



Spring School of Polish Neuroscience Society on:

**"Plasticity of neuronal connectivity:
morphological background and molecular mechanisms"**

**June 4th, 2008
Warsaw**

Organizer: Polish Neuroscience Society
Co-organizers: International Institute of Molecular and Cell Biology in Warsaw
Nencki Institute of Experimental Biology, PAS

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Dear ANE Readers and Participants of the Spring School of Polish Neuroscience Society

This issue of *Acta Neurobiologiae Experimentalis* contains review articles which are part of scientific contributions presented at the Spring School of the Polish Neuroscience Society entitled: “Plasticity of neuronal connectivity: morphological background and molecular mechanisms” held in Warsaw, Poland, on June 4th, 2008. The School, which is an annual event of the Polish Neuroscience Society, this year accompanies celebration of 90th anniversary of the Nencki Institute of Experimental Biology, Polish Academy of Sciences. Our major aim was to bring together experienced foreign and Polish scientists, with hands on experience in the school topic, and students and non-specialists in the field, who are eager to understand better basics of modern neuroscience. Our intention was to support and accelerate introduction of the newcomers to the rapidly growing field of molecular neurobiology of plasticity of neuronal connectivity.

Our understanding of mechanisms underlying plasticity of neuronal connectivity at the cellular and molecular level increases virtually almost every day. Every month hundreds of publications describe novel aspects of molecular processes underlying neurons’ development, survival, integration to the network and interaction with non-neuronal cells. Studies are carried out at the level of brain structures as well as single neurons, dendrites, axons or even single synapses, and deal with their electrical properties, morphological, biochemical, and molecular features. There is also a growing input of theoretical modeling into experimental studies on nervous system connectivity. It is a challenge to follow that progress, to pick up the most valuable reports and understand the approaches and techniques which become increasingly sophisticated. Our School was aimed to bring the participants to these issues. Obviously, it is not possible to cover all exciting topics in the field in one day. Therefore we focused on dendritic and axonal arbors and their specialized connections – synapses. At the same time it has been our ambition to present this topic in the widest possible perspective. Therefore, in the first session of the School, devoted to basic mechanisms underlying plasticity of neuronal connectivity, at first, lectures by Drs. Daniel Wojcik and Jerzy Mozrzymas described theoretical and practical aspects of electrophysiological properties of dendrites and synapses. Next, presentations by Drs. Jacek Jaworski, Carlo Sala and Małgorzata Skup, tackled dendritic compartment and described molecular events underlying formation of dendritic arbors and dendritic spines, as well as a role of the phenomenon of local protein translation for synaptic plasticity. The talk of Dr. Elżbieta Pyza, describing structural changes of flies’ synapses in response to circadian rhythm, external sensory stimuli and motor activity, concluded that part of the Meeting. The second part of the School addressed changes of dendritic and axonal arbors and dendritic spines under pathological conditions and during post-traumatic recovery, presented in the lectures of Dr. Jochen Herms and Dr. Matylda Macias. Finally, participants were introduced by Drs. Sebastian Kügler and Jochen Herms to the novel, state of art, visual techniques to study synaptic connectivity in cultured neurons and the nervous system *in vivo*. This technical part was additionally supported by M.Sci. Michał Młodkowski who presented applications and possibilities of the most advanced software for microscopic image analysis in neuroscience. Fortunately, also readers of this issue of ANE can become a part of our “class” and participate in our School by reading following reviews. Wishing you a nice lecture we hope we stimulate you enough to join our growing field of research on the mechanisms of plasticity of synaptic connectivity.

We also express our gratitude to those, whose work supported us with reaching our aims both in School organization and in ANE Special Issue preparation. We thank our sponsors for financial support. We also owe a debt of gratitude to Paweł Boguszewski (PNS), Małgorzata Gałysz (ANE), Anna Malik (International Institute of Molecular and Cell Biology), Małgorzata Urbańska (International Institute of Molecular and Cell Biology) and Teresa Zalewska (PNS) for their hard work and commitment.

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