Development of a protein binding assay for teleost IGF: Relationships between GH and IGF in the serum of rainbow trout (Oncorhynchus mykiss)

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Abstracts

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DEVELOPMENT OF A PROTEIN BINDING ASSAY FOR TELEOST IGF: RELATIONSHIPS BETWEEN GH AND IGF IN THE SERUM OF RAINBOW TROUT (*Oncorhynchus mykiss*).

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In rainbow trout, we have recently described the presence of a serum protein (tIGFBP) which specificaly binds human IGF. Using a tIGFBP preparation, we have developed a binding assay to measure the plasma IGF level in different teleost species.
Before the assay, the binding protein of serum or tissue extracts was discarded using SP Sephadex G-25 in acidic conditions. After this treatment, contamination of the IGF fraction by IGFBP estimated by binding assay, was around 5 %, and was not detectable by a western ligand blot technic.
Using human IGF1 as standard and labelled hormone, sensitivity of the assay was 0.15 ng/ml (ED90) with an ED50 of about 1.3 ng/ml. Increasing concentrations of hIGF1 added in trout serum were fully recovered by the assay. hIGF2 crossreaction was partial and no significant displacement was observed with Insulin from different species or with other hormones. Inhibition curves obtained with serum IGF fractions from teleost and mammals are parallel to the standard curve which suggests that the binding sites of IFG are well concerved during evolution. No significant displacement was obtained with extracts from tissues such as spleen, liver, kidney, brain and muscle.
Using this tIGF binding assay, IGF was measured in parallel with GH in serum from young trout sampled every 1.5 hour during one day. The daily profiles for both hormones, which appear pulsatile, are similar but not completely synchronous. Significant correlation was observed between GH and IGF levels but changes in IGF were delayed 1.5 hour. Analogous observations were obtained in catheterized adult trout. Although serum GH levels differ greatly between fish, less variability is found in IGF. This suggests that IGF secretion depends on the level of serum GH and that the receptivity to GH varies between fish. To verify this hypothesis, trout were submitted to starvation or to bovine GH treatment for four weeks. In starved fish, in which serum GH levels increased in parallel to a decrease in the number of liver GH receptors, the serum IGF level was significantly lower than in fed fish. In bGH injected fish, the serum IGF level was significantly higher than in non-injected fish.
These results are in accordance, with those obtained in mammals in which liver IGF1 secretion is controlled by GH and modulated by the nutritional status.