

琉球大学学術リポジトリ

雌性先熟魚ヤイトハタ *Epinephelus malabaricus*
の性分化に関する生理学的研究：
魚類における生殖腺の性分化の多様性と性的可塑性

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論文要旨

論文題目

Physiological studies on the sex differentiation in the protogynous hermaphrodite Malabar grouper, *Epinephelus malabaricus*: Diversity and plasticity of gonadal sex differentiation in fishes

(雌性先熟魚ヤイトハタ *Epinephelus malabaricus* の性分化に関する生理学的研究：
魚類における生殖腺の性分化の多様性と性的可塑性)

Fishes show diversity and plasticity of sexuality. However, there is little information on sex differentiation in hermaphrodite fishes. To clarify gonadal sex differentiation in the protogynous hermaphrodite Malabar grouper, *Epinephelus malabaricus*, the process of gonadal sex differentiation was followed histologically for three years from hatching in chapter II. The observations demonstrate that morphological changes associated with ovarian differentiation in the Malabar grouper begin at approximately 50 DPH and that in all individuals the gonads directly differentiate into ovaries. Next, in chapter III, the presence of three steroidogenic enzymes was followed immunohistochemically in the gonads during ovarian differentiation to understand the role of sex steroid hormones on gonadal sex differentiation in this fish. The results suggest that endogenous estrogen is involved in ovarian differentiation. In addition, androgen-producing cells which may function during sex change, are already differentiated in the ovarian tunica at the end of sexual differentiation. In chapter IV, the expression patterns of gonadotropin mRNA and protein in the fish pituitary throughout gonadal sex differentiation were monitored to clarify the roles of pituitary gonadotropins in this process. From the results, it seems unlikely that gonadotropins have major involvement in gonadal sex differentiation in the Malabar grouper. Finally in chapter V, to clarify sexual plasticity the potential for precocious sex change to male, in immature female protogynous hermaphrodite Malabar grouper, the effect of 17α -methyltestosterone (MT) and aromatase inhibitor (AI) administration on precocious sex change from the immature female to male at different ages (0-3 years old) was investigated. The findings support the view that germ cells in the immature ovary of this grouper can differentiate into male germ cells under the influence of androgen. However, androgen-induced precocious sex change from the immature female to male is not permanent; the gonads reverse again from the testes to the ovaries after withdrawal of androgen treatment, because of lower sensitivity to exogenous androgen in endogenous steroidogenesis. In conclusion, this study demonstrated that hermaphrodite fishes show a unique and rich diversity in the processes of gonadal sex differentiation. The protogynous Malabar grouper shows sexual plasticity in germ cells throughout its life cycle, but sensitivity of endogenous steroidogenesis to exogenous androgen fluctuates based on life stage.

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