



Associate Professor, Maria Bijak, Ph.D.  
(1957–2001)

## OBITUARY

Associate Professor Maria Bijak, Ph.D., head of the Department of Physiology at the Institute of Pharmacology of the Polish Academy of Sciences in Kraków, an enthusiastic scientist, and an expert in the field of electrophysiology and pharmacology of the central nervous system and – last but not least – an active member of our Editorial Office passed away on 30 July 2001.

Maria Bijak was born on 8 September 1957 at Żory. She completed her primary and secondary education in Gliwice, and in 1976 she commenced her studies at the Faculty of Biology and Earth Sciences of the Jagiellonian University in Kraków, having graduated in molecular biology in 1981. Immediately thereafter she started her work with the Animal Physiology Section of the Institute of Zoology, the Jagiellonian University, as a junior researcher and engaged in investigations into circadian changes in sodium, potassium, calcium and magnesium ion levels in mouse cortex using atomic absorption and emission spectroscopy. In the same year she begun 4-year postgraduate studies at

that Institute under Prof. Józef Surowiak supervision. She also further developed her knowledge at the Nencki Institute of Experimental Biology in Warszawa and at the Institute of Pharmacology of the Polish Academy of Sciences in Kraków, having acquired first-hand experience of electrophysiological techniques. While carrying on her research in the field of chronobiology, she investigated circadian changes in the spontaneous activity and sensitivity of neurons in mouse cortex and cingulate gyrus slices

After she had obtained a doctor's degree in 1985, she was employed by the Institute of Pharmacology of the Polish Academy of Science in Kraków where she quickly advanced in her brilliant and promising scientific career and was promptly promoted to higher and higher positions. She had worked for 13 years at the Department of Neurobiology of the Institute of Pharmacology where she organized an Electrophysiology Unit from scratch having thereby successfully joined the mainstream of the Institute's studies into the mechanism of ac-

tion of psychotropic drugs, with special regard to antidepressants. Since antidepressant drugs require long-term administration to exhibit their therapeutic activity, Assoc. Prof. Maria Bijak decided to study principally adaptive changes in various monoaminergic receptors in the brain, induced by chronic treatment with antidepressants. Having applied advanced electrophysiological methodology and constantly improved analytical procedures, she enriched the world scientific literature with many original observations and discoveries and contributed substantially to our understanding of the mechanisms responsible for therapeutic effects of that group of psychotropics. At the start of that research direction and in co-operation with Dr. Antoni Śmiałowski, she described the contribution of D1 and D2 receptors to inhibitory and excitatory effects of dopamine on hippocampal neurons and discovered that those excitatory effects in that brain structure were enhanced in animals chronically treated with imipramine.

Another of her conspicuous findings was that long-term antidepressant drug administration also led to supersensitivity of  $\alpha_1$ -adrenergic receptors in hippocampal neurons. The results of her studies on adaptive changes in serotonin receptor reactivity, conducted jointly with researchers from the Department of Pharmacology, especially with Prof. Jerzy Maj, are equally noteworthy. Having analyzed population spikes in hippocampal slices, she showed that both long-term administration of antidepressant drugs and multiple electroconvulsive treatments augmented the inhibitory effect of 5-HT<sub>1A</sub> receptors on neuronal excitability in that brain structure and diminished the stimulatory effect of 5-HT<sub>4</sub> receptors. Successive intracellular studies revealed that antidepressant drugs also enhanced the hyperpolarizing effect of serotonin and a 5-HT<sub>1A</sub> agonist on pyramidal hippocampal neurons, while the effect of a 5-HT<sub>4</sub> receptor agonist on afterhyperpolarization was attenuated. Those and successive studies conducted by Assoc. Prof. Maria Bijak showed enhancement of the inhibition of hippocampal neuron activity by the serotonergic system, possibly at the level of an interaction between the receptor or potassium channel and G-protein. Those changes occurred after two-week drug administration, which correlated well with the time necessary for manifestation of therapeutic effects. In the last phase of her so suddenly interrupted scientific activity, she discovered and studiously documented opposite effects of chronically admini-

stered antidepressants and corticosterone on the activity of hippocampal 5-HT<sub>1A</sub> and 5-HT<sub>4</sub> receptors, which shed new light on the significance of disturbances of the hypothalamic-pituitary-adrenal axis in the pathomechanism of depression.

Another important area of her work was concerned with processes contributing to the mechanisms of generating and extinguishing seizure attacks, i.e. the phenomena of synaptic inhibition and its modulation by different neurotransmitters in the dentate gyrus of the hippocampal formation. She achieved further progress in those studies working as a visiting researcher in Munich, and Heidelberg in co-operation with Prof. Ulrich Misgeld, having described functional and morphological characteristics of inhibitory interneurons in that structure, and having characterized GABA-A and GABA-B receptor-dependent inhibitory synaptic potentials. Moreover, she demonstrated that noradrenaline and serotonin inhibited the hippocampal interneuron activity, and she gathered evidence for contribution of  $\beta$ -adrenergic receptors to the regulation of GABA release from synaptic terminals of those interneurons. As a continuation of her investigations of the electrophysiological bases of epilepsy she devised and implemented a project entitled "Mechanisms of antiseizure action of neuropeptide Y in the frontal cortex and hippocampus *in vitro*". Having applied intra- and extracellular recording techniques, she demonstrated that neuropeptide Y (acting at Y1, but not Y2, receptors) inhibited spike frequency in the rat frontal cortex and diminished the depolarization of neurons induced by a type T calcium current. Furthermore, she confirmed the inhibitory effect of neuropeptide Y on spikes in the CA1 region of the hippocampus, and – even more importantly – on synaptic excitation of the dentate gyrus granule cells *via* Y2 receptor activation. An analysis of the obtained data allowed her to conclude that glutamic acid release from synaptic terminals of CA3 pyramidal cells located in both the CA1 dendritic region and hilus of the dentate gyrus was inhibited by neuropeptide Y. Those results are of great value and they open up new perspectives in the search for more effective antiepileptic drugs.

It is worth mentioning here that Assoc. Prof. Maria Bijak conducted her research not exclusively at our Institute. In the late eighties and at the beginning of the nineties she visited various leading scientific centers abroad, having often obtained support to her research from international sources as

the European Science Foundation, Alexander von Humboldt's Foundation and European Community. She carried out her studies and got training at the Department of Neurobiology of the Institute of Psychiatry in London, the Max-Planck-Institute of Psychiatry in Munich, and the Physiology Unit of the Heidelberg University. Her few visits to Heidelberg were particularly fruitful, as she mastered a number of new scientific techniques and undertook the abovementioned studies into synaptic inhibition. Those studies yielded promising results, which helped her be promoted to a higher scientific position of Assoc. Professor in 1998. The scientific activity of Assoc. Prof. Maria Bijak was always very hectic and intense, which can be evidenced by the fact that she was an author of more than 100 scientific papers, including over 50 original studies published in prestigious international journals; she also actively participated in numerous scientific conferences and symposia in Poland and abroad and frequently delivered lectures both at our Institute and in other scientific centers. The numerous prizes she was awarded can substantiate the high scientific level of her work. They include an award of the European Collegium of Neuropsychopharmacology for her presentations at congresses organized by the abovementioned Collegium (received twice), an award of the Department of Medical Sciences of the Polish Academy of Sciences, and a prize of the J. & J. Supniewski Foundation.

Apart from her scientific research, Assoc. Prof. Maria Bijak was also intensely and emotionally involved in animating research and other activities of the scientific community. For several years she had been a member of Editorial Board of our journal. She was performing that function with competence and enthusiasm, so characteristic of her; furthermore, she greatly contributed to constantly growing position of the Polish Journal of Pharmacology in the international scientific arena.

She was an active member of the Commission for Epilepsy Studies within the framework of Polish Antiepileptic League, as well as a member of the Polish Pharmacological Society and Polish Neuroscience Society, having been given by the latter a responsible function of secretary of the Organizing Committee of the II International Congress. Her organizational skills, the sense of responsibility for everything she was doing and her

hard work, together with her personal charm and exceptional kindness, all those qualities made her a highly respected member of different bodies responsible for organization of scientific events at our Institute.

At the beginning of 1999, when she was still actively engaged in her studies, Assoc. Prof. Maria Bijak was appointed to a position of Head of the Department of Physiology of the Institute of Pharmacology of the Polish Academy of Sciences in Kraków. Since then, she had taken on many new responsibilities connected with management of team work, supervision of her workers' scientific development, a search for financial support. She supervised research of her younger colleagues, helping them to prepare their doctoral theses, but also setting them a remarkable example of an ethical researcher. She efficiently sought co-operation with other researchers both at the Institute of Pharmacology and in others scientific centers, being a much welcome partner herself. She was remarkably successful in obtaining financial support and she used to encourage her partners to apply for grants. She was in charge of 3 projects, of which the last was brought into operation only in the past spring, and was a co-investigator in two other scientific projects financed by the State Committee for Scientific Research. That support and her other initiatives allowed her to equip her laboratory with new scientific apparatuses, which facilitated the application of very advanced experimental techniques by herself and her colleagues. She always took all her initiatives and actions with deliberation and performed them efficiently and successfully. She did not stop work even when she had already been seriously ill. Almost till the end of her life she was deeply interested in the progress her team was making, having stayed in close contact with all her colleagues.

Her untimely death is a severe loss to our Institute. We have been bereaved of an eminent scientist and a remarkably kind and gentle person who was always ready to share her knowledge and experience with others and who was much respected and loved by the scientific community. We lost a true friend who had done a lot for science and for the people who had the opportunity to know her or to work with her. We shall keep her vivid picture forever in our fond memory.

*Edmund Przegaliński, Władysław Lason*