GROWTH HORMONE PROFILES AND DEVELOPMENT OF SOMATOTROPHS IN ATLANTIC HALIBUT LARVAE

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Introduction

The Atlantic halibut is the largest flatfish species, and as other flatfish, has a complicated larval development. The pelagic larvae hatch after about two weeks and feeding starts six weeks later. After three to four months, they start to undergo metamorphosis. Following major changes in body shape, including the

migration of the left to the right side, the larvae settle as bottom dwelling. In Atlantic halibut aquaculture, the larval rearing is a critical rearing stage, with high incidence of mortality and abnormal development.

Growth hormone in teleost fishes is known to participate in the regulation of several important physiological processes including metabolism, growth, appetite, and osmoregulation. It is therefore likely that the hormone may be important for larval growth and development.

Therefore, this study was carried out in order to elucidate the growth hormone (GH) endocrinology of halibut larvae, by measuring GH tissue content as well as the histology of the pituitary somatotrophs

Materials and Methods

The study was carried out with unfertilized eggs and larvae from hatching through metamorphosis (from 22 to 859 day-degrees (D°)), collected at the halibut hatchery of Fiskey Ltd, Northern Iceland, over two consecutive years.

In order to study GH profiles during early development, a homologous radioimmunoassay was established. GH was isolated from adult halibut pituitaries collected at Fiskey Ltd, using methods modified from Johnson *et al* (1997). In the radioimmunoassay, this GH was used for standards and iodination, together with specific antibodies raised in rabbits, courtesy of Dr. P. Swanson.

For the immunohistochemistry of GH-producing somatotrophs in the pituitaries, anti-halibut antibodies were raised in rabbits and validated.

Results and Conclusions

Tissue GH analysis revealed that GH is detectable in unfertilized eggs. In developing larvae, tissue GH content per body weight increased during development from hatching to metamorphosis. The earliest stage at which GH was localized in the somatotrophs by immunohistochemistry, was at the age of 187 D°.

The present study demonstrates that there appears to be a maternal source of growth hormone in halibut eggs, similar to what has been demonstrated for thyroid hormones in eggs of different teleost species (Kobuke *et al* 1987). The study further demonstrates that endogenous production of growth hormone is initiated early in larval development, during the yolk-sack stage, prior to first feeding. The study establishes that GH can play a regulatory role during early development of the Atlantic halibut

References

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