

Characterization of gene regions containing α and β like globin genes in Atlantic cod, *Gadus morhua*

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The aim of the research is to characterize and understand the sequences and gene regions containing α and β globin like genes in Atlantic cod, *Gadus morhua*, in order to analyze the potential effects of natural selection on variation in these genes and their norms-of-reaction. These loci are well known in many other animal species but have not been characterized in Atlantic cod. Previously, however, protein variation of hemoglobin has been used to analyse population structure. However, it shows indications of natural selection and it is therefore important and even necessary to analyze the molecular genetics behind this variation. The research aims to explain the known allozyme variation at the DNA level. Some variation has been discovered in the introns of the β locus linked to amino acid replacement variation in the exons. A 3000 basepair fragment was cloned and characterized. It was confirmed by sequencing analysis that α and β like genes are located in the same 300 bp stretch on the same chromosome. First comes a β like gene in a 5'-3' orientation, followed by approximately 1500 basepairs of a noncoding region and ending in an α like gene which also is in a 5'-3' orientation. Three main types are found of this 3000 basepair long fragment with the largest differences in the noncoding region. This region is characterized of repeated basepairs and microsatellites which mutate by slippage and length variations. Clones with this fragment from the three main protein electrophoretic phenotypes are under study now. We will discuss if the different protein phenotype can be explained by this DNA variation.