

SEMINAR ANNOUNCEMENT

We would like to invite you to attend this seminar hosted by A/Prof. Philipp Kaldis:

Date: 29 October 2014, Wednesday

Time: 11:00AM – 12:00PM

Venue: Level 3, IMCB Seminar Room 3-46, Proteos, Biopolis

Speaker: Dr. Yvette Yien, Postdoctoral Fellow, Brigham and Women's Hospital/Harvard Medical School, Boston, MA

Title: A novel transporter of protoporphyrinogen IX, TMEM14C, is required for erythroid heme synthesis.

The transport and intracellular trafficking of heme biosynthesis intermediates are crucial for hemoglobin production, which is a critical process in developing red cells. Here, we profiled gene expression in terminally differentiating murine fetal liver-derived erythroid cells to identify regulators of heme metabolism. We determined that TMEM14C, an inner mitochondrial membrane protein that is enriched in vertebrate hematopoietic tissues, is essential for erythropoiesis and heme synthesis in vivo and in cultured erythroid cells. In mice, TMEM14C deficiency resulted in porphyrin accumulation in the fetal liver, erythroid maturation arrest, and embryonic lethality due to profound anemia. Protoporphyrin IX synthesis in TMEM14C-deficient erythroid cells was blocked, leading to an accumulation of porphyrin precursors. The heme synthesis defect in TMEM14C-deficient cells was ameliorated with a protoporphyrin IX analog, indicating that TMEM14C primarily functions in the terminal steps of the heme synthesis pathway. Together, our data demonstrate that TMEM14C facilitates the import of protoporphyrinogen IX into the mitochondrial matrix for heme synthesis and subsequent hemoglobin production. Furthermore, the identification of TMEM14C as a protoporphyrinogen IX importer provides a genetic tool for further exploring erythropoiesis and congenital anemias.

Biography:

I earned a B.Sc. (Life Sciences) from the National University of Singapore and a Ph.D. from the Mount Sinai School of Medicine in New York City. During my doctoral work supervised by Dr. James Bieker, I identified novel post-transcriptional mechanisms that regulate the expression and function of the Erythroid Kruppel Like Factor, which is a transcription factor and master regulator of mammalian erythroid differentiation. I am currently a postdoctoral fellow in the laboratory of Dr. Barry Paw at the Brigham and Women's Hospital and Harvard Medical School. My research interests center upon the transport and trafficking of tetrapyrrolic heme intermediates. In a recent study, I identified TMEM14C as being essential for the import of protoporphyrinogen IX into the mitochondrial matrix. I am currently dissecting the intricate molecular mechanisms by which TMEM14C facilitates the transport of protoporphyrinogen IX.

ALL ARE WELCOME (No registration required)