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Einladung zum Vortrag

Mitochondrial transport processes that are important for life

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Mitochondria are known as the powerhouse of the cell, where food components are broken down to generate the cellular fuel adenosine triphosphate (ATP) via a series of energy conversion steps. An essential transport protein in this process is the mitochondrial ADP/ATP carrier, also called adenine nucleotide translocase, which imports the spent fuel adenosine diphosphate (ADP) into the mitochondrial matrix for ATP synthesis and exports the synthesised ATP. Every day these carriers transport our own body weight in ADP and in ATP to fuel the cellular processes. Here, we will discuss the molecular mechanism of the ADP/ATP carrier and explain how it is able to exchange these highly charged nucleotides across the mitochondrial inner membrane in the presence of a membrane potential.

Mitochondria are also important for the generation of heat in specialised fat deposits, called brown adipose tissue, which provides protection against cold shocks. This process is critical in the first few days after birth and in the adaptation process against prolonged periods of cold, for instance in hibernation. Key to this process is the uncoupling protein, which belongs to the same protein family as the mitochondrial ADP/ATP carrier. When activated by fatty acids, uncoupling protein short-circuits the mitochondrion by allowing protons to leak back, which in turn leads to heat production in brown adipose tissue. This process is inhibited by purine nucleotides as part of its metabolic control. Here, we will discuss the pH-dependent mechanism of inhibition and some key functional elements of its activation.

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Seminarraum der Physiologie (HA05 P51)
Veterinärmedizinische Universität Wien, Veterinärplatz 1, 1210 Wien

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