IST AUSTRIA
Institute of Science and Technology

Life Sciences Seminar

Organelle Assembly and Evolution

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Host: Fyodor Kondrashov

Proteins localized to mitochondria by a carboxyl-terminal tail anchor (TA) play important roles in apoptosis and mitochondrial dynamics. We have carried out a deep mutational scanning approach to investigate sequential and structural features required for TA targeting to mitochondria. We found that positively charged amino acids were much more acceptable at several positions within the membrane-associated portion of a mitochondria-directed TA than negatively charged residues. These results provide strong, in vivo evidence that lysine and arginine can snorkel, or partition the non-polar portion of their side chains into the hydrophobic region of the lipid bilayer while placing the terminal charge near the polar interface of the membrane.TAs are not only used by cells to target proteins to mitochondria, but also to direct proteins to other organelles. Moreover, prokaryotes can provide new genetic information to eukaryotes by horizontal gene transfer (HGT), and such transfers are likely to have been particularly consequential during the early evolution of eukaryotes. I will outline our recent results regarding the targeting of bacterial TAs to different organelles in yeast and human cells. Our results highlight the ease with which bacteria-derived sequences might target to distinct compartments of eukaryotic cells following HGT, and I discuss the importance of flexible recognition of organelle targeting information during and after eukaryogenesis.Finally, I will provide a novel theory regarding the initial role of the proto-mitochondrial symbiont in the evolving eukaryote. It is unlikely that that the endosymbiont that eventually became the mitochondrion provided ATP to its host immediately upon entry to the archaeon, raising the question of what benefits the endosymbiont initially did provide. Based on recent studies suggesting that mitochondria can maintain their temperature at a value much higher than their surroundings, I suggest that heat generated by the proto-mitochondrial endosymbiont allowed its archaeal host to sample cooler environments.

Wednesday, November 28, 2018 11:00am - 12:00pm

IST Austria Campus Mondi Seminar Room 2, Central Building

This invitation is valid as a ticket for the IST Shuttle from and to Heiligenstadt Station. Please find a schedule of the IST Shuttle on our webpage: http://ist.ac.at/fileadmin/user_upload/pdfs/IST_shuttle_bus.pdf The IST Shuttle bus is marked IST Shuttle (#142) and has the Institute Logo printed on the side.