Studies on the Tilapia (Oreochromis mossambicus) Hepatocyte Nuclear Factor-1 and -3 in the Regulation of Reproductive Sy

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ABSTRACT

Tilapia is the most general aguacultivating fish in the fresh water and has characteristics of fast growing and well disease resistance. Thus tilapia is an important animal model for relative aquaculture researches. Hepatocyte nuclear factors (HNFs) are liver-enriched transcription factors, which can activate the expressions of tissue-specific, growth and development related genes. The expression of HNFs was detected in the gonads of tilapia previously, and which could be regulated by steroid hormones. Therefore, the reproductive system in tilapia could exist a different endocrine pathway other than the traditional one. To identify this hypothesis and to find out the optimal steroid, concentration and culture period, gonads from tilapia were cultured in vitro in a time course manner (0, 6, 12, 18, 24, 32 and 36 hrs) with different kinds (?-estradiol and hydrocortisone) or concentrations (0, 0.1, 1, 10, 100 and 1000 nM) of steroid hormones, which were all performed after a 6-hr preculture without hormone supplement. The total RNA isolated from previous different groups was analyzed by RT-PCR and semi-quantified with an internal control of ?-actin. Though the expression of HNF-1? and -1? could not be induced by ?-estradiol and hydrocortisone, the expression of HNF-3? could be induced by these two steroids, and showed a dose-dependent manner. Beta-estradiol exerted a better induction result, and the optimal concentration and incubation period were 10 nM and 12 hours, respectively. The detection of HNF proteins in 1-, 2-week and one month old juvenile tilapia by immunohistochemistry showed that HNFs were found mainly in liver and epithelial cells of the digestive organs. According to the above results, the expression of HNF-3 β in the gonads of tilapia can be regulated by the steroid hormone and could be involved in the development and gametogenesis of gonads in tilapia. Whether the growth and development of juvenile tilapia is affected by HNFs still needs further investigation.

Keywords : tilapia ; gonad ; hepatocyte nuclear factors (HNFs) ; steroid hormones

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