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## RESEARCH AREA

Investigating the effects of PACAP.

Pituitary adenylate cyclase activating polypeptide (PACAP) is an anti-apoptotic, anti-inflammatory and antioxidant neuropeptide with neuroprotective and general cytoprotective effects that have been demonstrated in a number of experiments. Our group has been working for more than 15 years on mapping the physiological effects of PACAP and its protective role in in vitro and in vivo models of various pathological conditions. In the absence of endogenous PACAP, knockout (KO) mice are highly susceptible to adverse effects. Early signs of ageing are also observed due to increased oxidative stress, inflammation and apoptosis associated with the deficiency state. Our preliminary observations show increased neuronal degeneration in the brains of KO mice. In the absence of PACAP, we have described systemic tissue amyloidosis associated with aging, in addition to retinal degeneration. Our results so far suggest that the absence of PACAP accelerates several degenerative processes and leads to premature ageing. Our human, translational studies investigate PACAP expression/levels in different human tissues and biological fluids and we investigate correlations between pathological conditions and alterations in PACAP levels. These may be important for the future biomarker use of PACAP as a diagnostic and/or prognostic tool. Results can also shed light on biological functions of PACAP in the human body.

## TECHNIQUES AVAILABLE IN THE LAB

Histology, immunohistology, ELISA measurements, clinical sampling, data analysis.

Animal models: anaesthesia, operations, treatments, sample taking, handling of animals, ethical permissions.

## SELECTED PUBLICATIONS

Szabo, D., Sarszegi, Zs., Polgar, B., Saghy, E., Reglodi, D., Toth, T., Onodi, Zs., Leszek, P., Varga, Z.V., Helyes, Zs., Kemeny, A., Ferdinandy, P., **Tamas, A.** (2022) PACAP-38 and PAC1 Receptor Alterations in Plasma and Cardiac Tissue Samples of Heart Failure Patients. *Int J Mol Sci* **23**: 3715.

Pham, D., Polgar, B., Toth, T., Jungling, A., Kovacs, N., Balas, I., Pal, E., Szabo, D., Fulop, B.D., Reglodi, D., Szanto, Z., Herczeg, R., Gyenesei, A., **Tamas, A.** (2022) Examination of pituitary adenylate cyclase-activating polypeptide in Parkinson's disease focusing on correlations with motor symptoms. *Geroscience* **44**: 785-803.

Szabo, D., Sarszegi, Zs., Polgar, B., Saghy, E., Nemeth, A., Reglodi, D., Makkos, A., Gorbe, A., Helyes, Zs., Ferdinandy, P., Herczeg, R., Gyenesei, A., Cziraki, A., **Tamas, A.** (2021) PACAP-38 in Acute ST-Segment Elevation Myocardial Infarction in Humans and Pigs: A Translational Study. *Int J Mol Sci* **22**: 2883.

Fulop, DB., Humli, V., Szepes, J., Ott, V., Reglodi, D., Gaszner, B., Nemeth, A., Szirmai, A., Tamas, L., Hashimoto, H., Zelles, T., **Tamas, A.** (2019) Hearing impairment and associated morphological changes in pituitary adenylate cyclase activating polypeptide (PACAP)-deficient mice. *Sci Rep* **9**: 14598.

Tóth, T., Alizadeh, H., Polgár, B., Csalódi, R., Reglődi, D., **Tamás, A.** (2023) Diagnostic and Prognostic Value of PACAP in Multiple Myeloma. *Int J Mol Sci* **24**: 10801.