
Foreword

We are pleased to present to you the Special Issue of the *Advances of Biochemistry*, which celebrates the 100th Anniversary of the Nencki Institute. Over these 100 years, generations of scientists at the Institute have conducted intensive studies on the most contemporary topics in biology and have worked out a visible position of the Institute in the field of basic and translational life sciences. Simultaneously, the Institute's community has shared the turbulent history of the reborn Poland, as Leszek Kuźnicki describes in his overview. We learn more about the recent years of the Institute's history from the personal perspective of Maciej Nałęcz, the Institute's Director in years 1991–2002 – a time period which has brought important changes in the Poland's political system and accompanying fundamental changes in the organization of science in our country.

Throughout all these years, studies carried out at the Nencki Institute have been focused on revealing the fundamental biological processes under physiological and pathological conditions in two major fields – neurobiology and cell biology/biochemistry. This Issue presents our most recent activities, challenges and discoveries. They include studies on memory, neurodegeneration, aging, cancerogenesis and cell metabolism, with a common goal of the understanding the basics of civilization diseases. The two major fields of the Institute's scientific activities, i.e. neuro- and cell biology, are tightly interconnected – perfectly exemplified by studies of the group of Leszek Kaczmarek. These studies led to the discovery of the pathway leading from the expression of genes controlled by c-Fos/AP-1 to the activity of MMP-9, a matrix metalloproteinase crucial for synaptic plasticity inherent in functioning of healthy and diseased mind. Other factors controlling nervous system function, i.e., somatostatin and neurotrophins, with their therapeutic potential in neurodegenerative diseases and injuries are discussed by Agnieszka Łukomska and co-authors and Małgorzata Skup.



Agnieszka Dobrzyń



Katarzyna Kwiatkowska



Katarzyna Piwocka

Recent years have brought new challenges to the Nencki's scientists interested in human health, which are associated with aging of the society and development of age-related diseases, including cancer. The contribution of cell senescence to aging and development of cancer is discussed by Ewa Sikora. Studies on cancer biology, including leukemias and brain cancers, as well as investigation of novel possible therapeutic strategies, is a strong field of studies conducted at the Nencki Institute. New developments in personalized therapies of leukemia based on synthetic lethality phenomenon in BRCA1-deficient leukemias are discussed by Katarzyna Piwocka. Furthermore, a series of papers written by Bożena Kamińska and her co-workers dissect the molecular basis of malignant gliomas development and new modes of treatment of these brain tumors. Thus, Iwona Ciechomska discusses the potential role of autophagy in treatment of glioblastoma, Aleksandra Ellert-Miklaszewska and co-authors write about the complex relation between the malignant gliomas and their microenvironment, while Marta Maleszewska and co-authors describe dysregulation of epigenetic mechanisms in cancer, particularly gliomas.

Epigenetic modifications also play an intrinsic role in pathogenesis of metabolic diseases linked with lipid metabolism alterations, which have emerged as an important topic of studies carried out at the Nencki Institute. Two papers of Agnieszka Dobrzyń's group, written by Aneta Dobosz and co-authors and Justyna Janikiewicz and co-authors, provide comprehensive discussion of factors facilitating the development of obesity-related

type 2 diabetes. Furthermore, Sabina Tabaczar and co-authors from Paweł Dobrzyń's team address the role of fatty acid desaturation in the regulation of cardiac metabolism, while paper by Katarzyna Kwiatkowska and Anna Ciesielska points to the pro-inflammatory properties of saturated fatty acids, facilitating the development of metabolic diseases and sepsis.

Many other questions still exist in terms of molecular mechanism of various (patho)physiological conditions and their unravelling can lead to new therapeutical approaches. In particular, Joanna Bandorowicz-Pikula and Agnieszka Seliga discuss the role of annexin A6 in membrane repair and vesicular transport, Adam Szewczyk and co-workers write about mitochondrial potassium channels and therapeutic potential of their modulation, Anna Filipek and Wiesława Leśniak about multifunctional calcium-binding S100A6 protein and its ligands while Agnieszka Strzelecka-Kiliszek and co-authors from the group of Sławomir Pikuła address the role of vesicles in tissue differentiation.

In summary, this issue of the *Advances of Biochemistry* provides a comprehensive overview of the contribution of scientists at Nencki Institute to understanding the basis of various biological processes and human diseases, with therapeutic potential. We hope that reading this Issue will be a pleasure that leads you through our history, undertaken challenges and recent scientific achievements.

Agnieszka Dobrzyń
Katarzyna Kwiatkowska
Katarzyna Piwocka