

EARLY-LIFE EXPOSURE TO ETONOGESTREL IN ZEBRAFISH: BEHAVIORAL AND ENDOCRINE EFFECTS

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INTRODUCTION: Progestin use as a contraceptive method has grown exponentially in recent decades, contributing to its disposal in the environment. These synthetic hormones can affect non-target organisms, such as fish. Etonogestrel (ETO), a synthetic progestin, is a testosterone derivate widely used as a contraceptive treatment. With the increasing use of contraceptive methods, many progestins, such as ETO, have been detected in surface water. The concentrations in the environment are low, which can cause unexpected responses from those observed in therapeutic doses. This type of exposure can cause minimal immediate effects, however, in the long term, these effects can modulate physiological or behavioral changes.

OBJECTIVES: In this study, we aimed to evaluate the possible effects of embryonic and larval exposure to ETO on larval behavior and the endocrine stress axis.

MATERIALS AND METHODS: Zebrafish embryos and larvae were exposed from 0 to 5 days post-fertilization to 3.2 ng L⁻¹ of ETO, a concentration already reported in the environment. Untreated larvae were exposed to clean water and kept in the same conditions. Behavioral analyses were performed in larvae in the sequence, at the beginning of the sixth dpf, using Open Field and Light-Dark Tests. After tests, larvae were euthanized with ice cold water and used for evaluating changes in whole-body cortisol concentration.

RESULTS AND CONCLUSIONS: Early-life exposure to ETO impaired zebrafish larvae's behavior, causing anxiety- and fear-like behaviors. In the OFT, the larvae exposed to ETO entry and spend less time in the central area, suggesting an anxiety-like behavior, while spending more time in the light zone in the LDT, a behavior suggestive of fear. In addition, the ETO exposure also increased whole-body cortisol levels. As of present day, this is the first study to elucidate the effects of etonogestrel exposure in zebrafish's early life and indicates its potential to disrupt fish's behavior and endocrine response.