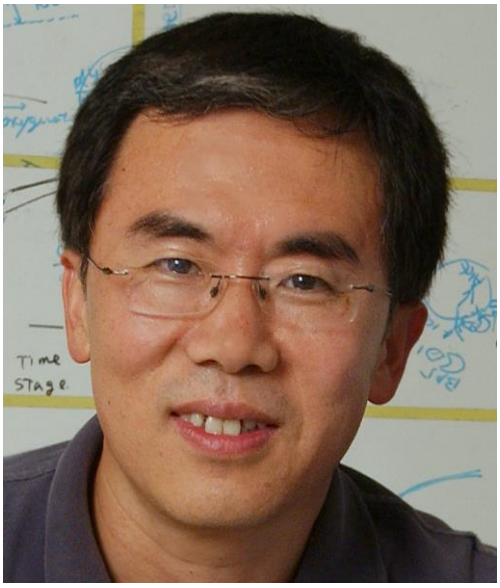
NUS National University of Singapore | Department of Biological Sciences, Faculty of Science

BIOLOGY COLLOQUIUM

Friday, 8 Feb 2019 | 4pm | DBS Conference Room 1

Hosted by Professor Gong Zhiyuan

Two are better than one: Specialization of IGFBP genes after whole genome duplication



Dr. Cunming Duan is a tenured full Professor at the Department of Molecular, Cellular and Developmental Biology, University of Michigan, Ann Arbor. He earned his PhD from University of Tokyo in 1991. He was a postdoctoral fellow at University of Washington from 1991 to 1993 and at University of North Carolina at Chapel Hill from 1993 to 1996. He joined the University of Michigan faculty as an assistant professor in 1996. Dr. Duan's scientific expertise is in understanding the roles of hormones and growth factors in regulating cell proliferation, differentiation, and apoptosis in development and growth; signal transduction mechanisms of growth factor actions; transcriptional and post-transcriptional regulation of gene expression; roles of hormones and growth factors in modulating growth and development in response to hypoxia and nutrient restriction. He has published over 110 scientific articles on these topics.

By **Duan Cunming**

Professor, University of Michigan, USA

Insulin and Insulin-like growth factors (IIS) are evolutionarily ancient and structurally related peptides that play key roles in regulating development, growth, metabolism and aging. Aberrant regulation of the IIS-PI3K-AKT-TOR signaling pathway is linked to major human diseases, including diabetes and cancers. In the blood, insulin is free, while IGFs are bound by IGF binding proteins (IGFBPs), of which six distinct types exist. It is believed that the six IGFBP genes in human genome are evolved via two successive rounds of whole genome duplications (WGD) during vertebrate evolution. Recent studies show that many teleost fish possess two copies of each of the six types of IGFBPs, which is attributable to the third WGD. Salmonid fish experienced an additional round of WGD and have four copies of each IGFBP. Why has evolution favored the retention of so many IGFBP genes? What are the unique functions of these IGFBPs? In this talk, I will discuss emerging evidence that many IGFBP have evolved specialized expression and functions to targeted adjustment of IGF signaling locally under stressful or pathological conditions. Based on genetic and functional data in zebrafish and other animals, we propose that IGFBPs provide a set of tools with which evolution has acted to increase the flexibility and versatility in the regulation of IIS actions.

Artwork by Ann Nee, DBS, NUS