

STEROID AROMATASE, 2-HYDROXYLASE AND COMT ACTIVITY IN GONADOTROPIC CELLS OF THE AFRICAN CATFISH, *CLARIAS GARIEPINUS*

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In many teleost species, including the African catfish, gonadotropin (GTH) secretion is subject to a gonadotropin-releasing hormone (GnRH) stimulation (1). Besides this GnRH stimulation a dopaminergic inhibition has been demonstrated. Dopamine acts indirectly by blocking the GnRH-induced GTH release (1). Sex steroids also affect the activity of the GTH cells: the GTH release is under negative steroid feedback regulation (2,3). In catfish only aromatizable androgens were able to reduce the increased GTH level following castration (de Leeuw *et al.*, in prep.). So it is likely that a conversion of androgens into estrogens is involved in the negative feedback regulation of GTH release. In order to find a link between the dopaminergic inhibition of GTH release and the steroid negative feedback, a hypothesis was put forward, partly based on data and suggestions from literature (4, 5,6).

According to this hypothesis sex steroids (in the case of androgens) are aromatized to estrogens, which are subsequently hydroxylated to catecholestrogens. Catecholestrogens and dopamine are both methylated by catechol-O-methyltransferase (COMT). However, catecholestrogens being a superior substrate for COMT cause a decrease in dopamine methylation leading to an increase in dopamine concentration. This in turn inhibits the GnRH-induced GTH release (summarized in Fig. 1). The aim of the present study was to investigate the presence of aromatase, 2-hydroxylase and COMT activity in the gonadotropic cells.

To demonstrate aromatase purified GTH cells were incubated with ³H-androstenedione. The culture medium was analysed by TLC and the reaction product of aromatase estrone was finally identified by recrystallisation. The presence of both 2-hydroxylase and COMT was tested in a single incubation with estrone as substrate for 2-hydroxylase and ³H-S-adenosylmethionine (³H-SAM) as ³H-methyl donor to allow the COMT reaction to occur. The incubation medium was analysed for the presence of ³H-methoxyestrone. After an 18 hr incubation ³H-estrone and ³H-methoxyestrone resp. could be detected.

These results prove the presence of aromatase, 2-hydroxylase and COMT within the GTH cells of the African catfish, pointing to the GTH cell as a possible site of action of the sex steroid negative feedback.

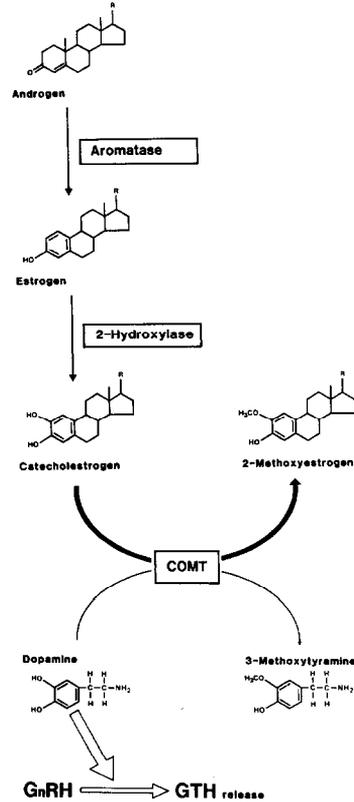


Fig. 1. Schematic representation of the interaction between sex steroids and dopamine in the regulation of GTH release.

References

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