

# Title: Developing molecular tools for manipulation of salmon gonial stem cells

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## Description:

Gonial stem cells (GSC) serve as specialized reservoir cell population whose job is to produce millions of spermatozoa in the testis of mature salmon. After physically isolating these from one donor individual, it is possible to transfer them by microinjection into sterile or non-sterile recipient embryos which will develop and mature to produce sperm as if from the donor. As an extreme example, one can take salmon GCS, transfer to a trout recipient, and the recipient will produce salmon sperm. This manipulation can also theoretically allow for genetic editing of stem cells prior to transplantation and represents a powerful strategy to accelerate breeding. Although this approach has great potential, it is also highly novel and requires a great deal of protocol optimization to succeed. A critical aspect of the approach is the physical isolation of GSC (spermatogonia) from testis. In our group, we have developed a cell sorting approach to do this which requires further optimization and validation. In this Masters project, we will seek to optimize the chemical (antibiotic) and physical separation of spermatogonia and, using RNAseq data being collected now, develop cell-specific antibodies that can be used for fluorescence based sorting of GSC and validation of colonisation following transplantation.

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