S4.O7. HISTOLOGICAL, TRANSCRIPTOMIC AND IN VITRO ANALYSIS REVEALS AN INTRINSIC ACTIVATED STATE OF MYOGENIC PRECURSORS IN HYPERPLASTIC MUSCLE OF TROUT

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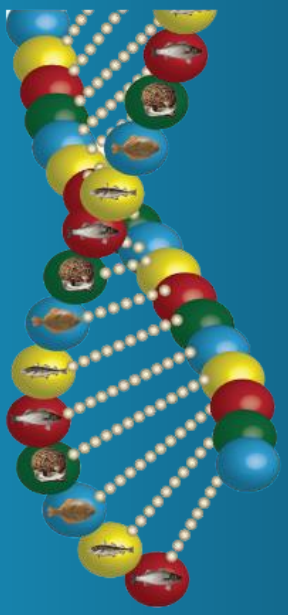
SUMMARY

Post hatching growth in trout muscle is characterized by fiber hypertrophy and hyperplasia. Hyperplasia is defined by production of additional nascent fibers that involves lasting muscle stem cell activation. The aim of this study was to characterize cellular and molecular mechanisms maintaining the activated state of myogenic precursors during fish hyperplasia growth. For this purpose, we examined *in situ* proliferation, *in vitro* cell behavior and transcriptomic profile of 24H-cultured myogenic precursors originating from juvenile trout displaying hyperplasia (Growing Trout, GT) compared to myogenic precursors from fasted juvenile (Fasted Trout, FT) trout in growth arrest and from adult trout (Adult Trout, AT) which does not exhibit hyperplasic growth.

For the first time we showed that myogenic precursors proliferated in hyperplasic muscle as shown by in vivo Brdu labelling. Myogenic cells from FT and AT displayed close expression profiles with only 64 differentially expressed genes. In contrast, 2623 differentially expressed genes were found between myogenic cells from GT and presumably quiescent myogenic cells from both FT and AT. Functional categories related to protein metabolism, metabolic process, proliferation and myogenic differentiation were inferred from genes up regulated in GT compared to AT and FT myogenic cells. Conversely, Notch signaling pathway, that signs cellular quiescence, was inferred from the genes down regulated in GT compared to the two others situations. In line with our transcriptomic data GT myogenic precursors displayed higher myogenic potentiality than FT and AT myogenic precursors as confirmed by their high proliferative capacity and their ability to form new myotubes in vitro.

In conclusion, transcriptomic analysis and examination of cell behavior converge to support the view that myogenic cells extracted from hyperplastic muscle of juvenile trout are intrinsically more potent to form myofibres than myogenic cells extracted from adult or fasted muscle. The generation of gene expression profiles in myogenic cell extracted from muscle of juvenile trout may yield insights into the molecular and cellular mechanisms controlling hyperplasia and provides a useful list of potential molecular markers of hyperplasic muscle.



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