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ROLE OF GROWTH HORMONE IN THE ADAPTATION TO SEA WATER OF THE SEDENTARY BROWN TROUT (Salmo trutta).

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The first part of the study investigates the ability of ovine growth hormone (oGH) to enhance the hypo-osmoregulatory and growth performance of a nonsmoltifying stock of the brown trout (Salmo trutta) after exposure to sea water (SW). Three groups of juvenile fish were either intraperitoneally implanted with cholesterol pellet (sham) or with a cholesterol pellet containing 250μg oGH (treated) or not implanted (control). While still in fresh water, gill Na+/K+-ATPase activity of the oGH-treated group was four times higher than that of sham and control groups. Transfer to sea water (SW) resulted in drastic increases in plasma electrolyte levels of the sham and control groups, whereas in the oGH-treated group plasma electrolyte concentrations reached steady SW values within two days Subsequent regulation of plasma electrolyte parameters to steady-state levels was less effective in the non-treated groups than in the oGH-treated group. Further increases in gill Na+/K+-ATPase activity were observed in the oGH-treated group after SW exposure, while in the sham and control, a lag time of about seven days was needed before gill ATPase activity started to increase. Additionally, by the end of the experiment oGH-treated fish were significantly larger than non-treated ones. The data indicate that juvenile nonsmoltifying brown trout, after oGH administration, responds to SW exposure like a fully smolted smoltifying salmonid.

The second part of the study examines the time course of changes in plasma GH levels and free binding sites and affinity of the organs involved in osmoregulation in juvenile brown trout kept in FW or transferred to SW. Scatchard analysis of GH binding to gill membranes of trout transferred to SW revealed significant decreases in the number of free binding sites at 7 and 14 days after transfer while that of trout kept in FW remained unchanged. Binding affinity of the gill GH receptor did not show any significant changes through out the length of the experiment. Reduction in free binding sites in the SW-transferred trout indicates occupation of the gill GH receptor by GH during the course of SW adaptation which may point to a direct role by GH on gill physiology during hypoosmoregulation. Scatchard analyses of GH binding to GH receptors in other osmoregulatory organs are in progress.