

Foreword

This Special Issue of *Biologia Serbica* is dedicated to the First Congress of Molecular Biologists of Serbia with international participation (1st CoMBoS) that will be held in Belgrade on September 20-22, 2017. CoMBoS is organized by the Serbian Society for Molecular Biology (MolBioS), a young society founded in 2015. One of the society's aims is to advance and spread molecular biology as a science and profession, and to contribute to its affirmation at national and international levels. The central goal of the CoMBoS is to encourage collaboration and the exchange of ideas, knowledge and expertise among scientists working in molecular biology and related fields. The special issue starts with the announcement of the first winner of the MolBioS Award, Prof. Dr. Gordana Matić. This is followed by mini-reviews by invited speakers that cover areas in the molecular biology of eukaryotes, biomedicine and the molecular biology of microorganisms that correspond to the eponymous sessions of the CoMBoS. These articles provide comprehensive reviews of many exciting topics and highlight the results and achievements of many research groups from Serbia. The last article *In memoriam* is dedicated to the late Academician Dušan Kanazir.

The MolBioS has established its award for scientific achievements and/or educational contribution to molecular biology and is envisioned for an active scientist. We are very proud to announce that the first winner of the MolBioS award is Gordana Matić, the distinguished professor of Biochemistry and Molecular Biology whose research has focused on steroid biology, with a particular interest in many facets of the glucocorticoid receptor in health and disease. An inspired article about Prof. Gordana Matić, with an emphasis on her distinguishing qualities, such as her commitment, consistency and motivation, was written by her close collaborators Dr. Ana Đorđević and Prof. Goran Brajušković.

The first article, entitled "The SOX2 gene – master regulator of numerous cellular processes" by Milena Stevanović, who discovered the SOX2 gene in 1994, and her collaborators reviews the roles of the SOX2 transcription factor in the maintenance of pluripotency and self-renewal of stem cells, in the determination of stem cell fate and differentiation and in reprogramming of differentiated cells, which has great promise in regenerative medicine. The mediatory role of glucocorticoid hormones in dietary fructose-induced disturbances that underlie the development of the metabolic syndrome, an emerging global health problem, is reviewed in the article entitled: "The role of glucocorticoid hormones in diet-induced metabolic diseases" by Ana Đorđević and collaborators. The article is complemented by hand-drawn figures by Ana Đorđević. The article entitled "The aging brain – molecular and metabolic changes" by Kosara Smiljanić and collaborators reviews the molecular and metabolic effects of dietary restriction as a potent noninvasive intervention that is capable of attenuating age-related alterations of the brain and of promoting the plastic capacity of the brain, which represents an attractive potential approach aimed at increasing the

resistance to age-related neurodegenerative disorders. Dynamic coevolutionary interactions between nuclear and mitochondrial genomes in the eukaryotes and different approaches in investigating the central roles of mitochondrial energy metabolism and mitochondrial-nuclear epistasis in life-history evolution are presented and discussed in the article entitled: “Interaction between mitochondrial and nuclear genomes: the role in life-history evolution” by Biljana Stojković and Mirko Đorđević.

The article entitled: “Genetic basis of prostate cancer: Association studies” by Goran Brajušković and collaborators gives an overview of candidate gene association studies related to the risk and progression of prostate cancer with a comprehensive insight into genetic research of the prostate cancer in the Serbian population. Prostate cancer is the most common malignancy in men, and genetic markers are promising novel tools with the potential to reduce its overdiagnosis by preventing unnecessary prostate biopsies and aggressive treatments. The implementation of molecular genetics and genomics in clinical practice in Serbia, with an overview of rare disease diagnostics and gene therapy, genetic markers and molecular-targeted therapy for hematological malignancies, population pharmacogenomics and the potential use of stem cells and tissue therapy are covered in the article entitled: “Genomics as a basis for precision medicine” by Sonja Pavlović and collaborators. The data on *SOX* genes as potential prognostic markers and therapeutic targets in cancer, with a focus on genes from *SOXB* and *SOXF* groups and their involvement in glioblastoma, nonseminomatesticular germ cell tumors and cervical carcinoma, is reviewed in the article entitled: “*SOX* genes as prognostic markers and potential therapeutic targets in cancer” by Marija Mojsin and collaborators. Zebrafish as a model system for biomedical research, with a focus on its suitability for validating newly identified genetic variants associated with diseases, the identification of disease modifiers and examination of the effects of novel therapeutics, are covered by examples obtained from studies of gastrointestinal tumors, thrombosis, cardiomyopathies and skeletal myopathies and presented in the article entitled: “Zebrafish (*Danio rerio*) in deciphering molecular mechanisms of human diseases” by Snežana Kojić and collaborators. The successes and pitfalls of genome-wide association studies in predicting complex traits, with a focus on cardiovascular diseases, and an emerging comprehension that the integration of genomic, transcriptomic and epigenomic data is essential to elucidate the “missing” heritability of these phenotypes, are reviewed in the article entitled: “TransEpiGen-omics in cardiovascular disease research: Unraveling the genetic basis of complex diseases” by Maja Živković and Aleksandra Stanković. In the era of different -omics’ approaches and clinical applications of next-generation sequencing, biologists have to handle large amounts of collected data with a high-dimensionality (large numbers of measured features), and to interpret the functional significance of detected genetic variants. The article entitled: “Annotation of the functional impact of coding genetic variants” by Vladimir Perović and collaborators reviews their own alignment-free method for phylogenetic analyses of protein sequences, ISTRÉE, and its applications as a promising approach for the functional assessment of coding variants. The usefulness of data-mining analyses of complex and high-dimensional data in research in molecular biology and biomedicine is covered in the article entitled: “Optimization, classification and dimensionality reduction in biomedicine and bioinformatics” by Vladimir Filipović, which reviews the technique of electromagnetism-like metaheuristic optimization for dimensionality reduction and parameter selection in the classification methods k-nearest-neighbor and support vector machine, as well as for solving the NP-hard maximum betweenness problem.

The article entitled: “Molecular biology of class 1 mobile integrons” by Branko Jovčić and collaborators reviews the molecular mechanism of integrons, genetic platforms carried by plasmids or contained within a transposon that play a central role in the dissemination of antibiotic resistance genes among bacteria, which has emerged as a major clinical problem. From the historical and contemporary points of view, the article entitled: “The protein folding problem” by Brankica Janković and Natalija Polović covers important aspects related to the protein folding problem, whose understanding is important in many different disciplines, from biophysics to biomedicine. An overview of two major bacterial immune response systems – restriction-modification and CRISPR/Cas systems, complemented with authors’ studies aimed at elucidating the regulation of gene expression in these systems by a systems biology approach, is covered in the article entitled: “Modeling and bioinformatics of bacterial immune systems: understanding regulation of CRISPR/Cas and restriction-modification systems” by Jelena Guzina and collaborators. The understanding of CRISPR/Cas functioning in its natural environment can further improve the application of CRISPR/Cas as a comparatively novel biotechnology tool.

MolBioS is committed to preserving the memory of the great Serbian scientists who paved the way for the fruitful research and education in molecular biology in Serbia. Hence, the first CoMBoS is devoted to Academician Dušan Kanazir (1921-2010), a eminent scientist who played an essential role in the foundation of the Department of Biochemistry and Molecular Biology and the study program Molecular Biology and Physiology at the Faculty of Science, University of Belgrade, in 1972. This study quickly become attractive and acquired distinction, and has served as an incubator for many talented scientists who conduct cutting edge research in modern biology, confirming the efforts of this great visionary. We are grateful to Prof. Ljubiša Topisirović for the approval to present in this Special Issue his warmly written *In Memoriam* to Academician Dušan Kanazir, which was published in the *Archives of Biological Sciences* in 2010. We are also thankful to the Editor-in-Chief of the *Archives of Biological Sciences*, Dr. Goran Poznanović, for supporting this choice.

We also wish to express our gratitude to all authors who devoted their time to writing the valuable articles presented in this

Special Issue. We would like to thank all colleagues that have been engaged in critically reviewing the submitted manuscripts, and Mrs. Myra Poznanović for the professional English editing. We are grateful to the Editor-in-Chief of *Biologia Serbica*, Prof. Milica Matavulj, for recognizing the importance of the CoMBoS for the Serbian scientific society and for providing us with the opportunity to publish the conference papers in the journal. We would also like to thank the Scientific and Organizing Committees of the first CoMBoS, in particular their presidents, Profs. Gordana Matić and Goran Brajušković, for their confidence in us to serve as invited editors. We sincerely hope that this Special Issue will be of interest to the general readership of the *Biologia Serbica*.

Guest Editors:
Milena Stevanović
Dužanka Savić-Pavićević

MolBioS Award

The Serbian Society for Molecular Biology (MolBioS) has established its own award in recognition of the achievements of individuals in the field of molecular biology and their contributions to its development and promotion in Serbia. The MolBioS Award will be presented at every subsequent Congress of Molecular Biologists of Serbia, with a closing lecture given by the winner.

At a meeting held on 22 December 2016, the Steering Committee of the MolBioS decided to organize its First Congress of Molecular Biologists of Serbia, with international participation. At the same meeting, the Steering Committee decided to establish the MolBioS Award, and an Award Committee was formed with the following members: Academician Milena Stevanović; Dr. Silvana Andrić, Full Professor at the University of Novi Sad – Faculty of Natural Sciences; Dr. Selma Kanazir, Principal Research Fellow of the University of Belgrade – Institute for Biological Sciences “Siniša Stanković”; Dr. Dužanka Savić-Pavićević, Associate Professor of the University of Belgrade – Faculty of Biology; Dr. Snežana Kojić, Senior Research Associate of the University of Belgrade – Institute for Molecular Genetics and Genetic Engineering; Dr. Đorđe Fira, Full Professor of the University of Belgrade – Faculty of Biology; Dr. Goran Poznanović, Principal Research Fellow of the University of Belgrade – Institute for Biological Sciences “Siniša Stanković” and Dr. Goran Brajušković, Associate Professor of the University of Belgrade – Faculty of Biology.

At a meeting held on 11 April 2017, the Committee unanimously agreed to present the first MolBioS Award to Dr. Gordana Matić, Full Professor at the University of Belgrade – Faculty of Biology and Principal Research Fellow of the University of Belgrade – Institute for Biological Sciences “Siniša Stanković”.