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RESEARCH AREA

Functional and morphological changes within mitochondria and their altered interactions with other organelles are suggested to play a critical role in the pathogenesis of various diseases associated with life-threatening organ dysfunction. Some of these, such as sepsis and ischaemia/reperfusion-induced injury, have more recently become intensively developing fields of basic research. Our main purpose is to investigate the underlying mitochondrial and cellular mechanisms involved in the corresponding animal models of these diseases.

TECHNIQUES AVAILABLE IN THE LAB

Isolation of intact mitochondria and preparation of tissue homogenates from various organs of laboratory animals (e.g., liver, small intestine, kidney, and brain); assessment of cellular respiratory function and respiratory states using high-resolution respirometry (OROBOROS O2k); simultaneous monitoring of mitochondrial membrane potential (safranin fluorescence), reactive oxygen species production (HRP/Amplex UltraRed assay), and calcium flux (Calcium Green-5N fluorescence); and assessment of oxidative and nitrosative stress markers.

SELECTED PUBLICATIONS

Juhász, L., Spisák, K., Szolnoki, B. Z., Nászai, A., Szabó, Á., Rutai, A., Tallósy, S. P., Szabó, A., Toldi, J., Tanaka, M., Takeda, K., Ozaki, K., Inoue, H., Yamamoto, S., Ono, E., Boros, M., Kaszaki, J., & Vécsei, L. (2025). The Power Struggle: Kynurenine Pathway Enzyme Knockouts and Brain Mitochondrial Respiration. *J Neurochem* **169**(5): e70075.

Gulácsi, L. F., Rutai, A., Juhász, L., Czakó, B. L., Szabó, A., Boros, M., Kaszaki, J., Poles, M. Z., & Tallósy, S. P. (2025). Time Matters: Methane Inhalation Mitigates Mitochondrial and Organ Dysfunction in Advanced Experimental Sepsis. *Antioxidants (Basel)* **14**(7): 814.

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