ROLE OF KISSPEPTIN ON GONADAL MATURATION OF STRIPED MURREL, *CHANNA STRIATUS*

Francis T., Rajagopalsamy C.B.T., Jeyakumar N., Venkatasamy M. and Archana Devi C.

Department of Fisheries Biology& Resource Management, Fisheries College and Research Institute, Thoothukudi, 628008, India.
Fax: 0461 2340574, Email: t_franciz2000@yahoo.com

Introduction:

The use of kisspeptin for gonadal maturation and breeding of fish is more important in aquaculture industry. To make an alternative of other inducing agents, standardization of protocol for the use of kisspeptin is very important. Kisspeptin, the peptide products of the kiss- I gene were identified in 2001 as natural ligands orphan G protein coupled receptor, GPRSH. They include, among others, metastin and kisspeptin – 10. In the last two years, kisspeptin have been demonstrated as very potent stimulators of the gonadotropic axis in a number of species and through different routes of administration. In addition, the Kiss – 1 /GPR 4 system has been proven as an essential gatekeeper of GnRH neurons involved in their activation at puperty and their regulation by gonadal steroids. The role of kisspeptin on gonadal maturation of Striped Murrel, *Channa Striatus* was carried out in the present study.

Methods:

Striped murrel, *Channa striatus* with body weight ranging from 750 to 850 g were collected from culture pond/rivers and then stocked in circular cement tanks (4m in length, 2 m in diameter and 1.5m in length). The fishes were maintained at ambient photoperiod (12L: 12D) and temperature that fluctuated from 29 and 32^{θ} C and fed with cooked chicken meat. The male and female fish were stocked in separate tanks. After Acclamatization, the male and female fish were injected with kisspeptin -10 at the concentration of 0.01 and 0.05 µg/gram body weight respectively. Before injection, the fish were anaesthetised one by one in a 0.1% solution of benzocaine. Following anesthesia the male and female fish were injected with kisspeptin at different concentration (0.01 µg/gram and 0.05 µg/gram body weight). Monthly sampling of gonad from injected and control fish were carried out to assess the matur ation. Levels of testosterone in male and estradiol in female fish serum were measured following enzyme linked immunosorbent assay kit.

Result and discussion:

Gonadal development, Gonadosomatic Index (GSI), histology and level of serum steroid hormones (testosterone and estradiol) were observed in captive striped Murrel (*Channa striatus,* Bloch) injected with kisspeptin for the period of 4 months after injection. Kisspeptin induced a significant increase in the GSI of male and female fish. Histological examination of the gonads of kisspeptin injected fish showed that numerous oogonia were present in the ovary after one month of kisspeptin injection which continued to develop into vitellogenic oocytes in the fourth month. Higher level of testosterone and estradiol was observed from the kisspeptin injected fish compare to the control fish. At the end of fourth month, the level of testosterone in the treated male fish was higher than the control fish. The estradiol level was high in treated female fish compare to control fish. Among the two concentration of kisspeptin tested, the concentration of 0.05 µg/gram body weight influenced the high level of steroid hormone in both male and female. Sethu selvaraj et al.(1), studied the influence of kisspeptin on male and female chub mackerel *Scomber japonicas.*In human and non-human primate, human chorionic gonadotropin injection stimulated Kiss1 expression in the ovary (2). These findings in mammals suggested the possibilities of local role of kisspeptins in the control of ovulation process. The present study revealed the influence of kisspeptin on the gonadal development in murrel, *Channa striatus*.The results of the present work can be used as a reference study for controlled breeding and reproduction of stripped Murrel, *Channa striatus*.

Table 1.Influence of Kisspeptin on the level of testosterone and estradiol in the male and female fish of *Channa striatus*

	Male*			Female**		
Duration	**Control**	**T1**	**T2**	**Control**	**T1**	**T2**
I month	0.25±0.005	0.23±0.003	0.25±0.003	689±13.22	680±16.59	726±13.56
II month	0.38±0.076	0.58±0.011	0.61±0.012	962±18.24	1013±19.23	3541±60.82
III month	0.6±0.012	0.72±0.014	1.0±0.018	1820±32.64	3604±71.23	5780±92.61
IV month	0.85±0.017	1.12±0.022	1.5±0.029	2450±41.22	3852±69.04	7040±92.36
* Not Significant T1- Kisspeptine (0.01µg/g body wt.) T2- Kisspeptine (0.05µg/g body wt.)				** P<0.01 T1- Kisspeptine (0.01µg/g body wt.) T2- Kisspeptine (0.05µg/g body wt.)		

Conclusion:

The results confirm that kisspeptin played a major role in influencing the steroid hormone level in male and female *Channa striatus*. Among the two concentration tried, 0.05 µg/gram body weight influenced higher level of steroid hormones in both male and female fish. Further experiments should be carried out to confirm the correct dosage for influencing the gonadal maturation of murrel, *channa striatus*. It could be possible to develop a new kisspeptin based hormone for influencing gonadal maturation and breeding of finfishes.

References:

[1] Sethu Selvaraj , Hajime Kitano , Yoichiro Fujinaga , Hirofumi Ohga , Michio Yoneda, Akihiko Yamaguchi , Akio Shimizu , Michiya Matsuyama. , 2010. Molecular characterization, tissue distribution, and mRNA expression profiles of two Kiss genes in the adult male and female chub mackerel (Scomber japonicus) during different gonadal stages. General and Comparative Endocrinology 169 (2010) 28–38.

[2]Gaytán, F., Gaytán, M., Castellano, J.M., Romero, M., Roa, J., Aparicio, B., Garrido, N.,Sánchez-Criado, J.E., Millar, R.P., Pellicer, A., Fraser, H.M., Tena- Sempere, M.,2009. KiSS-1 in the mammalian ovary: distribution of kisspeptin in human and marmoset and alterations in KiSS-1 mRNA levels in a rat model of ovulatory dysfunction. Am. J. Physiol. Endocrinol. Metab. 296, E520–E531.