

Influence of AVT and cortisol treatment on stress and thyroid pathways in the gilthead sea bream (*Sparus aurata*)



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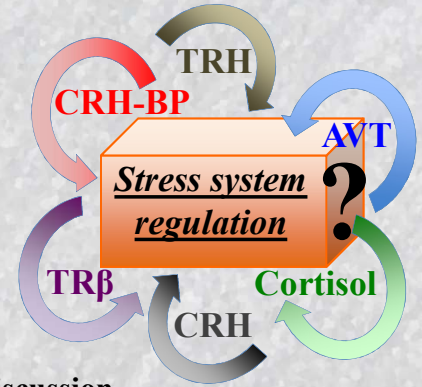
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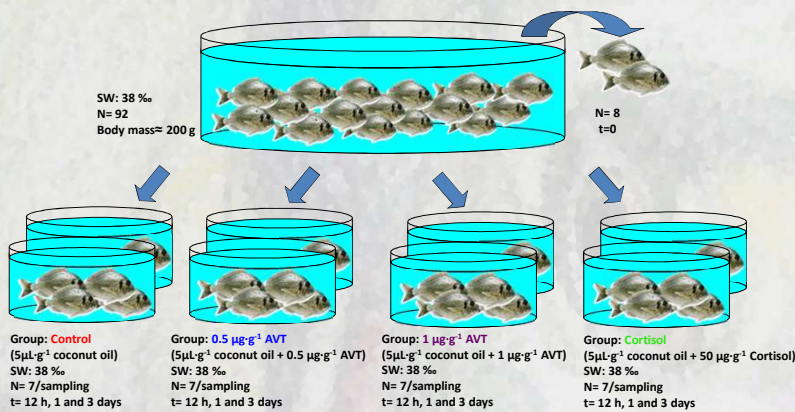
1. Introduction

Cortisol, the main corticosteroid in teleosts, is the final step on the hypothalamic-pituitary-interrenal axis, and its functions are related to intermediary metabolism, osmotic and ionic regulation, growth, stress and immunity. In turn, the vasotocinergic, homologous to the mammalian vasopressinergic pathways, and thyroid systems have also an important role in several physiological processes in which cortisol plays a role (e.g. osmoregulation, metabolism or stress). The aim of this study was to evaluate the possible interaction between different endocrine axes (vasotocinergic, stress and thyroid pathways) in the gilthead sea bream (*Sparus aurata*), through assessing the effects of exogenous arginine vasotocin (AVT) and cortisol administration.

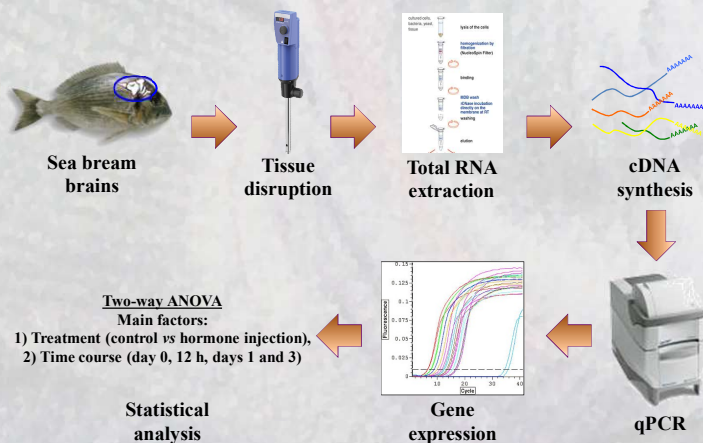


2. Material and Methods

2.1. Experimental protocol and sampling

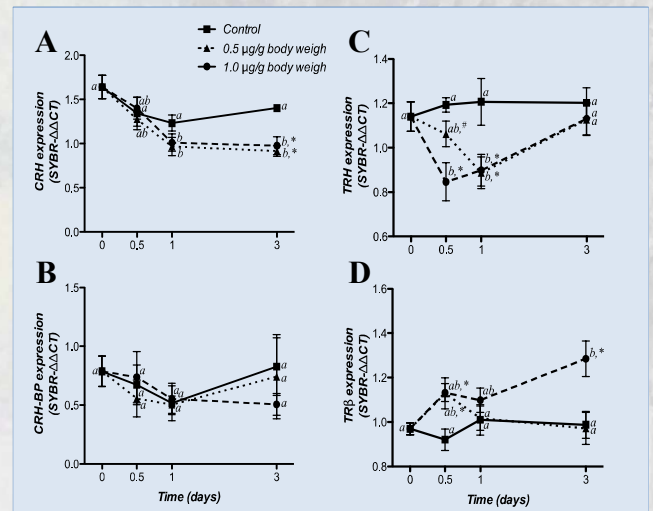


2.2. Gene expression

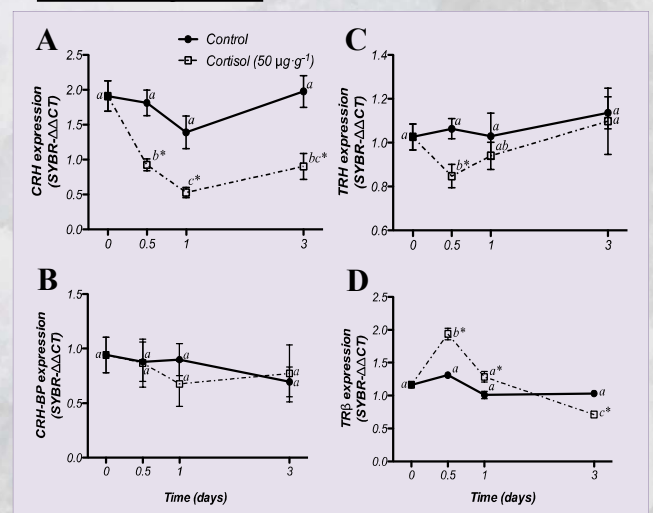


3. Results and Discussion

3.1. AVT administration



3.2. Cortisol injection



4. Conclusions

In summary, we have demonstrated, by using an *in vivo* approach in the gilthead sea bream as a biological model, that both stress and thyroid systems are centrally and independently regulated by two different hormones produced at hypothalamic (AVT) and interrenal (cortisol) levels.

5. Acknowledgments

Experiments have been carried out at the *Campus de Excelencia Internacional del Mar (CEI-MAR)* facilities from the University of Cádiz and ICMAN-CSIC. This study was funded by projects AGL2013-48835-C2-1-R from Ministerio de Ciencia e Innovación (Spain) to JMM.

Both hormones produced a significant decrease in hypothalamic corticotrophin releasing hormone (CRH) gene expression, while CRH-binding protein (CRH-BP) mRNA levels did not alter its values in any of the treated specimens during the time that the experiment lasted. Moreover, both AVT and cortisol injection decreased significantly thyrotropin-releasing hormone (TRH) gene expression from 12 h post-injection, whereas an up-regulation in thyroid receptor β (TR β) mRNA was observed just 12 h after hormonal administration.