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**Signaling pathways in insulin- and IGF-mediated ovarian steroid production in common carp  
*Cyprinus carpio***

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Previously, we observed that *in vitro* ovarian steroidogenesis in *Cyprinus carpio* can be induced by insulin and insulin-like growth factor (IGF-I) and this induction was gonadotropin-independent. Exposure of carp ovarian follicles to insulin and IGF-I initiates various signaling cascades that culminate to production testosterone and 17 $\beta$ -estradiol. But the regulation of these signaling pathways is not fully characterized in fish ovary. We studied the participation of PI3 kinase/Aktsignaling pathways during insulin- and IGF-I-induced ovarian steroidogenesis in common carp. Insulin and IGF-I induced testosterone and 17 $\beta$ -estradiol production both in intact vitellogenic follicles and isolated theca and granulosa cells in short-term co-culture in a dose- and time-dependent manner and this induction was significantly inhibited by Wortmannin and LY294002, two mechanistically different specific inhibitor of PI3 kinase. Immunoblot analyses of follicular cell lysate revealed that phospho-PI3 kinase was up regulated within 30-90 min of insulin and IGF-I stimulation followed by phospho-Akt at 90-120 min. We also found involvement of mitogen-activated protein kinase (MAP kinase) in the regulation of insulin- and IGF-I-stimulated steroid production in isolated follicular cells of carp. An antagonist of mitogen-activated protein kinase kinase 1/2 (MEK1/2) markedly attenuated insulin- and IGF-I-induced steroidogenesis. PI3 kinase inhibitors strongly attenuated phosphorylation and activation of MAP kinase, increased during insulin-and IGF-1 induced steroidogenesis. Taken together, these results suggest that PI3 kinase/Akt is an initial component of signal transduction pathway which precedes the MAP kinase during insulin- and IGF-I-induced steroidogenesis in carp ovarian follicles.

**Biography**

Dilip Mukherjee after completion his PhD degree joined the department of Zoology Kalyani University, India as a faculty in 1981. He did his post-doctoral in Hormone Research Centre, Chonnam National University, Korea as a Brain-Pool Fellow in 1998. He is now a senior Professor in the Department of Zoology, Kalyani University and engaged in teaching and research on comparative and molecular endocrinology taking fish and mice as animal model. He published more than 60 full research papers in peer reviewed International Journals and three book chapters. Fourteen students have been awarded PhD degree under his supervision and eight students are working for PhD. He has completed ten research projects funded by various fund giving agencies, Govt. of India and one DST project is running. He is the Member of Indian National Science Academy, Fellow of West Bengal Science and Technology and Member of AOSCE, Japan, ICCEP, Society for Comparative Endocrinology, India, Zoological Society of India and reviewers of many International Journals.

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