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Slovenskou spoločnosťou pre biochémiu a molekulárnu biológiu

Vás pozývajú na 55. prednášku v rámci Kuželových seminárov:

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Nucleo-mitochondrial interactions: central player in yeast retrograde signaling

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v miestnosti B1-320 Prírodovedeckej fakulty UK

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Mário Špírek, PhD.

1993 – 1998: Master degree project: Xenomitochondrial cybrids in *Saccharomyces cerevisiae* (P. Sulo, A. Horváth – supervisors), Department of Biochemistry, Faculty of Natural Sciences, Comenius University, Slovakia

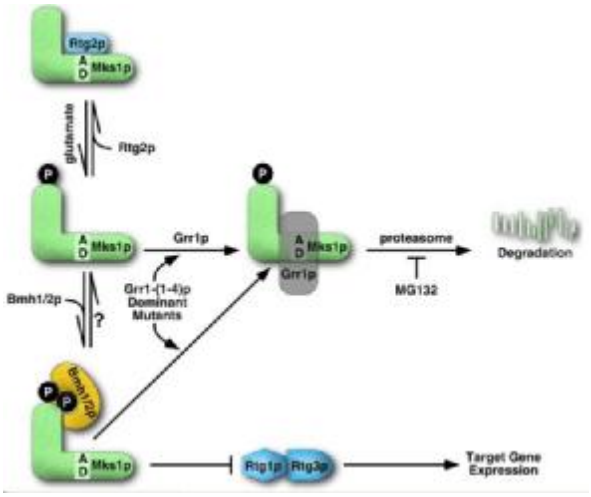
1998 – 2002: PhD student at the Department of Biochemistry, Faculty of Natural Sciences, Comenius University, Slovakia (P. Sulo – supervisor): "Interspecies yeast nucleo-mitochondrial interactions", (How the yeast cell faces to organellar xenophobia)

1999, 2001: Half-year visiting student at the Technical University of Denmark, Section of Molecular Microbiology in the laboratory of Prof. Jure Piškur, phylogenetic study of *Saccharomyces* sensu lato nuclear and mitochondrial sequences, and the chromosome structure; molecular research on *Candida glabrata* pathogenic isolates

2002 – 2005: Postdoctoral researcher in the laboratory of Prof. Ronald A. Butow, Department of Molecular Biology at University of Texas Southwestern Medical Center at Dallas, study of retrograde signaling and amino-sensing pathway

2005 – present: Postdoctoral researcher in the laboratory of Prof. Josef Loidl, study of meiosis features of *Schizosaccharomyces pombe.* Department of Chromosome Biology, Faculty of Life Sciences, University of Vienna

Awards: Špírek, M. Rules, limits and consequences of mitochondrial replacement with foreign ones. Ivanka days of Young Biologists, UBGZ SAV Ivánka pri Dunaji, Bratislava 22. 6. 2000 (lecture), Award of Shimadzu Slovakia Company for Biochemistry and Cell Biology.



Mitochondrial retrograde signalling (RS) is a pathway of communication from mitochondria to the nucleus that influences many cellular and organismal activities under both normal and pathophysiological conditions. It involves processes that is likely to have far-reaching implications in development, aging, disease, and environmental adaptation. In yeast it is used as a sensor of mitochondrial dysfunction that initiates readjustments of carbohydrate and nitrogen metabolism. RS terminates with two transcription factors, Rtg1p and Rtg3p. One positive regulator, Rtg2p, and four negative regulators, Lst8p, Mks1p, and the redundant 14-3-3 proteins, Bmh1p and Bmh2p, control RS upstream of Rtg1/3p. Mks1p is negatively regulated by binding to Rtg2p and positively regulated when bound to Bmh1/2p. A component of the SCF^{Grr1} E3 ubiquitin ligase, Grr1p , modulates RS by affecting Mks1p levels. Grr1p polyubiquitinates Mks1p not bound to either Rtg2p or to Bmh1/2p, targeting it for degradation. An acidic domain region of Mks1p constitutes the portable Mks1p degron sequence. Dominant mutations in Grr1p were isolated leading to increased Mks1p degradation. These mutations result in a gain of positive charge on the concave surface of the leucine rich repeat (LRR) domain of Grr1p, the proposed substrate binding site. Mks1p is a central player of RS and is acted upon by multiple regulators of the pathway.

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Liu Z, Sekito T, Špírek M, Thornton J, Butow RA. (2003). Retrograde signaling is regulated by the dynamic interaction between Rtg2p and Mks1p. *Mol Cell* **12**: 401-411.

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Špírek M, Yang J, Groth C, Petersen RF, Langkjaer RB, Naumova ES, Sulo P, Naumov GI, Piškur J. High-rate evolution of *Saccharomyces sensu lato* chromosomes. *FEMS Yeast Res*. **3**: 363-373.

Špírek M, Šoltésová A, Horváth A, Slavikova E, Sulo P. (2003). GC clusters and the stability of mitochondrial genomes of *Saccharomyces cerevisiae* and related yeats. *Folia Microbiol* **47**: 263-270.

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