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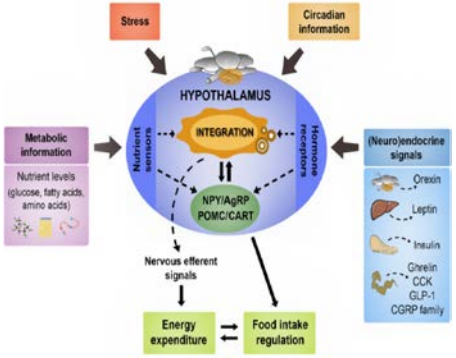
Date doctoral degree: 18/12/2017

Orientation: Sustainable Use of Marine Resources
Specialization Area: Aquaculture
Research Area: 2.8 Marine ecology and cultures



Modificado Delgado et al., 2017

PhD project: **Advances in the study of glucosensing systems in rainbow trout and their involvement in the control of food intake**

Supervisors: Dr. José Luis Soengas Fernández (University of Vigo)

Summary: Studies performed with rainbow trout have demonstrated the activation/inhibition of GK-based central (hypothalamus and hindbrain) and peripheral (liver and Brockmann bodies) glucosensor systems by the increase/decrease of glucose levels. This results in changes in the production of orexigenic (NPY/AgRP) and anorexigenic factors (POMC/CART), with the subsequent inhibition/stimulation of food intake. To date little is known regarding the presence-absence of functional alternative glucosensor systems, such as those dependent on LXR, SGLT-1, mitochondrial activity and alpha-gustducin, and their involvement in the control of food intake and the stress-related anorectic effects. In adition, the impact of the changes in glucose levels on integratory systems, such as AMPK or sirtuins, is unknown, but also the intracellular signaling pathways involved as well. Accordingly, the main goals of the present research schedule are:
1. Characterization in rainbow trout of the presence of alternative glucosensor systems based on GK in central (hypothalamus and hindbrain) and peripheral (liver and Brockmann bodies) tissues. 2. *In vivo* and *in vitro* evaluation of the response of such sensor systems to induced- increases/decreases of circulating glucose levels. 3. To test in such areas the presence of integratory systems based on AMPK, mTOR, Akt, sirtuins or Fox01, and the intracellular pathways involved in their activation. In parallel to the activation/inhibition of the different glucosensor systems, the activation/inhibition of such pathways will be also evaluated. 4. Characterization of the interaction between the activity of glucosensor systems and food intake regulation. 5. Demostrate the presence of ANLS (astrocyte-neuron lactate shuttle) in brain of rainbow trout, based on lactate metabolism being altered by changes in glucose levels. 6. Evaluate the response of glucosensor systems to different stress conditions. 7. Immunohistochemically localize of the presence of glucosensing markers in central tissues such as hypothalamus and preoptic area. 8. To localize by *in situ* hybridization in trout brain the expression of the glucosensing markers related to metabolic control of food intake and their possible co-localization with food intake-related neuropeptides. 9. Characterization of the possible presence of different glucosensor systems in telencephalon. 10. To evaluate the expression of the binding protein carbohydrate response element (ChREBP) in different brain regions (hypothalamus, telencephalon and hindbrain).