

## MEMORIAL



### **Professor Halina Krzanowska (1926-2004)**

*On August 2, 2004, an outstanding Polish geneticist Prof. Halina Krzanowska died in Kraków at age 78. Professor Halina Krzanowska was born in Żabie, spent her childhood in Vilnius, and in 1936 moved to Kraków. She graduated with master degree in biology at the Faculty of Mathematics and Natural Sciences at Jagiellonian University in 1947, later earning a PhD in 1949. Her professional career started in 1948 in the Department of Comparative Anatomy led by Prof. Zygmunt Grodziński. In 1952 she moved to the Department of Experimental Biology of the Institute of Animal Production in Puławy, working as research associate under the supervision of Prof. Laura Kaufman, and later as director of this department. In 1957 she stayed at the Poultry Research Centre in Edinburgh, Scotland as a fellow of the Rockefeller Foundation. Between 1960-1962 she performed her habilitation studies at the Faculty of Biology and Earth Sciences of the Jagiellonian University in the field of animal genetics. In 1964 she returned from Puławy to Kraków and assumed the chair of what is now known as the Department of Genetics and Evolution at Jagiellonian University. Professor Krzanowska managed the department for the next 32 years. In 1971 she became an associate professor, in 1978 a full professor. She served as dean in*

*the Faculty of Biology and Earth Sciences for two terms (1981-1987). After retirement in 1996 she continued her professional activities and maintained close contact with the Department and the scientific community.*

*Several honors testify to Prof. Krzanowska's acknowledged scientific career. Her research on the genetics of reproduction is acknowledged and respected not only in Poland, but also abroad. She was a full member of the Polish Academy of Sciences and the Polish Academy of Arts and Sciences as well as a member of national and international scientific societies (Academia Europaea, Society for the Study of Fertility, Polish Society for Genetics, Nicolai Copernicus Society of Naturalists, Polish Society of Animal Production, Society for Biology of Reproduction).*

*Professor Krzanowska was distinguished scientist and teacher, the Prize winner of several prestigious medals and awards. Broad knowledge, respectable scientific achievement and great authority entrusted her with many important positions. She was a member of numerous committees and scientific councils. The most important were Committees of Polish Academy of Sciences: for Zoology, (since 1984), Evolutionary and Theoretical Biology (1974-1998), Collaboration with the International Council for Laboratory Animal Science (since 1997), Biology of Laboratory Animals (from 1964; chaired by her from 1966 to 1980), and Reproductive Biology (from 1997). She was the member of various councils like Scientific Council of the Institute of Systematics and Evolution of Animals (from 1969, chairman: 1987-1998, vice-chairman: 1985-1987), Scientific Council of the Institute of Mammalian Research (from 1972), and Council of the Institute of Genetics and Animal Breeding (1972-1992). Professor Krzanowska was the editor-in-chief of a journal Laboratory Animals (1972-1987). She also was the member of Advisory and Editorial Boards of Folia Biologica, Journal of Applied Genetics, Wszechświat [Universe] and Reproductive Biology.*

*Besides earlier work carried out on poultry, Prof. Krzanowska's scientific career involved laboratory mice. It focused mainly on the analysis of genetic factors governing fertility. These analyses were performed on inbred lines and on hybrids. One of the most useful lines developed by prof. Krzanowska was KE with low quality sperm and reduced efficiency of fertilization. Genetic analysis revealed that the percent of morphologically abnormal*

sperm is determined by more than one gene, with an important role played by genes on the Y chromosome. This was the first published account of the role of the Y chromosome in controlling the quality of sperm in mammals, and therefore the quality of spermatogenesis<sup>1</sup>. The study is cited to this day in the international literature.

In further work, H. Krzanowska discovered that only the propensity for faulty spermatogenesis is heritable, while morphologically abnormal sperm are impeded by the uterotubal junction in the female and do not participate in fertilization of the egg<sup>2</sup>. Another significant accomplishment in professor Krzanowska's career was showing that the quality of gametes in mammals is determined autonomically by the expression of their own genes, while the environment inside the gonad can only induce slight modifications<sup>3</sup>.

H. Krzanowska also studied the mechanisms that control the meiotic cycle, which results in the production of male gametes in mammals. It is well known that the X and Y chromosomes in mammals conjugate during the prophase of meiosis only in a small, homologous terminal fragment. There was some evidence that the lack of conjugation or its premature termination is registered by the mechanism controlling the meiotic cycle and leads to apoptotic death of the spermatocyte. Professor Krzanowska showed that the level of dissociation of the X and Y chromosomes is heightened in maturing males, is genetically controlled, and that differences in X-Y dissociation between inbred strains of mice are determined at least by two genes, one of which is associated with the Agouti locus, and not with the Y chromosome<sup>4</sup>. In recent years professor Krzanowska focused on the genetic analysis of inbred recombinant strains. These studies have shown

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<sup>1</sup>Krzanowska H. 1972. Influence of the Y chromosome on fertility in mice. *Proceedings of International Symposium: The Genetics of the Spermatozoa* in Edinburgh, 37.

<sup>2</sup>Krzanowska H. 1974. The passage of abnormal spermatozoa through the uterotubal junction of the mouse. *Journal of Reproduction and Fertility*, **38**, 81-90.

<sup>3</sup>Krzanowska H. Wabik-Śliz B., Rafiński J. 1991. Phenotype and fertilizing capacity of spermatozoa of chimaeric mice produced from two strains that differ in sperm quality. *Journal of Reproduction and Fertility*, **91**, 667-676.

<sup>4</sup>Krzanowska H., Wabik-Śliz B. 1994. Frequency of X-Y chromosome dissociation in mouse spermatocytes from interstrain crosses, recombinant inbred strains and chimeras: Possible involvement of paternal genome imprinting. *Molecular Reproduction and Development*, **39**, 347-354.

*the correlation between morphology of sperm heads and the frequency of abnormalities<sup>1</sup>. Professor Krzanowska's publication record lists 170 positions, 73 of which are original research papers.*

*H. Krzanowska was an excellent lecturer and also a very talented science writer of many books and textbooks. Additionally, she coauthored or edited many academic textbooks. The most important include: Embryology (1970), Introduction to Population Genetics (1982), Biological Lexicon (1992), Molecular Genetics (1995), and Molecular Mechanisms of Embryonic Development (2002). The popularization of science was very important for her and she was a well known ambassador of science to the general public. Her style of writing was always clear-cut and easy to comprehend, which made even the most complex subjects understandable for any reader. The articles that Prof. H. Krzanowska wrote in *Wszechświat* always concerned contemporary, broadly disputed topics in science such as: "From Mendel to contemporary genetics" (1965), "How genes arise" (1972), "Maps of human chromosomes", (1975), and "How the gene determining male sex in humans was found" (1993).*

*Professor Krzanowska was a wonderful person and a great role model. She possessed knowledge and authority, but also kindness and light-heartedness. For these reasons, we, her students, often requested advice not only in scientific matters. She was very hard-working even in her final days of life, and still managed to surprise us with sharpness of mind in many discussions. For her students and colleagues, she will always remain an irreplaceable Friend and Teacher.*

*Prof. Józefa Styrna*

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<sup>1</sup>Krzanowska H., Styrna J., Wabik-Śliz B. 1995. Analysis of sperm quality in recombinant inbred mouse strains: correlation of sperm head shape with sperm abnormalities and with the incidence of supplementary spermatozoa in perivitelline space. *Journal of Reproduction and Fertility*, **104**, 347-354.