

## **DESCRIPTION FOR THE GENERAL PUBLIC**

The general objective of the project is the understanding the mechanisms responsible for maturation of spermatozoa of sex-reversed females rainbow trout and better understanding the mechanisms of formation of cryoinjuries and possibility of their control using supplementation with antioxidants at controlled conditions. The specific objectives include: 1) testing the relationship between hormonal stimulation of sex-reversed females rainbow trout and degree of maturation of semen and its usefulness for cryopreservation, 2) evaluation of oxidative stress during cryopreservation and possibility of its control with the use of antioxidants.

This study is based on the identification of existing knowledge gaps and research needs concerning the maturation of sex-reversed females rainbow trout semen and negative effects occurred in spermatozoa during cryopreservation. First aim will focus on obtaining detailed information concerning changes in semen (both spermatozoa and seminal plasma) during hormonal stimulation of sex-reversed females rainbow trout and maturation of their semen. Completion of this aim will allow to obtain high quality of semen in order to control the oxidative stress by the antioxidants. Moreover, we plan to analyze those modifications on fertilizing ability of cryopreserved semen. During realization of this tasks the comprehensive characteristic of semen quality (sperm concentration, sperm motility parameters, viability, oxidative stress, total antioxidant capacity and ATP content) will be performed. Realization of the project should provide new information about the mechanisms underlying cryoinjuries with regard to sperm viability, oxidative stress, energy status (ATP) and sperm motility parameters as well as sperm fertilizing ability. Moreover, the mechanisms of semen maturation and hormonal stimulation of sex-reversed females rainbow trout will be studied with special attention regarding lines of different sex-reversed females maintained in the hatchery.

This proposal have identified important gaps in the knowledge regarding maturation of semen of sex-reversed females rainbow trout and its control by hormonal stimulation as well as the formation of cryoinjuries in sperm occurring during cryopreservation. Our experimental approach aim to gather new information regarding semen of sex-reversed females rainbow trout, vital not only for further studies concerning cryopreservation of sperm, but also for the knowledge about reproductive physiology as well. The specificity of sex-reversed females semen in terms of cryopreservation may led to significant increase in knowledge important for fundamental cryobiology and biology regarding development of reproductive system of sex-reversed females. Also, according to our best knowledge, no attempt towards knowledge of mechanisms of sperm maturation and hormonal stimulation of sex-reversed females was made to date.