

INFORMAL SEMINAR
MOLECULAR STRUCTURE AND FUNCTION PROGRAM

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The architecture of the large subunit of the mammalian mitochondrial ribosome

Abstract: Mitochondrial ribosomes (mitoribosomes) perform protein synthesis inside mitochondria, the organelles responsible for energy conversion in eukaryotic cells. Mammalian mitoribosomes have undergone extensive structural and compositional changes throughout evolutionary time, including acquisition of a large number of mitochondrial-specific ribosomal proteins and shortening of the ribosomal RNA (rRNA). To fully understand the function of these highly modified ribosomes, atomic resolution structures are required.

We have determined the structure of the large ribosomal subunit from porcine mitochondria using cryo-electron microscopy (cryo-EM) at 4.9 Å resolution [1]. Our cryo-EM structure at near-atomic resolution combined with data from chemical crosslinking and mass spectrometry experiments enabled a detailed interpretation of the architecture of the 39S subunit. We have been able to localize several mitoribosomal-specific proteins and provide a detailed model of the highly reduced mitoribosomal 16S rRNA. The identification of a membrane-binding mitoribosomal protein near the highly remodelled polypeptide tunnel exit provides a mechanistic explanation for the permanent membrane attachment of mitochondrial ribosomes, which likely facilitates the insertion of newly synthesized membrane proteins into the mitochondrial inner membrane.

[1] Greber BJ, Boehringer D, Leitner A, Bieri P, Voigts-Hoffman F, Erzberger JP, Leibundgut M, Aebersold R, Ban N. (2013). Architecture of the large subunit of the mammalian mitochondrial ribosome. *Nature* 505(7484): 515-9. Epub 2013 Dec 22.

Date : Monday, June 9, 2014

Time : 2:00 - 3:00 p.m.

Location : Event Room 1 (Room 02.9320, 2nd floor), PGCR
Peter Gilgan Centre for Research and Learning, 686 Bay Street

Host: Dr. John Rubinstein

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