Katedry biochémie a genetiky PriF UK
a občianske združenie *NATURA*

Vás pozývajú na 116. prednášku v rámci Kuželových seminárov:

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MITOCHONDRIA OF DIPLONEMIDS – NATURE'S TREASURE TROVES OF GENETIC ECCENTRICITIES

ktorá sa uskutoční **14. januára 2020** (utorok) o **14:00**

v miestnosti B1-501 Prírodovedeckej fakulty UK

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CV

2016-present - Research assistant at the Robert-Cedergren Center for Bioinformatics and Genomics, Department of Biochemistry and Molecular Medicine, Faculty of Medicine, Université de Montréal, Montreal, Canada

2011-2016 - Post-doctoral researcher at the Robert-Cedergren Center for Bioinformatics and Genomics, Department of Biochemistry, Faculty of Medicine, Université de Montréal, Montreal, Canada

2006-2011 - PhD. at the Department of Biochemistry, Faculty of Natural Sciences, Comenius University, Bratislava, Slovakia

Abstract:

Mitochondria - hallmark energy-transforming endosymbiotic organelles of eukaryotes - evolved along their host cells and nowadays encompass a staggering diversity of metabolic, morphological, and genetic features. The phylum Discoba alone contains lineages with the most bacteria-like and the most divergent and innovative mitochondrial information processing - jakobids and euglenozoans. Diplonemids, a group of marine unicellular flagellates, which belongs to the latter clade, are uniquely characterized by their strikingly bloated mitochondrial genome with several dozen discontiguous gene pieces spread over several dozen chromosomes. Over the last decade, numerous diplonemid mitochondrial idiosyncrasies have been characterized. We now know that gene expression involves separate transcription of each gene piece, unique and profuse RNA editing of many exons, and systematic joining of cognate exons into eighteen distinct mature mRNAs and rRNAs. The manifold RNA editing calls for at least three different biochemical activities, while the mechanism of exon recognition and ligation is distinct from the known intron-dependent splicing, making the diplonemid mitochondria a promising source of innovative strategies in gene expression. After reviewing the current status of research on diplonemid mitochondrial genes, I will discuss the proposed molecular mechanisms and evolutionary aspects of the uncovered post-transcriptional revisions of genetic information.

Selected publications

- **Valach M**, Léveillé-Kunst A, Gray MW, Burger G (2018) Respiratory chain Complex I of unparalleled divergence in diplonemids. *J. Biol. Chem.* 293(41): 16043-16056. doi: 10.1074/jbc.RA118.005326
- Kaur B, **Valach M**, Peña-Diaz P, Moreira S, Keeling PJ, Burger G, Lukeš J, Faktorová D (2018) Transformation of *Diplonema papillatum*, the type species of the highly diverse and abundant marine micro-eukaryotes Diplonemida (Euglenozoa). *Environ. Microbiol.* 20(3): 1030-1040. doi: 10.1111/1462-2920.14041
- **Valach M**, Moreira S, Hoffmann S, Stadler PF, Burger G (2017) Keeping it complicated: Mitochondrial genome plasticity across diplonemids. *Sci. Rep.* 7(1): 14166. doi: 0.1038/s41598-017-14286-z
- Moreira S, **Valach M**, Aoulad Aissa M, Otto C, Burger G (2016) Novel modes of RNA editing in mitochondria. *Nucleic Acids Res.* 44(10): 4907-4919. doi: 10.1093/nar/gkw188