BtBs Seminars
Biotechnology and Biosciences Seminars

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From DNA Damage to Bioenergetic Collapse: Genome–Mitochondria Crosstalk in ALS

Amyotrophic lateral sclerosis (ALS) is characterized by both genomic instability and mitochondrial dysfunction, yet the mechanistic connection between these hallmarks remains unclear. We previously demonstrated that the RNA-binding protein FUS promotes DNA damage response (DDR) signaling through liquid-liquid phase separation, enabling the recruitment of repair factors and proper DNA repair organization. Now we found that persistent DDR signaling is sufficient to trigger an early bioenergetic collapse characterized by reduced respiration and ATP production. Now we identify a potential mechanistic pathway linking DDR-induced PARP1 activation and NAD+ depletion to impaired oxidative phosphorylation. Importantly, these defects are reversible through DNA damage resolution, PARP1 inhibition, or NAD+ replenishment. Our findings identify a pathogenic nuclear–mitochondrial axis linking genomic instability to metabolic dysfunction in ALS and suggest new therapeutic opportunities targeting DDR-driven bioenergetic failure.

Thursday
June 18, 2026

4.30 pm
to 5.30 pm

U3-BIOS building
room U3-09

Host:
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The certificates of attendance for the seminar are also valid for the acquisition of CFU credits
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