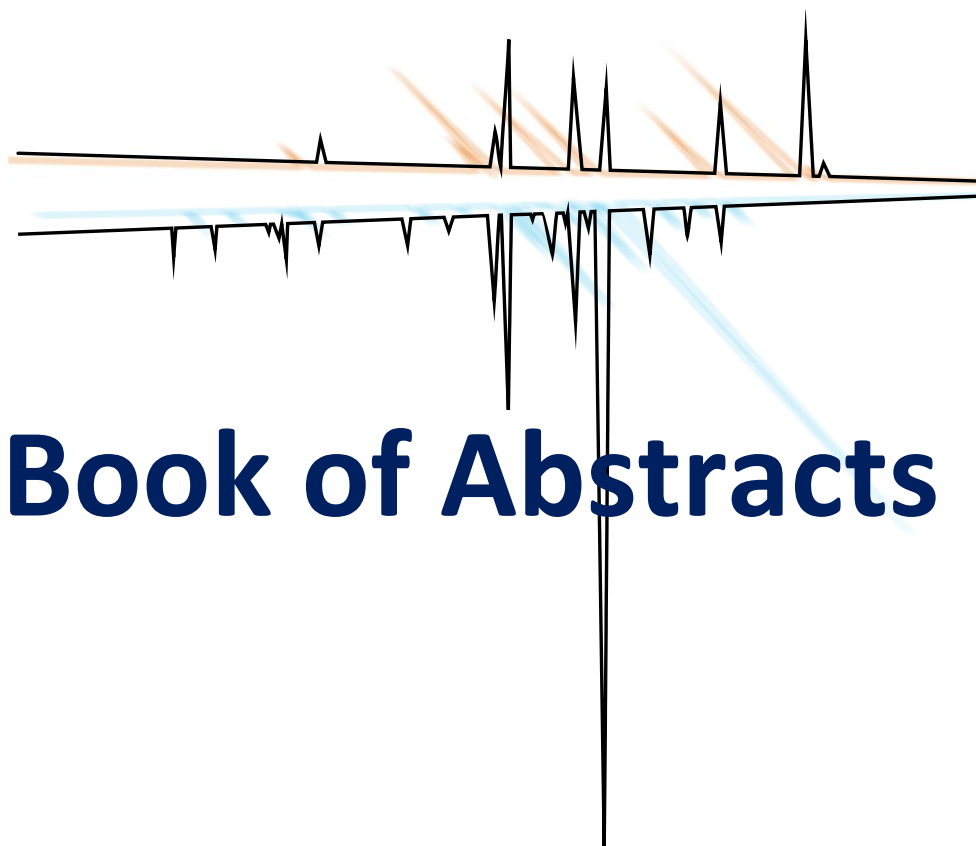


10th IAPC Meeting

Tenth World Conference on
Physico-Chemical Methods in Drug Discovery
&
Sixth World Conference on ADMET and DMPK



Book of Abstracts



September 2023 :: Belgrade, Serbia

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CONTENTS

Oral presentations

Virtual assessment to provide insights into drug-exciipient-intestinal fluid interactions and support virtual formulation design <i>Christel Bergström</i>	2
In vitro evaluation of drug presence in the micellar phase of contents of upper small intestine: Rationale, challenges, opportunities <i>Christos Reppas</i>	3
Continuous improvement in the molecular properties assessment world <i>Gilles Goetz, Jim Federico, Brendon Kapinos, Matt Troutman</i>	4
Nanotechnology enabled innovation in inhalation drug delivery <i>Eride Quarta, Paolo Colombo, Lorenzo Degli Esposti, Daniele Catalucci, Michele Iafisco, Claudio De Luca, Gaia Colombo</i>	5
Neuro pharmacokinetics: the secret life of - old and novel - psychopharmacological drugs <i>Miroslav Savić</i>	6
Celebrating 40 years of the ROSS™ electrode and 50 years of pH_{max} <i>Alex Avdeef</i>	7
Salt disproportionation in bicarbonate buffer <i>Kiyohiko Sugano</i>	8
Development of rapidly dissolving 3D-printed tablets for personalized medicine by applying acid-base supersolubilization (ABS) principle <i>Abu Serajuddin</i>	9
Salt selection for development - solubility & bioperformance advantages from salts made by weaker acidic counterions explained by thermodynamic equilibria <i>Yan He</i>	10
Solubility prediction by deep learning of quantum information <i>Tonglei Li</i>	11
Micro-scale solubility measurement to guide early decision making <i>Sami Svanbäck</i>	12
Insights in the solubility and dissolution rate determination of cocrystals <i>Elisabet Fuguet, Hanan Fael, Rafael Barbas, Rafel Prohens, Rebeca Ruiz, Clara Ràfols</i>	13

Preparation and characterization of solid dispersion of mesalazine using anti-solvent precipitation technique

Emin, Zekir Kade, Poturcu, Alan Bogos, Aygme, Konstantyn Kozłowski, Abdalla E. Elbashir _____ 14

Revealing the story of an orphan drug: clofazimine speciation and solubilization as a function of pH

Tatjana Ž. Verbić, Alex Avdeef, Kin Y. Tam, Olivera S. Marković, Miloš P. Pešić, Igor A. Topalović, Dušan Ž. Veljković, Mufaddal Kathawala, Abu T. M. Serajuddin __ 15

Amorphous solid dispersions: True supersaturation measured in a time-resolved manner by microdialysis

Annette Bauer Brandl _____ 16

Metabolism as a target for drug development

Godefridus J. Peters, Kin Tam, Marika Franczak, Yan Zhou, Filippo Minutolo, Carlotta Granchi, R. Tom Smolenski, Elisa Giovannetti _____ 17

Dichloroacetophenone derivatives as pyruvate dehydrogenase kinase inhibitor in non-small cell lung cancer models

Kin Tam _____ 18

Development of catalytic inhibitors of topoisomerase II α as chemotherapeutic agents

Barbara Herlah, Matej Janežič, Kaja Bergant Loboda, Katja Valjavec, Andrej Perdih _ 19

Highlight on the benefits of PBPK modeling: A link between drug properties and its in vivo performance

Sandra Cvijić _____ 20

Navigating towards improved cytotoxicity assessment in nanomedicine development: Shifting from colorimetric to fluorescence-based assays

Ines Nikolić, Marija Petrović, Jelena Mitović, Emmanuelle Sublet, Olivier Jordan, Snežana Savić, Gerrit Borchard _____ 21

Chromatography platform to highlight compounds behavior in a membrane: A journey of interactions

Laurence Philippe-Venec _____ 22

Combining biomimetic chromatography and the quantitative structure-(chromatographic) retention relationships approach using machine learning

Krzyszimir Ciura _____ 24

Application of lipophilicity, protein and phospholipid binding measured by HPLC for prediction of ADME properties and toxicity of compounds

Klara Valko, Bard Calvin _____ 25

Application of biomimetic chromatography for the prediction of acute aquatic toxicity of organic pollutants

C. Stergiopoulos, F. Tsopeas, M. Ochsenkühn-Petropoulou, K. Valko _____ 26

From $\Delta \log k_w^{IAM}$ to multidimensional biomimetic chromatography: a journey to shed light on the absorption potential of therapeutics. What will the future bring?	
<i>Giacomo Russo</i> _____	27
Ability of physicochemical systems to predict skin permeation of neutral compounds. A comparison study	
<i>Martí Rosés, Sara Soriano-Meseguer, Adriana Port, Elisabet Fuguet</i> _____	28
Towards better understanding of drug interactions with mesoporous silica carriers by using inverse gas chromatography and molecular modelling	
<i>Andreas Niederquell, Barbora Vraníková, Martin Kuentz</i> _____	29
In silico approaches for understanding the role of intermolecular interactions in formulations and combination therapies: implications for ADME properties optimization	
<i>Mire Zloh</i> _____	30
Octanol-water distribution coefficient ($\log D$) as molecular descriptor to count environmental effect in QSAR models: comparison on experimental and predicted values for common reference drug substances for wide pH scale	
<i>Mare Oja, Uko Maran</i> _____	31
With a little help from computer-aided drug design – new antitumor agents as tubulin polymerization inhibitors	
<i>Robert Vianello</i> _____	32
Elucidation of molecular mechanisms of activity of <i>Echinacea spp.</i> constituents for possible treatment of COVID 19 by computer-aided methods	
<i>Slavica Erić, Milena Jović, Mire Zloh</i> _____	33
Quantitative structure-activity relationship of pyrimidine and uracil derivatives for characterization and evaluation the potential of chemical compounds for cervical cancer	
<i>S. Zukic, U. Maran</i> _____	34
Bridging science & regulation: quality by design in patient- focused formulation development	
<i>Jelena Đuriš</i> _____	35
Improvement of digital twin for transdermal fentanyl delivery based on anomalous diffusion	
<i>Milena Čukić Radenković, Slobodanka Galović</i> _____	36
Sponsors' presentations	
High-resolution mass spectrometry in drug discovery and design – trends and perspectives	
<i>Luka Mihajlović</i> _____	38

Determination of active components in medicines and food on Shimadzu chromatographies	
<i>Stefan Jovanović, Aleksandar Zurkić, Vanja Vranjevac</i>	39
Advancing drug safety: PrimeVigilance's comprehensive pharmacovigilance approach	
<i>Nebojša Jankov, Nikola Stojanović</i>	40
Poster presentations	
Evaluation of the micellization of the biosurfactant sodium taurocholate using fluorescence measurements	
<i>S. Amézqueta, E. Fuguet, U. Casanova, C. Ràfols</i>	42
Investigation of molecular mechanism of action of <i>Satureja Montana</i> essential oil constituents related to effects on viremias	
<i>Slavica Erić, Đorđe Vasilić, Katarina Ilić, Mire Zloh</i>	43
Computational study of interactions of <i>Cannabis Sativa</i> constituents with potential epigenetic targets involved in processes of multiple sclerosis	
<i>Slavica Erić, Charline Hendricks, Mire Zloh</i>	44
Computational study of the monoamin oxidase B mechanism- based irreversible inhibitors	
<i>Lucija Vrban, Robert Vianello</i>	45
Virtual docking and design of novel Histone deacetylase and Rho- associated protein kinases dual inhibitors (HDAC/ROCKs)	
<i>Milan Beljkaš, Miloš Petković, Katarina Nikolić, Slavica Oljačić</i>	46
Towards the multitarget HDAC Inhibitors for the treatment of pancreatic carcinoma by joining the drug synergy predictions and the molecular modeling	
<i>Nemanja Đoković, Aleksandra Ilić, Alen Čebzan, Branko Radović, Dušan Ružić, Ana Đurić, Tatjana Srdić-Rajić, Katarina Nikolić</i>	47
Biomimetic characteristics of dual TLC retention mechanism	
<i>Darija Obradović, Lukasz Komsta, Marija Popović-Nikolić, Jovana Milutinović, Saša Lazović</i>	48
Study of ionization of montelukast in differently charged micellar solutions as biomembrane mimetic systems	
<i>Marija Popović-Nikolić, Slavica Oljačić, Katarina Nikolić, Gordana Popović</i>	49
Improvement of the vitamin D₂ photostability through the formation of cocrystals	
<i>Emma Bello, Eirini Tarelli, Rafael Barbas, Rafel Prohens, Clara Ràfols, Elisabet Fuguet</i>	50
Design of microfluidic devices for fast determination of octanol/water partition coefficients by HPLC	
<i>Elisabet Fuguet, Abdulkarim Albishiri, Joan M. Cabot, Martí Rosés</i>	51

Drug-excipient interactions: evaluation of the binding constants <i>Clara Râfols, Rebeca Ruiz, Elisabet Fuguet</i>	52
Chamelogk: a new experimental-chromatographic chameleonicity descriptor <i>Maura Vallaro, Diego Garcia Jimenez, Matteo Rossi Sebastiano, Giulia Aprato,</i>	53
EPR imaging: A convenient method for <i>in vivo</i> monitoring the efficacy of anti-inflammatory drugs <i>Marko Jovanović, Hadi Waisi, Stevan Blagojević, Vladimir Tajković, Marko Daković, Đura Nakarada, Miloš Mojović</i>	54
Green synthesis of Ag-Fe nanoparticles using <i>cotinus coggygia</i>: Preparation, characterization and photothermal potential <i>Tsenka Grancharova, Stanislava Simeonova, Bissera Pilicheva, Plamen Zagorchev</i>	55
Quantitative measurement of concentration and diffusion properties of molecules using fluorescence correlation spectroscopy <i>J. Z. Jelić, A. Denčevski, M. D. Rabasović, A. J. Krmpot</i>	56
Evaluation of dose dependent oral drug absorption by μFlux <i>Shiori Ishida, Samuel Lee, Karl Box, Balint Sinko, Kiyohiko Sugano</i>	57
Effect of bicarbonate buffer on the precipitation behavior of drugs <i>Hibiki Yamamoto, Kiyohiko Sugano</i>	58
Combined in silico approach in screening of flavonoids database for potential NLRP3 inhibitors <i>Kristina Stevanović, Draginja Radošević, Vladimir Perović, Sanja Glišić</i>	59
Searching for the best way to incorporate the proprietary compound GL-II -73 into the nanoemulsion carrier for prospective parenteral application <i>Jelena Đoković, Bojan Marković, Dishary Sharmin, James M Cook, Miroslav Savić, Snežana Savić</i>	60
Design of tailor-made biocompatible nanocarrier for novel pyrazoloquinolinone ligand (CW-02-79) based on comprehensive evaluation of critical physicochemical descriptors <i>Tijana Stanković, Tanja Ilić, Ivana Pantelić, Anđela Tošić, Jelena Mitrović, James M. Cook, Miroslav Savić, Snežana Savić</i>	61
<i>In silico</i> prediction of liquid-liquid phase separation concentration using abraham solute descriptors <i>Taiga Uekusa, Kiyohiko Sugano</i>	62
Polymorphic conversion of a hydrophobic drug in water: Posaconazole suspensions <i>Matteo Guidetti; Fritz Blatter; Rolf Hilfiker; Annette Bauer-Brandl; Martin Kuentz</i>	63
Challenges in peptide method development Interactions between peptides and HPLC vials <i>Ksenija Žibert, Mateja Filković, Iva Filipović</i>	64

Determination of the nifedipine solubility at biorelevant temperature <i>Ekin Guler, Kaan Altun, Emelhan Rehimoglu, Bolgacem Aybar</i>	65
Clofazimine acid-base solubilization: influence of small organic acids' concentration <i>Igor A. Topalović, Olivera S. Marković, Miloš P. Pešić, Mufaddal Kathawala, Abu T. M. Serajuddin, Alex Avdeef, Tatjana Ž. Verbić</i>	66
¹H-NMR-based serum metabolomics of bipolar disorder patients <i>Nataša Avramović, Katarina Simić, Zoran Miladinović, Nina Todorović, Snežana Trifunović, Aleksandra Gavrilović, Silvana Jovanović, Dejan Gođevac, Ljubodrag Vujisić, Vele Tešević, Ljubica Tasić, Boris Mandić</i>	67
¹H-NMR metabonomic view on schizophrenia <i>Nataša Avramović, Katarina Simić, Zoran Miladinović, Nina Todorović, Snežana Trifunović, Aleksandra Gavrilović, Silvana Jovanović, Dejan Gođevac, Ljubodrag Vujisić, Vele Tešević, Ljubica Tasić, Boris Mandić</i>	68
Salt dissolution, supersaturation, and precipitation kinetics: A comparison between the USP II and the μDISS Profiler™ <i>Laurin Zöllner, Sara Carlert, Eva Karlsson, Anders Borde, Christoph Saal, Jennifer Dressman</i>	69
Development of ophthalmic nanoemulsion for advanced delivery of poorly water- and oil-soluble loteprednol etabonate <i>Josip Ljubica, Bisera Jurišić Dukovski, Drago Špoljarić, Iva Krtalić, Ivan Sušan, Anita Hafner, Ivan Pepić, Jasmina Lovrić</i>	70
Preparation and evaluation of poly-ϵ-caprolactone nanoparticles as carriers for nose-to-brain delivery of lidebenone <i>R. Boyuklieva, B. Pilicheva</i>	71
Directed protein evolution for the investigation of endogenous proteins in synaptic organization and transmission <i>Ivana Trivunovic, Charlotte Rimbault, Ellyn Renou, Cameron Mackereth, Daniel Choquet, Matthieu Sainlos</i>	72
NMR study of haloperidol in weak acid solutions <i>Mladen M. Đurđević, Miloš P. Pešić, Tatjana Ž. Verbić</i>	69

O 19

Highlight on the benefits of PBPK modeling: A link between drug properties and its *in vivo* performance

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Physiologically based pharmacokinetic (PBPK) modeling or more recently also known as physiologically based biopharmaceutics modeling (PBBM) is a computer-aided (*in silico*) biopharmaceutical tool, designed to mechanistically describe bioperformance of a drug and predict its absorption and systemic availability. PBPK/PBBM was quickly adopted by pharmaceutical companies and medical regulatory agencies, its scope has expanded over the years, and nowadays PBPK/PBBM represents an essential tool in various phases of drug and formulation development (1).

A major advantage of PBPK modeling over traditional *in vitro* and preclinical animal studies is the ability to link the physicochemical properties of a drug to its dissolution, absorption and disposition in a target patient or population, taking into account specific physiological conditions. This is accomplished through linked differential equations that describe simultaneous or sequential dynamic processes that a drug undergoes in the body following different routes of administration. PBPK predictions can refer to various physiological or disease states, so this unique approach can support personalized pharmacotherapy and drug/dose/dosing regimen selection in different patient populations or individual patients (2).

Although PBPK modeling can rely solely on the *in silico* generated data regarding drug's properties (i.e., predicted based on the chemical structure of a drug), the prediction accuracy can be significantly improved with experimentally obtained input values. Therefore, any improvement in experimental drug characterization methods will inevitably lead to more reliable PBPK predictions.

To illustrate the concept and implementation of PBPK modeling, this presentation will provide basic information on the structure of a PBPK model, and emphasis will be placed on case studies describing the interplay between drug-specific and physiologically relevant parameters that determine drug performance *in vivo*. Selected examples will be used to demonstrate how PBPK predictions can be used in conjunction with *in vitro* data on drug properties to answer clinically relevant questions, such as selecting appropriate drug therapy in bariatric patients, and assessing the impact of changes in gastric pH resulting from impaired gastric secretion or co-administration of proton pump inhibitors on drug dissolution, potential gastrointestinal precipitation and concomitant oral absorption.

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