Characterization of neuroendocrine signalling systems during gametogenesis in the Pacific oyster, *Crassostrea gigas*

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Despite the major commercial and ecological importance of some species, mollusks remain like a majority of Lophotrochozoan species, an under-described phylogenetic group with respects to the functional knowledge of their large genomic and transcriptomic resources.

The Pacific oyster, Crassostrea gigas represents one of the most important aquaculture shellfish resource worldwide. Thus, a better understanding of the molecular basis of the neuroendocrine regulation of its physiological processes may be relevant to the aquaculture industry and could ultimately provide substantial economic benefit.

In addition to controlling a majority of biological processes, the neuroendocrine system also plays a crucial role in the elaboration of adapted physiological and behavioural responses to environmental pressures. As reproduction represents a major concern in aquaculture and is highly influenced by environmental and internal parameters, we investigated the molecular bases of this complex physiological process.

In this study, a genome wide expression profiling of visceral ganglia at different stages of gametogenesis was conducted using quantitative RNAseq data. Statistical analysis using student's t tests ($p<0.01$ with adjusted Bonferroni's correction) identified, among 37518 transcripts, 425 differentially expressed genes distributed into 6 clusters corresponding to distinct expression patterns. Among them, 35 genes encoding G-protein coupled receptors (GPCR) (putative serotonin, CCAP receptors…) and 13 genes encoding neuropeptide precursors (GnRH, Calcitonin, ELH, Allatostatin C–like and allatotropin-like …) were identified highlighting the involvement of these signalling system in the regulation of reproduction and associated physiological processes in oyster.

Image

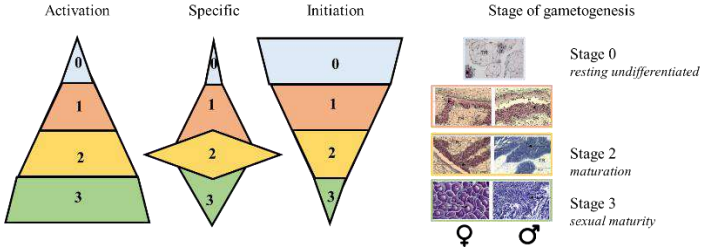


Figure 1 :Schema of the different patterns of possible expression of genes involved in gametogenesis in oysters according to their stage and sex

Recent Publications (minimum 5)

1 Realis-Doyelle E., Schwartz J., Cabau C., Klopp C., Dubos M.P., Rivière G., Favrel P. 2019 Characterization of neuroendocrine signalling systems during gametogenesis in the Pacific oyster, Crassostrea gigas. Scientific report in press

2 Pasquet A., Réalis-Doyelle E., Fontaine P., Teletchea F.2019 What can we learn by studying dead fish larvae in a climate change context? Aquaculture Research. *accepted in minor revision*

3 Schwartz J., Realis-Doyelle E., Cabau C., Klopp C., Dubos M.P., Rivière G., Favrel P. 2019 Caracterisation of evolutionary conserved calcitonin signaliting system a locotrophozaan , the pacific oyster. Scientific report in press

4 Réalis-Doyelle E., Gisbert E., Alcaraz C., Teletchea F., Pasquet A. 2017. Temperature affects growth allometry and developmental patterns of in the brown trout (Salmo trutta) fry: a multi trait approach. Canadian Journal of Fisheries and Aquatic Sciences, cjfas-2017-0037.R2, IF : 2,46 P.CAJAR

5 Réalis-Doyelle E., Pasquet A., Fontaine P., Teletchea F. 2017. Effects of temperature on the survival rate and development during the endogenous feeding period in the common carp (Cyprinus carpio). Hydrobiologia doi: 10.1007/s10750-017-3324-y, IF : 2,06 P.HYDRO

6 Réalis-Doyelle E., Pasquet A., De Charleroy D., Fontaine P., Teletchea F. 2016. Effect of temperatures on the survival, the development and the body condition of a cold stenothermal fish, brown trout (Salmo trutta). PLOS ONE 11(5): e0155487. doi: 10.1371/journal.pone.0155487, IF: 3,54 P.PLOS One

7 Réalis-Doyelle E., Pasquet A., Fontaine P., Teletchea F. 2015. Etude de l'ossification durant la phase de nutrition endogène chez la truite Salmo trutta. Séminaire 2015 de l'Ecole Doctorale RP2E « Ingénierie des Ressources, Procédés, Produits et Environnement » ISBN 978-2-9541008-3-8

Photograph



Biography

Dr Emilie Réalis-Doyelle has her expertise in impact of anthropogenic factors on the variation of the life traits of unconventional organisms. For this reason, her favors a multidisciplinary approach (Morpho-anatomy, bioenergetics, enzymatics, genetics) to different scales (molecular, individual, population) in order to evaluate their impacts on target populations during their development. Currently, her work in functional genomics with as model the reproduction of oyster C. gigas. aims to understand the control and evolution of neuropeptides and RCPG in order to improve the reproductive capacity and regulation of C. gigas.

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Notes/Comments: