

Abstract

Thyroid hormones play an important role on growth and early development of vertebrates including fish. The green catfish (*Mystus nemurus*) was investigated for the effect of thyroid hormones on hatching, survival, and metabolism. Activity of two metabolic key enzymes, glucose-6-phosphate dehydrogenase (G6PDH) and lactate dehydrogenase (LDH) were measured. Intercommunication between thyroid hormone and retinoic acid was observed via an expression of transglutaminase (TG). In addition, the hormone action mediated via thyroid hormone receptor (TR) was also determined through the expression of the receptor.

Thyroid hormones, both T_4 and T_3 , showed no effect on hatch ability of the catfish. Effect of the short-term exposure to T_3 on survival of the catfish varied from age to age of the larvae. Significant increase of the survival was detected in the 15-, 30- and 45-days fish. Inverse correlation of thyroid hormone concentration and age of the fish was detected with the long-term treatment.

The G6PDH and LDH expression were affected by the thyroid hormone action. Immediate response occurred in most ages of the larvae at particular concentrations of T_3 . Decrease of the activity of both enzymes was detected with the long-term T_3 treatment. Lengthening the larvae viability by redirection the glucose breakdown by thyroid hormone to the more effective pathway of energy production was suggested. An alteration of the activity of TG and the expression of its mRNA demonstrated a possible effect of thyroid hormone on as well as intercommunication with the retinoid pathway.

Finally, partial fragments of thyroid hormone receptor α -isoform, G6PDH, TG and deiodinaseIII were successfully cloned and their sequences were analyzed. The effect of T_3 action on expression of the genes was determined and discussed.