

### **Molecular characterization of CD4 homologue in brown trout (*Salmo trutta*)**

Brown trout (*Salmo trutta*) belong to the order Salmoniformes, and are classed within the family *Salmonidae*. Following intensification of aquaculture, disease outbreaks remain a major limitation in achieving production level to a desired level, which calls for better prophylactic and diagnostic measures during farming. The most cost effective way to control disease is prevention and this is achieved, for example, by vaccination. The introduction of successful vaccines requires knowledge of the immune response which is relatively poorly characterized in brown trout.

The immune system of fish is composed of an innate and an adaptive immune system. Adaptive immunity is further divided between humoral and cell-mediated immunity. Cell-mediated immunity is governed by T lymphocytes. T lymphocytes are further divided into cytotoxic T lymphocytes (CTLs) and T helper (Th) cells based on their function. CD8 molecules are expressed by CTLs and interact with MHC class I, while CD4 receptors are expressed by Th interacting with MHC class II; mainly helping B cells to produce antibodies.

In this study, the CD4 homologue or CD4 homologues will be identified in brown trout and characterized. The basal expression of the identified brown trout CD4 genes will be evaluated in different brown trout tissues (thymus, spleen, head kidney, liver, and gills) by means of quantitative real-time PCR. Subsequently, monoclonal antibodies against brown trout CD4 will be produced and used for identification of leukocyte populations that express CD4 in brown trout. Finally, the expression levels of the brown trout CD4 genes in different tissues in response to viral infection will be investigated after experimental infection of brown trout with VHSV.

This project will identify the different possible CD4 homologue present in brown trout along with expression of CD4 in different tissue before and their response to infection. It will identify specific leukocytes expressing these CD4 genes and result in the production of monoclonal antibodies that could be used for future immune study in brown trout.