CSCB Seminar Series

Title:

"Human aging-related metabolites and control of cellular quiescence"

Abstract:

I will present two research projects conducted in my laboratory, both of which are deeply rooted in metabolism. In the first, our LC-MS analysis of human blood metabolites (Chaleckis et al 2016 PNAS) identified aging-related changes. Compounds showing remarkable aging-related decreases or increases are related to muscle maintenance, anti-oxidation, oxidation and reduction, the urea cycle, phospholipid metabolism, etc. Age differences may be partly explained by a decrease in antioxidant production or increasing inefficiency of urea metabolism among the elderly. Some compounds are correlated, indicating that these compounds can be considered as human aging markers. Human aging can thus be estimated molecularly using metabolites. We attempted to establish a method for simple, rapid, mass measurements.

The second project I shall discuss concerns our model to explain maintenance of mitotic competence after long-term quiescence, as seen for example, in stem cells. Removal of a key nutritional element (NH_4Cl) from media causes fission yeast (*Schizosaccharomyces pombe*) to undergo a dramatic transition from cell proliferation to long-term quiescence (G0 phase). Upon addition of NH_4Cl, the yeast recommence reproduction with high viability. We identified a group of ~80 genes that are required for both phases, which we call super-housekeeping (SHK) genes (Sajiki et el. 2009 JCS 122, 1418 and unpublished; Yanagida 2009 TCB). A second group of 90 genes are required only for G0 quiescence (GZE, G zero essential; Sajiki et al, 2013 and unpublished; Shimanuki et al, 2013; Yanagida et al., 2011). Both group of genes are conserved from yeasts to humans. One subgroup of GZE products is related to protein phosphatases. I shall discuss a hypothesis that these PPases switch on or off SHK genes so that the transition from proliferation to quiescence can occur by regulation of SHK by GZE genes.

Date:
23 Nov 2017
(Thursday)

Time:
12pm – 1pm

Venue:
Amphitheatre, Level 2
Duke-NUS Medical School
8 College Road, S169857

(Opposite Singapore General Hospital, Block 6/7)

Host:

Koji ITAHANA , PhD
Associate Professor
Programme in Cancer & Stem Cell Biology
Duke-NUS Medical School

"No registration is required."
Any enquiry, please contact:
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Speaker:



Mitsuhiro YANAGIDA, PhD
Professor
Okinawa Institute of Science & Technology Graduate University
Okinawa, Japan

Biography:

2011 Professor, Okinawa Institute of Science and Technology Graduate School
1999 Professor, Kyoto University, Graduate School of Biostudies
1978 Professor, Kyoto University, Faculty of Science, Dept. of Biophysics

Awards

2012 Foreign Member, National Academy of Science USA
2011 Order of Culture Japan （文化勲章）
2010 Honorary Fellow, British Society of Biology
2004 Person of Cultural Merit Japan（文化功労者）
2000 Foreign Member, Royal Society of London, UK
1995 Foreign Member, EMBO (European Molecular Biology Organization