



Histological, transcriptomic and in vitro analysis reveals an intrinsic activated state of myogenic precursors in hyperplastic muscle of trout

Sabrina Jagot, Nathalie Sabin, Aurélie Le Cam, Jérôme Bugeon, Pierre-Yves Rescan, Jean-Charles Gabillard

► To cite this version:

Sabrina Jagot, Nathalie Sabin, Aurélie Le Cam, Jérôme Bugeon, Pierre-Yves Rescan, et al.. Histological, transcriptomic and in vitro analysis reveals an intrinsic activated state of myogenic precursors in hyperplastic muscle of trout. 5. International Symposium on Genomics in Aquaculture, Mar 2018, Albufeira, Portugal. 62 p. hal-02738246

HAL Id: hal-02738246

<https://hal.inrae.fr/hal-02738246>

Submitted on 2 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

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

Jagot, S., Sabin, N., Le Cam, A., Bugeon, J., Rescan, P.Y., Gabillard, J.C.

LPGP, INRA, 35000 Rennes, France

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 hyperplastic growth.

For the first time we showed that myogenic precursors proliferated in hyperplastic 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 hyperplastic muscle.



GIA2018

5th INTERNATIONAL SYMPOSIUM ON GENOMICS IN AQUACULTURE

Book of Abstracts

Editors: Jorge M.O. Fernandes, Elena Sarropoulou, Kiron Viswanath, Deborah Power and John Liu



Albufeira (Portugal), 21-23 March 2018

Editors: Jorge M.O. Fernandes, Elena Sarropoulou, Kiron Viswanath, Deborah Power and John Liu

GIA2018

**5th INTERNATIONAL SYMPOSIUM ON GENOMICS IN
AQUACULTURE**

Book of Abstracts

Albufeira (Portugal), 21-23 March 2018