

**CEPHALIC SECRETION OF *Arapaima gigas*: SEX STEROIDS, PEPTIDES AND PROTEINS SUGGEST ROLES IN CHEMICAL COMMUNICATION AND PARENTAL CARE.**

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**Introduction**

Adults of the Amazon fish *Arapaima gigas* secrete a fluid from the cephalic canals of the lateral line system, whose biological role(s) along the reproductive cycle are unclear. Up-to-date, the biochemical composition of this fluid has been poorly investigated in *A. gigas* as well as other teleosts. Hence, this study aimed to (1) investigate the potential pheromone release through this cephalic fluid, and (2) to characterise its proteome and peptidome by comparing males and females during and outside the parental care phase.

**Methods**

Sex steroids were investigated in 18 adult couples individually stocked in 330 m<sup>2</sup> earth ponds, which were sampled monthly from Jan to July 2015 in DNOCS research station, Pentecoste-CE, Brazil. Sex steroid concentrations were monitored in blood plasma and cephalic secretion from males (T and 11-KT) and females (T and E<sub>2</sub>) using ELISA and RIA methods validated for *A. gigas*. Proteome and peptidome investigations on the cephalic fluid compared parental (n=2) and non-parental (n = 10) males and females using capillary electrophoresis coupled to mass spectrometry (CE-MS) and GeLC-MS/MS analyses.

**Results and Discussion**

Significant correlations between blood plasma and cephalic secretion levels of 11-KT in males and T in females were observed throughout the study, suggesting a possible novel route of pheromone release in teleosts. Peptidomic analyses revealed 28 peptides were significantly different between males (M) and parental males (PM), 126 between females (F) and parental females (PF), 51 between M and F and 9 between PM and PF. Such results indicate marked physiological changes in the cephalic secretion of parental fish at the peptide level. Finally, 422 proteins were identified with gene ontology analyses revealing 28 secreted extracellular proteins. These included 2 hormones (*prolactin* and *stanniocalcin*) and 12 proteins associated with immunological processes (*serotransferrin*, *α-1-antitrypsin homolog*, *apolipoprotein A-I*, and others). As found in parental fish, such proteins could be potentially beneficial to developing offspring during parental care phase.

**Conclusion**

This study enhances information on the biochemistry of the lateral line system in arapaima, opening research possibilities in fish physiology and chemical communication. Data from this study highlight the complex role that the cephalic secretion of *A. gigas* may play not only on the adults but also on the development of the fingerlings.