Plenary Lecture

Animal Biotechnology - selected studies and achievements of polish research groups

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In the paper selected research efforts in the area of animal reproduction biotechnology performed by four Polish research groups are presented. The experiments concern several species of animals, including domestic cat. Such subjects as in vitro embryo production, cloning, transgenesis as well as cryoconservation of oocytes and embryos are covered. Studies on embryo production concern development of complex methods of bovine and goat embryo production including OPU, collection and maturation of oocytes, in vitro fertilization and in vitro culture. Separate item is research on in vitro maturation of cat oocytes used in somatic cloning project. The experiments on long-term culture of pre-antral and early-antral bovine ovarian follicles are also developed. Experiments on animal cloning concerned various aspects of embryo bisection in mice, sheep and cattle. Moreover successful re-cloning was achieved in rabbit and pig and healthy rabbits were born from the third generation of 8-cell embryos serially cloned by nuclear transfer. In the late 1990's studies on somatic cloning of different species of both farm animals (pig, goat, rabbit) and domestic animals (domestic cat) were initiated. Matured enucleated oocytes, selectively enucleated GV oocytes and zygotes as nuclei recipients were used. In rabbits the novel technique of chimeric somatic cell cloning which was applied for production of transgenic rabbits was developed. In pigs the studies in somatic cell cloning of genetically transformed pig with „humanized” immunological system were undertaken. In goats two kids which had been developed from NT embryos reconstructed with adult dermed fibroblast cells were generated. Studies on transgenesis concern several species of farm animals: rabbit, goat, pig and cattle. Gene constructs targeted to modify gene of growth hormone, milk sugar, interferon and antiallergic were used. Our teams initiated xenotransplantation project that aims at modification of immuno system of pigs. Recently works on use of spermatooza as DNA vectors for transgenic animals production were started. Studies on embryo cryoconservation were initiated by our teams in the 2nd half of 1970's. At that time experiments on freezing of bovine and sheep embryos were carried out. Science the late 1980's we started to focus on vitrification. As the result, first in the world rabbit and sheep after transfer of vitrified embryos were born. Recently, we concentrate on vitrification of pig embryos. Moreover, the method of cryoconservation of pig and cattle oocytes is developed.