



Developmental changes of thyroid hormones in sheepshead minnow, *Cyprinodon variegatus*



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INTRODUCTION

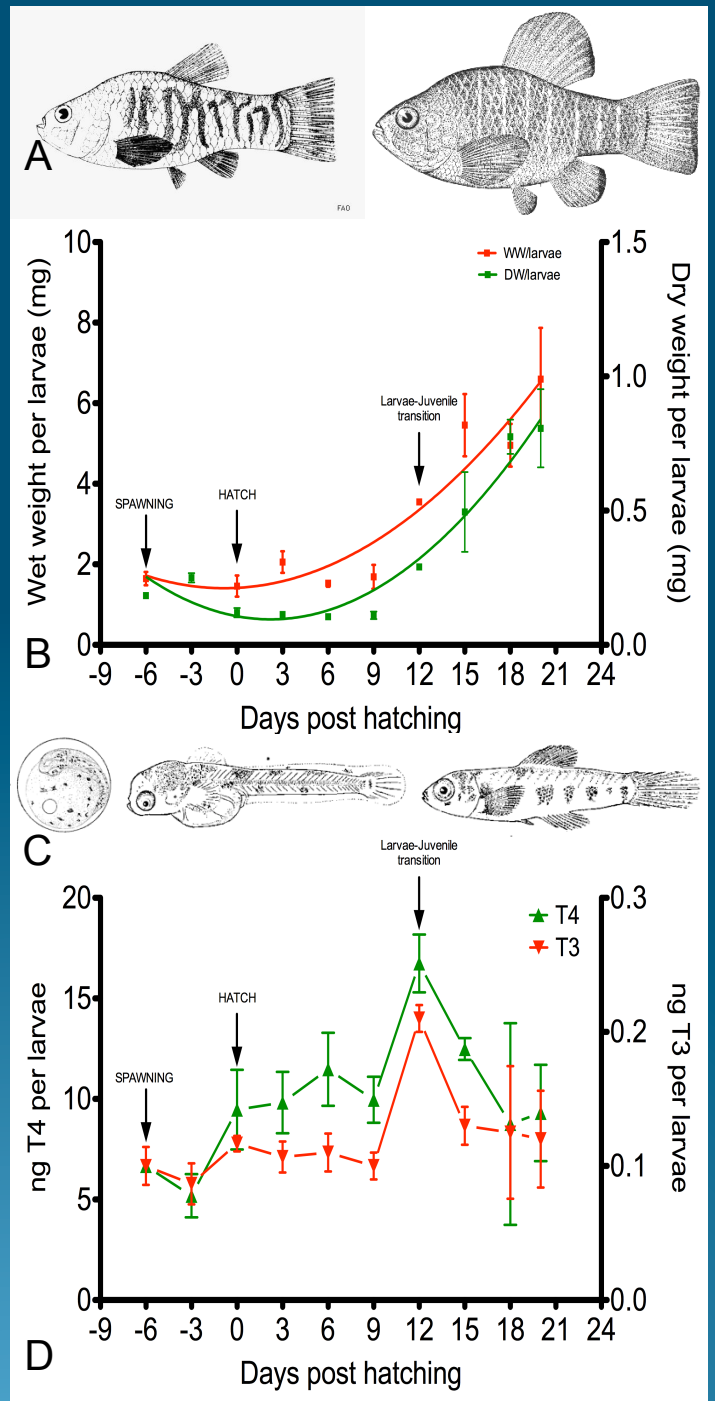
The sheepshead minnow is widely used in ecotoxicological studies and such investigations have begun to focus on potential disruption of the thyroid axis. However, normal levels of thyroxin (T_4) and 3,5,3'-triiodothyronine (T_3) and their developmental patterns are unknown. This study set out to determine the profiles of whole-body thyroxin (T_4) and 3,5,3'-triiodothyronine (T_3) levels during the development of sheepshead minnow from embryo to juvenile and adults.

MATERIALS AND METHODS

To provide these baseline data, radioimmunoassays were developed and validated for analysis of T_4 and T_3 after extraction from whole fish.

RESULTS AND DISCUSSION

- ✓ Adult female fish showed consistently higher thyroid hormone levels (1.5 fold more T_4 and 2 fold more T_3) than adult male fish.
- ✓ Analysis of thyroid hormones showed a significant rise in both T_4 and T_3 during the pre-hatch period, indicating embryonic production of both thyroid hormones.
- ✓ After hatching, whole body content of thyroid hormones significantly increased in early development, peaking at 12 days post-hatch when T_4 reached 17.4 ± 1.35 ng/larvae and T_3 reached 0.21 ± 0.01 ng/larvae.
- ✓ Thyroid hormones subsequently declined to a plateau in later development with approximately 10 ng/larvae T_4 and 0.10 ng/larvae T_3 .
- ✓ These data suggest a prominent role for thyroid hormones in early developmental process when we predict that the ecotoxicological effects of thyroid disruptors will be most significant.
- ✓ This study establishes a baseline for thyroid hormones in sheepshead minnows, which will be vital for the understanding of thyroid hormone functions and in future studies of thyroid toxicants in this species.



A: Adult female and male Sheepshead minnow
B: Mean weight of Sheepshead minnow throughout development
C: Developmental stages of Sheepshead minnows: Egg 48 hours after fertilization, newly hatched fish, juvenile fish
D: Whole body T_4 and T_3 content during development of Sheepshead minnows

