

Professor Halina Krzanowska (1926–2004)



Professor Halina Krzanowska died in Kraków on August 2, 2004. She was an outstanding Polish geneticist. Her work on the genetics of mouse reproduction is internationally acknowledged and widely respected. She was born in Żabie, but spent her childhood

in Vilnius, and in 1936 she moved to Kraków. She graduated from biology at the Faculty of Mathematics and Natural Sciences at the Jagiellonian University, later earning a PhD (1949). Her professional career started in 1948, in the Department of Comparative Anatomy led by Professor Zygmunt Grodzinski. In 1952 she moved to the Department of Experimental Biology of the Institute of Animal Reproduction in Puławy, working as research associate under the supervision of Professor Laura Kaufman, and later as head of this department. In 1957 she visited the well-known Poultry Research Centre in Edinburgh, Scotland, as a fellow of the Rockefeller Foundation. Between 1960 and 1962 she performed her habilitation studies at the Faculty of Biology and Earth Sciences, Jagiellonian University, in the field of animal genetics. In 1964 she returned from Puławy to Kraków, to become the head of the Department of Genetics and Evolution. Professor Krzanowska held this post 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 of the Jagiellonian University 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 Professor Krzanowska's acknowledged scientific career. She was a full member of the Polish Academy of Sciences and full member of the Polish Academy of Arts and Sciences and also a member of national and international scientific

societies, e.g. Academia Europaea, Society for the Study of Fertility, Polish Genetic Society, and Society for Reproductive Biology.

Professor Krzanowska received several prestigious awards. Because of her wide knowledge, respectable scientific achievements and great authority she was entrusted with many important positions. She was a member of numerous committees and scientific councils, such as the Committee for Zoology, Polish Academy of Sciences (since 1984), Committee for Evolutionary and Theoretical Biology, Polish Academy of Sciences (1974–1998), National Committee for Collaboration with the International Council for Laboratory Animal Science (ICLAS; since 1997), Scientific Council of the Institute (formerly Department) of Systematics and Evolution of Animals, Polish Academy of Sciences (from 1969, chairman in 1987–1998, vice-chairman in 1985–1987), Scientific Council of the Institute of Genetics and Animal Breeding, Polish Academy of Sciences (1972–1992).

Professor Krzanowska was the editor of the periodical *Zwierzęta Laboratoryjne* (1972–1987), a member of the editorial board of *Folia Biologica*, Kraków, *Journal of Applied Genetics* (formerly *Genetica Polonica*) and *Wszechświat*, in which she served for many years as deputy editor.

Beside earlier work concerned with poultry, mainly in Puławy, Professor Krzanowska's scientific career involved laboratory mice. It focused mainly on the analysis of genetic factors affecting fertility. These analyses were performed in inbred lines and in hybrids and revealed that the percentage of morphologically abnormal sperm is determined by more than one gene, i.e. polygenically, 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 hence the quality of spermatogenesis. In further work, 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.

Another significant accomplishment in Professor Krzanowska's career was the discovery that the quality of gametes in mammals is determined autonomously by expression of their own genes, while the environment inside the gonad can induce only slight modifications.

H. Krzanowska also studied the mechanism that controls 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, genetically controlled, and that differences in X-Y dissociation between inbred strains of mice are determined by at least two genes, one of which is associated with the *agouti* locus, and not with the Y chromosome.

In recent years Professor Krzanowska focused on the genetic analysis of inbred recombinant strains. These studies have shown the correlation between morphology of sperm heads and the frequency of abnormalities.

Professor Krzanowska's publication record lists 170 positions, 73 of which are original research papers.

H. Krzanowska was an exemplary academic lecturer and also a very talented science writer, as demonstrated by the many books and textbooks she has authored. Additionally she co-authored or edited many academic textbooks. The most important include: *Embriologia* (PWN 1970), *Wprowadzenie do genetyki populacji* (PWN 1982), *Leksykon biologiczny* (Wiedza Powszechna 1992), *Genetyka molekularna* (PWN 1995), *Molekularne mechanizmy rozwoju zarodkowego* (PWN 2002). Most of them were awarded.

The popularization of science was very important for her and she was a well-known ambassador of science to the general public. All the articles written by Professor Krzanowska concerned contemporary, broadly disputed topics in science. Her style of writing was always clear and easy to comprehend, which

made even the most complex subjects available to any reader.

Professor Krzanowska was a wonderful person. She possessed knowledge and authority, but was also kind and light-hearted. For these reasons, we – her students – often requested her advice not only in scientific matters. She was very hard-working even in her last 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.

Józefa Styryna
Jagiellonian University, Kraków, Poland

Professor Krzanowska's ten basic publications:

- Krzanowska H, 1954. Investigations on the activity of mixed cock semen. *Folia Biol*, Kraków 2: 169–184.
- Krzanowska H, 1966. Fertilization rate in mice after artificial insemination with epididymal or capacitated sperm from inbred and crossbred males. *Folia Biol*, Kraków 14: 171–175.
- Krzanowska H, 1969. Factor responsible for spermatozoan abnormality located on the Y chromosome in mice. *Genet Res Camb* 13: 17–24.
- Krzanowska H, 1972. Influence of the Y chromosome on fertility in mice. *Proc Intern Symp The Genetics of the Spermatozoon* (Eds RA Beatty & S. Gluecksohn-Waelsch), 370–386.
- Krzanowska H, 1974. The passage of abnormal spermatozoa through the uterotubal junction of the mouse. *J Reprod Fertil* 38: 81–90.
- 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. *J Reprod Fertil* 91: 667–676.
- 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. *Molec Reprod Dev* 39: 347–354.
- Krzanowska H, Styryna 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. *J Reprod Fertil* 104: 347–354.
- Krzanowska H, Bilińska B, 2000. Number of chromocentres in nuclei of mouse Sertoli cells in relation to the strain and age of males from puberty to senescence. *J Reprod Fertil* 118:343–350.
- Styryna J, Kilarski W, Krzanowska H, 2003. Influence of the CBA genetic background on sperm morphology and fertilization efficiency in mice with partial Y chromosome deletion. *Reproduction* 126: 579–588.