

LIFE SCIENCES

seminar series

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Beyond the prokaryotic ribosome: structural and functional insights into eukaryotic and mitochondrial ribosomes

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Thursday, 15:00 – 16:00

Seminar room 114, pavilion A11
University campus Bohunice

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We are investigating bacterial and eukaryotic ribosomes and their functional complexes to obtain insights into the process of protein synthesis. Although basic aspects of protein synthesis are preserved in all kingdoms of life, eukaryotic ribosomes are much more complex than their bacterial counterparts, require a large number of assembly and maturation factors during their biogenesis, use numerous initiation factors, and are subjected to extensive regulation. In an effort to better understand the structure and the function of eukaryotic ribosomes we have determined complete structures of both eukaryotic ribosomal subunits each in complex with an initiation factor (1, 2). These results provide detailed structural information on the entire eukaryotic ribosome, reveal novel architectural features of this ribonucleoprotein complex and offer insights into the various eukaryotic-specific aspects of protein synthesis and ribosome evolution. Recently, using cryo electron microscopy we obtained first insights into the architecture of mammalian mitochondrial ribosomes and revealed the mechanism of how mitochondrial ribosomes, specialized for the synthesis of membrane proteins, are attached to the membrane (3).

1. Rabl J, Leibundgut M, Ataide SF, Haag A, Ban N. (2011) Crystal structure of the eukaryotic 40S ribosomal subunit in complex with initiation factor 1. *Science* 331(6018):730-6, Epub 2010 Dec 23.

2. Klinge S, Voigts-Hoffmann F, Leibundgut M, Arpagaus S, Ban N. (2011) Crystal Structure of the Eukaryotic 60S Ribosomal Subunit in Complex with Initiation Factor 6. *Science* 334(6058):941-948

3. Greber BJ, Boehringer D, Leitner A, Bieri P, Voigts-Hoffmann F, Erzberger JP, Leibundgut M, Aebersold R, Ban N. (2014) Architecture of the large subunit of the mammalian mitochondrial ribosome. *Nature*. 505(7484):515-9.



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