

# Plant-made putative contraceptive peptides

Khadijeh Ghasemian, Inge Broer and Jana Huckauf

University of Rostock, Department of Agrobiotechnology, Rostock

E-mail of corresponding author: Khadijeh.Ghasemian@uni-rostock.de

Rodents are the most important group of mammals in terms of the problems they create in agriculture, horticulture, forestry and public health. Fertility is a key factor that determines the population density.

Contraceptive vaccines have been proposed for wildlife population management. Gamete specific proteins may be good candidates for the development of contraceptive vaccines. Sterility can be achieved in mammals via the induction of antibodies against Zona pellucida (ZP) glycoproteins that are located on the surface of the oocyte and mediate the gamete recognition. In addition, a sperm-specific protein, IZUMO, plays a vital role in the sperm-egg fusion process, hence it also may be a potential target for the development of a contraceptive vaccine. In order to prevent non target effects an immun-contraceptive vaccine has to be orally administered and species specific. Specificity might be achieved by the restriction of vaccine to small, species specific peptides.

Plants have shown to be one of the most promising alternative pharmaceutical production platforms that are robust, scalable, low-cost and safe. We tried to establish the transient expression of putative mice-specific contraceptive mZP3, mZP2 and mIZUMO small peptides in *Nicotiana benthamiana*, via viral MagniCON expression system.

Successful production of antigen and improved recombinant protein stability in plant were achieved by fusion of mZP3 antigen to GFP protein. Increasing the protein size by tripling of the antigenic mZP3 epitope also stabilized the antigen and increased the expression levels in *N.benthamiana*.

We also examined the production of mice-specific ZP2 and IZUMO peptides. The antigens were overexpressed as recombinant repeated antigenic peptides using MagniCON system in *N.benthamiana*. Multiplying of the antigenic epitopes can increase antigen-antigenicity as well.