Role of the two tilapia prolactin (PRL-1 and PRL-2) during adaptation to saltwater : studies of plasma and pituitary levels using specific radioimmunoassays

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ROLE OF THE TWO TILAPIA PROLACTIN (PRL-I and PRL-II) DURING ADAPTATION TO SALTWATER : STUDIES OF PLASMA AND PITUITARY LEVELS USING SPECIFIC RADIOIMMUNOASSAYS

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In order to analyze plasma and pituitary levels of the two prolactins (PRL-I, 188 aa and PRL-II, 177 aa) in Tilapia (*Oreochromis niloticus*), 2 specific radioimmunoassays (RIA) have been developped. Cross-reactivity between the hormones appeared to be negligeable (maximum 0.04%) and these assays showed a high sensitivity (0.05 ng/ml for both PRL-I and PRL-II RIA). Using these assays, plasma and pituitary levels were studied during transfer from freshwater to brackish water (20 g/l salinity). Adaptation of the fish to hyperosmotic environment was followed by measuring plasma chloride (and sodium) levels for 2 weeks after change of salinity. This parameter indicated that 72 hours after transfer and later on, fish have adpted their hydromineral balance to high salinity. Within 6 hours after transfer, both PRL-I and PRL-II plasma levels decreased and these levels stayed significantly lower than freshwater (FW) control until the end of the experiment. PRL-I was no more detectable after 7 days in brackish water whereas PRL-II showed low but measurable levels (0.5 ng/ml) after 24 hours in brackish water and later on. Pituitary PRL-I content showed a continous steady decrease from 12 hours until the end of the experiment. Pituitary PRL-II content showed a different pattern with no significant change until 7 days and after, levels in brackish water were significantly lower than FW control.

Differential changes in both plasma and pituitary levels between PRL-I and PRL-II after transfer to brackish water was further confirm by analyzing the yield PRL-II/PRL-I ratio. These analysis clearly indicates that control secretion of the two PRL is different during hyperosmotic adaptation, PRL-II showing significant secretion in brackish water adapted fish whereas PRL-I secretion was abolished. Further studies confirmed such different osmoregulatory role between PRL-I and PRL-II : repeated injections of these hormones in saltwater adapted tilapia showed that PRL-I displayed a significantly higher sodium retaining effects than PRL-II when tested at the same concentration.

Beyond these differential osmoregulatory effects, our results also suggest possible additionnal role of PRL-II in hyperosmotic environment.