

## ALEXANDRA VÁCZY



University of Pécs  
Medical School  
Department of Anatomy

Address: Szigeti út 12., H-7624 Pécs, Hungary

## 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

In our ophthalmic research, we use state-of-the-art technology in rodents in vivo, such as optical coherence tomography (OCT). OCT is suitable for comprehensive examination of the posterior and anterior segments of the eye. It also allows us to measure intraocular pressure, examine the fundus with funduscopy, and analyze vision via the electroretinographic method. Additionally, our laboratory routinely uses histological, immunohistochemical, and molecular biological methods (western blot, ELISA, apoptosis, and cytokine array kit).

## SELECTED PUBLICATIONS

- Patko, E., Szabo, E., Toth, D., Tornoczky, T., Bosnyak, I., **Vaczy A.**, Atlasz, T., Reglodi, D. (2022) Distribution of PACAP and PAC1 Receptor in the Human Eye, *J Mol Neurosci*
- Kvarik, T., Reglodi, D., Werling, D., **Vaczy, A.**, Kovari, P., Szabo, E., Kovacs, K., Hashimoto, H., Ertl, T., Gyarmati, J., Atlasz, T. (2021) The Protective Effects of Endogenous PACAP in Oxygen-Induced Retinopathy, *J Mol Neurosci* **71**: 2546–2557.
- Szabó, E., Patkó, E., **Váczy, A.**, Molitor, D., Csutak, A., Tóth, G., Reglódi, D., Atlasz, T. (2021) Retinoprotective Effects of PACAP Eye Drops in Microbead-Induced Glaucoma Model in Rats, *Int J Mol Sci* **22**: 16.
- Kovacs, K., **Vaczy, A.**, Fekete, K., Kovari, P., Atlasz, T., Reglodi, D., Gabriel, R., Gallyas, F., Sumegi, B. (2019) PARP Inhibitor Protects Against Chronic Hypoxia/Reoxygenation-Induced Retinal Injury by Regulation of MAPKs, HIF1 $\alpha$ , Nrf2, and NF $\kappa$ B. *IOVS* **60**: 1478–1490.
- Vaczy, A.**, Kovari, P., Kovacs, K., Farkas, K., Szabo, E., Kvarik, T., Kocsis, B., Fulop, B., Atlasz, T., Reglodi, D. (2018) Protective role of endogenous PACAP in inflammation-induced retinal degeneration. *Curr Pharm Des* **24**: 3534–3542.
- Vaczy, A.**, Reglodi, D., Somoskeoy, T., Kovacs, K., Lokos, E., Szabo, E., Tamas, A., Atlasz, T. (2016) The Protective Role of PAC1-Receptor Agonist Maxadilan in BCCAO-Induced Retinal Degeneration. *J Mol Neurosci* **60**: 186–194.