lung cancer patients undergoing chemotherapy in Serbia

P108 Budimir S. Ilić
Crystallography-driven drug design: Unlocking potent VMAT2 inhibitors for Huntington's disease

P109 Daria Maria Monti
Assessment of caspase modulation in human epidermoid carcinoma cells (A431) treated with silver nanoparticles synthesized using plant extract

P110 David Fekete
High-affinity binding of concanavalin A to B-phycoerythrin

P111 David Pirić
Global research trends in diffuse large B-cell lymphoma

P112 Faiza Zafar
Peanut allergens affected intestinal barrier function in human intestinal epithelial cell lines Caco-2 and T84

P113 Gligorije Gligorić
A novel approach to extracellular vesicles staining facilitates their tracking during cellular uptake

P114 Iva Uzelac
Effect of prolonged heat stress on the activity of four important metabolic enzymes during diapause of the European corn borer *Ostrinia nubilalis* (Hbn.)

P115 Ivana Beara
Bermet wine polyphenolics as modulators of lipase activity *in vitro*

P216 Ivana Ivelja
Hepatotoxic effects of perfluorooctanoic acid on female Swiss mice

Poster Session 2

P201 Jelena Purać
Molecular insights into aging in honey bees: RNA-Seq analysis of winter worker bees across different age groups

P202 Jelena Radović
Investigation of the effect of algal chromopeptides on the activity of the SARS-CoV-2 main protease Mpro

P203 Jelena Spremo
Evaluation of vitellogenin content in worker honey bees (*Apis mellifera* L.) during ageing

P204 Jovana Jagodić
Exploring trace elements in adrenal tissues: New insights into Cushing's syndrome

P205 Jovana Matić
Interactions of 2-thiohydantoin derivatives with DNA and human serum albumin as a part of their cytotoxic activity against human breast adenocarcinoma

P206 Jovana Stevanović
Diagnostic significance of miR-146a, miR-21 and miR-155 from PBMCs in gestational diabetes

P217 Ljiljana Milovanović
Bioactivity profiling of wine from Vojvodina: Antioxidant potential of Bermet wine

P208 Marija Marin
Potential biological activity of the aqueous extract of *Fumana bonapartei* Maire et Petitm. from the serpentine substrate of the Rogozna mountain

P209 Marija Novaković
Antioxidative potential of *Quercus pericarp*

P210 Marija Opačić
Long-term low-level exposure to perfluorooctanoic acid affects the survival of human endothelial cells in vitro

P211 Marija Paunović
Impact of aromatase inhibitor therapy on plasma phospholipid profiles in women with breast cancer

P212 Marija Stanišić
Immobilization of chemically modified glucose-oxidase by biomineralization in ZIF-8

P213 Marija Stojadinović
Assessing the FBS-substituting potential of algal and cyanobacterial extracts for cell-based meat cultivation

P214 Marija Tanović
Application of ^{31}P NMR spectroscopy in the study of the interaction of Mn(II) with polyphosphate compunds in the green microalgae *Chlorella sorokiniana*

P215 Marijana Janić
Comparison of chemical composition and antioxidant activity of *Salvia officinalis* L. ethanolic leaves extracts

Poster Session 3

P301 Marijana Kovačić
The expression of terminal monosaccharides on immune complexes IgG glycans in rheumatoid arthritis

P302 Marijana Stojanović
PARP inhibitors increase NSCLC sensitivity to cisplatin via modulation of TET activity

P303 Marina Crnković
Changes in CAT and PPX activity induced by sodium deoxycholate in sunflower seedlings infected with *P. brasiliense* and *S. sclerotiorum*

P304 Maša Marković
Phenethyl ester of rosmarinic acid ameliorates acute respiratory distress syndrome

P305 Milena Milutinović
Potential of isorhamnetin to inhibit expression of membrane transporters associated with cancer cell resistance development

P306 Milica Crnoglavac Popović
***In situ* biomimetic mineralization of Laccase@ZIF**

P307 Milica Spasojević Savković
"Green" chemistry approach for preparation of hydrogels used for controlled drug delivery

P308 Miloš Filipović
Gaining insight into disordered and aggregated protein structure via ATR-FTIR spectroscopy

P309 Miloš Matić
Antitumor potential of ethanol *Lycium ruthenicum* extract on various human cancer cell lines

P310 Miloš Šunderić
Interaction of commonly used antioxidants with major circulating proteins: spectroscopic and *in silico* study

P311 Mina Janković
Our favorite spices: Is turmeric always only turmeric?

P312 Minja Derikonjić
Examination of biochemical indicators of cardiometabolic risk in patients with hypothyroidism

P313 Nevena Tomašević
Computational approaches to rational design isocoumarins as warheads for PROTACs against HDAC4 to treat SMA

P314 Nikola Radenković
Isorhamnetin activates apoptotic signaling pathways in colon cancer cells

P315 Olgica Stefanović
Macroalga *Cladophora glomerata* as a potential source of bioactive compounds

P316 Petar Jovanović
Effect of ferulic acid, hyperoside, and rutin on reactivity of human serum albumin Cys-34 thiol group

Poster Session 4

P401 Samo Kreft
Exploring the potential of *Calendula officinalis* L. extract to improve benzyl alcohol's effectiveness in cosmetic products

P402 Sanja Erceg
Adiponectin's potential as a predictor of non-alcoholic fatty liver diseases

P403 Sanja Krstić
Inhibitory effects of *Salvia verticillata* L. extracts on COX-1 and COX-2 enzymes: The influence of extraction methods

P404 Sara Milojević
Cytotoxic, proapoptotic, and antiferroptotic effects of *Amanita muscaria* on choriocarcinoma cells

P405 Sara Protić
Biomineralization of two glucose oxidase mutants in ZIF-8

P406 Srđan Sokanović
Effects of long-term caloric restriction on lipid profile status and testosterone production in aged Wistar rats

P407 Stefan Blagojević
Dysregulation in expression of miRNA machinery genes *DICER1* and *AGO2* in endometrial adenocarcinoma

P408 Stefanela Kvrgić
Effect of calcium nanofertilizer on chemical composition and antioxidant activity of strawberry fruits

P409 Strahinja Pešić
Antioxidant activity of hexane and methanol acorn extracts of four *Quercus* species

P410 Tamara Lujić
Impact of chymotrypsin on physico-chemical properties of PET MNPs

P411 Tamara Todorović
Synthesis, characterization, and antitumor activity of alizarine derivatives

P412 Teodora Knežić
Insect larvae as alternative protein sources – expression of storage protein genes in non-diapausing larvae of the European corn borer *Ostrinia nubilalis* (Hbn.)

P413 Tijana Mićović
Antimicrobial activity of *Hyssopus officinalis* L. essential oils from Montenegro and Serbia

P414 Vanja Tatić
Tissue-specific expression of peptidoglycan recognition peptides in a non-model insect species

P415 Višnja Kosić
Characterization of free and immobilized pullulanase on modified bentonite: Sustainable enzyme immobilization

P416 Yaraslau Dzichenka
Identification of novel ligands of human cytochromes P450 among steroidal 1,2,4,5-tetraoxanes

Identification of novel ligands of human cytochromes P450 among steroidal 1,2,4,5-tetraoxanes

Darya Chebotkova[1], Yaraslau Dzichenka[1*], Dejan Opsenica[2], Suzana Jovanović-Šanta[3*]

[1]Institute of Bioorganic Chemistry of National Academy of Sciences, Minsk, Belarus
[2]University of Belgrade, University of Belgrade – Institute for Chemistry, Technology and Metallurgy - National institute of the Republic of Sebia, Belgrade, Serbia
[3]University of Novi Sad Faculty of Sciences, Department of Chemistry, Biochemistry and Environmental protection, Novi Sad, Serbia

[*]e-mail: dichenko@iboch.by; suzana.jovanovic-santa@dh.uns.ac.rs

Cytochrome P450 enzymes (P450s) are involved in a wide variety of biotransformations including endogenous substrates (e.g. steroids, fatty acids, prostaglandins and leukotrienes) as well as exogenous compounds (xenobiotics, as drugs or environmental toxins). P450s are responsible for most of the important reactions (drug metabolism, hormone synthesis etc.) in tissues such as liver, gastrointestinal tract, brain, lung, kidney and heart. 1,2,4,5-tetraoxanes are specific class of peroxide compounds exhibiting antimalarial and antitumor activity, and very low cytotoxicity against normal cell lines. In the present work we examined binding potency of a group of steroidal mixed 1,2,4,5-tetraoxanes in the active site of four isoforms of human cytochrome P450 (CYP7A1, CYP7B1, CYP2E1 and CYP21A2). UV-VIS spectroscopy, reconstruction of enzymatic activity and SAR analysis were used in this study. A group of compounds with high affinity to the active site of all the enzymes was found, among which 2 new CYP7A1 ligands, 1 new CYP7B1 ligand, 3 ligands for CYP2E1 and 4 for CYP21A2. For a group of molecules K_d values were in the micromolar range: 3.91μM and 4.51μM (CYP7A1), 7.1μM (CYP7B1), 2.1μM and 3.8μM (CYP2E1) and 2.6μM (CYP21A2). This is comparable with the K_d values for natural ligands – cholesterol, DHEA, arachidonic acid and testosterone. SAR analysis of novel ligands allowed to identify pharmacophore features of the molecules that are crucial for compound binding. The data obtained are of great importance for the in-depth understanding of the mechanism of the molecular recognition/interaction of human P450s and their ligands in facilitating the discovery, design and development of novel bioregulators of the enzymes.

Acknowledgements

This study was supported by bilateral Belarus-Serbia project (project No. X22SRBG-009 / 337-00-00230/2022-09/09) and Ministry of Science, Technological Development and Innovation of the Republic of Serbia (SRO 200125 and No. 451-03-66/2024-03/200026).

CIP - Каталогизација у публикацији Народна библиотека Србије, Београд

577.1(048)

SERBIAN Biochemical Society. International scientific meeting (13 ; 2024 ; Kragujevac) Amplifying Biochemistry Concepts / Serbian Biochemical Society, Thirteenth Conference International Scientific Meeting, September 19-20, 2024, Kragujevac, Serbia ; [editor Dragana Robajac]. - Belgrade : Faculty of Chemistry : Serbian Biochemical Society, 2024 (Belgrade : Colorgrafx). - 133 str. ; 23 cm

Tiraž 100. - Str. 7: Foreword / Dragana Robajac. - Bibliografija uz većinu apstrakata.

ISBN 978-86-7220-141-3 (FOC)

а) Биохемија -- Апстракти

COBISS.SR-ID 151829513

Belgrade 2024