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RESEARCH AREA

The prevalence of age- and lifestyle-related diseases is a growing problem worldwide. The number of individuals suffering from neurodegenerative disorders, such as Alzheimer's disease is increasing, placing a huge burden on our aging society. In addition, obesity is also reaching epidemic proportions as a consequence of unhealthy diet and sedentary lifestyle. The chronic inflammation associated with excess weight gain accelerates the aging process, thereby becoming an important risk factor for a number of diseases, including type 2 diabetes and various forms of cancer. A common feature of the above mentioned health problems is the dysfunction of the cellular stress response. Our cells defend themselves against external threats, such as increasing temperature or disease-associated factors, by activating the stress response. This process involves a wide range of molecular alterations, including the rearrangement of the membrane structure and the synthesis of stress proteins to protect proteins and other cellular components. The aim of our laboratory is to elucidate the impact of different pathological conditions on these cellular defense mechanisms using cell cultures and mouse models. The findings of these experiments may contribute to the development of therapeutic strategies that promote healthy aging and the prevention of certain diseases by optimizing the cellular stress response.

TECHNIQUES AVAILABLE IN THE LAB

Isolation and culture of primary cells, animal experiments (blood sampling, oral glucose tolerance test, drug treatment of mice, behavioral tests), preparation and staining of histological slides, immunohistochemistry, fluorescence microscopy techniques, classical biochemical and molecular biology techniques (PCR, Western blot)

SELECTED PUBLICATIONS

Ruppert, Z., Neuperger, P., Rákóczi, B., Gémes, N., Dukay, B., Hajdu, P., Péter, M., Balogh, G., Tiszlavicz, L., Vígh, L., Török, Z., Puskás, LG., Szebeni, GJ., **Tóth ME.** (2024) Characterization of obesity-related diseases and inflammation using single cell immunophenotyping in two different diet-induced obesity models. **Int J Obes.**

Tóth, ME., Sárközy, M., Szűcs, G., Dukay, B., Hajdu, P., Zvara, Á., Puskás, LG., Szebeni, GJ., Ruppert, Z., Csonka, C., Kovács, F., Kriston, A., Horváth, P., Kővári, B., Cserni, G., Csont, T., Sántha, M. (2022) Exercise training worsens cardiac performance in males but does not change ejection fraction and improves hypertrophy in females in a mouse model of metabolic syndrome. **Biol Sex Differ 13:** 5.

Tóth, ME., Dukay, B., Péter, M., Balogh, G., Szűcs, G., Zvara, Á., Szebeni, GJ., Hajdu, P., Sárközy, M., Puskás, LG., Török, Z., Csont, T., Vígh, L., Sántha, M. (2021) Male and Female Animals Respond Differently to High-Fat Diet and Regular Exercise Training in a Mouse Model of Hyperlipidemia. **Int J Mol Sci 22:** 8.

Dukay, B., Walte, FR., Vigh, JP., Barabási, B., Hajdu, P., Balassa, T., Migh, E., Kincse, A., Hoyk, Z., Szögi, T., Borbély, E., Csoboz, B., Horváth, P., Fülöp, L., Penke, B., Vígh, L., Deli, MA., Sántha, M., Tóth, ME. (2021) Neuroinflammatory processes are augmented in mice overexpressing human heat-shock protein B1 following ethanol-induced brain injury. **J Neuroinflammation 18:** 1.

Tóth, ME., Dukay, B., Hoyk, Z., Sántha, M. (2020) Cerebrovascular Changes and Neurodegeneration Related to Hyperlipidemia. **Curr Pharm Des 26:** 1486-1494.