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Standardization of products of biotechnological sericulture by parthenocloning and cryobanking of transgenic clonal silkworms

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Current genetic engineering of the silkworm enables to produce new kinds of silk and to use silkworms as proteosynthetic bioreactors for obtaining precious proteins. Nowadays a lot of target products derived from the silkworm are already used in many areas of life from cosmetics through pharmacy, regenerative medicine to cosmonautics. The problem of product standardization we propose to solve by easy and inexpensive decision – parthenocloning, which enables rapid fixation of transformed genotypes and conservation of any unique man-made complexes. Parthenocloning is based on exact copying of maternal genome and a single female initiates a clonal line with the same genetic and morphological traits, which can be easily maintained without sexual reproduction as exclusively female populations. Such populations exist already for more than 50 years as genetically stable females whose unfertilized eggs are induced to develop by heat-shock treatment. This is the best time-tested evidence of genome stability. We constructed new non-diapausing parthenogenetic strains and developed efficient injection method adapted for the eggs of parthenoclone. We showed that transgenic silkworms could be obtained in high frequency and propagated as clonal populations. We obtained successful transgenesis in a parthenoclone and inserted transgenes were faithfully transferred to successive generations. We showed the possibility of cryopreservation of ovaries of transgenic clonal strains and obtained recovery as individuals by ovary transplantation into female larvae, which opens door for cryobanking of any specific standardized genotypes used for obtaining of precious target products.

Biography

Valeriya Zabelina has completed her PhD in the field of Genetics at the age of 26 years from Karazin Kharkiv National University, Ukraine, was involved in teaching of Developmental biology and worked at the Laboratory of Germ and Stem Cells at the same University, Biology Faculty, Chair of Genetics and Cytology. Then continued her postdoctoral studies at the Biology Centre of the Czech Academy of Sciences, Czech Republic under several European projects (Mobitag, Postdoc Bioglobe), containing research stays abroad (Spain, Japan) and presenting her results at international meetings. She was also involved in teaching of Developmental biology and supervision of a student at the University of South Bohemia, Czech Republic. At the moment she is conducting her research in Japan under JSPS fellowship with the group working in transgenic silkworm. She has been a member of Ukrainian Society of Genetists and Breeders and Japanese Sericultural Society.

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