“Fin”-tastic Fish: Efficacy of Nonsteroidal Aromatase Inhibitors on the Sex Differentiation and Gonadal Development of Female Zebrafish

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Early fish maturation is an issue for aquaculture farms and fisheries. Early maturation is determined when a particular sex matures earlier, affecting fish growth and filet quality. To address this, researchers have begun exploring environmentally responsible and sustainable ways of creating neomales (genetic females sex-changed to males) that can be used to produce all-female populations. These all-female populations reach sexual maturity later, allowing for more time to grow physically larger. Aromatase inhibitors have the potential to convert sexually mature females into neomales by preventing testosterone from converting to estradiol. While using steroids or steroidal aromatase inhibitors for creating neomales is largely restricted in the United States, nonsteroidal aromatase inhibitors have been proposed as an alternative solution. Casper transgenic zebrafish with two specific reporter expression systems that produce green fluorescence protein and red fluorescence protein in the gonadal region. Green fluorescence protein is detected in the ovaries, while red fluorescence is detected in the testes. Casper transgenic zebrafish were used to study the efficacy of three orally administered nonsteroidal aromatase inhibitors - Letrozole, Anastrozole, and Fadrozole - to sexually mature females. Results are measured by observing gonadal development and changes of green fluorescent ovaries to red fluorescent testes and sex-specific gene expression. The results of this experiment will aid in increasing the sustainability of aquaculture.

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