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POLISH ACADEMY OF SCIENCES

ONLINE SEMINAR

Karolina Szczepanowska

**SAFEGUARDING
A BEAUTIFUL BEAST.
THE QUALITY CONTROL OF
RESPIRATORY COMPLEX I.**

June 9th, 2021, 2 pm (CET)
Online seminar via ZOOM

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Safeguarding a beautiful beast. The quality control of respiratory Complex I.



SPEAKER

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ABSTRACT:

The power plant function of mitochondria depends strictly on the elaborate molecular machines embedded inside the mitochondrial membranes, jointly known as the OXPHOS system.

Respiratory Complex I (CI), a beautiful beast of OXPHOS, is the largest respiratory chain complex, and its dysfunction associates with a broad spectrum of diseases. Despite huge advancements in understanding its structure and assembly, the CI quality control and turnover regulation remain enigmatic. The large-scale proteomic studies suggest a highly heterogenous turnover of individual CI subunits. However, underlying mechanisms are mostly elusive.

Our findings indicate that the NADH-oxidizing N-module of CI is turned over at a higher rate and largely independently of the rest of the complex by mitochondrial matrix protease ClpXP, which selectively removes and degrades damaged subunits. The observed mechanism seems to be a safeguard against the accumulation of dysfunctional CI caused by its constant activity under physiological conditions. This CI salvage pathway maintains highly functional CI through a favorable mechanism that demands a much lower energetic cost than de novo synthesis and reassembly of the entire CI. Furthermore, recent studies suggest that N-module repair can be part of a global quality control system that operates via the concurrent action of proteases and chaperones to keep Complex I in shape.

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