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## RESEARCH AREA

The consequence of ischemia or hypoxia is the emergence of a reductive stress (proton accumulation) in an intracellular level. The following reperfusion or reoxygenation indicates the formation of high amounts of reactive oxygen- (ROS) and nitrogen species (RNS). The onset of oxidative and nitrosative stress aggravates the damages caused by ischemia and reperfusion thereafter. Thus there is a clear interest in developing novel anti-inflammatory therapeutic agents which can specifically attenuate the damages caused by the processes mentioned before in a molecular and cellular level. We have demonstrated the anti-inflammatory effects of inhaled methane (CH<sub>4</sub>) however there are many unanswered questions remained of its mechanism of action. Our aim is to investigate the protective role of CH<sub>4</sub> inhalation on various damaged organs of systemic or local hypoxia and inflammatory processes such as sepsis.

## TECHNIQUES AVAILABLE IN THE LAB

Wide spectrum of performing surgical and microsurgical interventions on anesthetised rats and mice for invasive monitoring (e.g. arterial and venous blood pressure, cardiac output, arterial and venous oxygen levels). *In vivo* monitoring and measurement of microcirculation of various tissues in various conditions (e.g. hypoxia, inflammation) by imaging techniques such as fluorescent laser-scanning endomicroscopy or intravital microscopy. Monitoring and measurement of gastrointestinal motility by electrogastrography. *Ex vivo* monitoring and analysis of cellular and mitochondrial respiration with high-resolution respirometry. Measurements of various biochemical markers including the measurement of different enzyme activities. Preparing tissue sections with cryostat, or by whole-mount preparation, histochemical and immunohistochemical stainings.

## SELECTED PUBLICATIONS

**Poles, M.Z.**, Bódi, N., Bagyánszki, M., Fekete, É., Mészáros, A.T., Varga, G., Szűcs, S., Nászai, A., Kiss, L., Kozlov, A.V., Boros, M., Kaszaki, J. (2018) Reduction of nitrosative stress by methane: Neuroprotection through xanthine oxidoreductase inhibition in a rat model of mesenteric ischemia- reperfusion. **Free Radic Biol Med** **120**: 160-169.

Bódi, N., Jancsó, Zs., Talapka, P., Pál, A., **Poles, M.Z.**, Bagyánszki, M., Hermes, E., Fekete, É. (2014) Gut region-specific rearrangement of the cellular and subcellular compartments of nitric oxide synthase isoforms after chronic ethanol consumption in rats. **Histol Histopathol** **29**: 1547-1555.

Talapka, P., Nagy, L., Pál, A., **Poles, M.Z.**, Berkó, A., Bagyánszki, M., Puskás, L.G., Fekete, É., Bódi, N. (2014) Alleviated mucosal and neuronal damage in a rat model of Crohn's disease. **World J Gastroenterol** **20**: 16690-16697.

\*Máté, Z., \***Poles, M.Z.**, Szabó, G., Bagyánszki, M., Talapka, P., Fekete, É., Bódi, N. (2013) Spatiotemporal expression pattern of DsRedT3/CCK gene construct during postnatal development of myenteric plexus in transgenic mice. **Cell Tissue Res** **352**: 199-206. \*equal first authors

Bódi, N., Talapka, P., **Poles, M.Z.**, Hermes, E., Jancsó, Zs., Katarova, Z., Izbéki, F., Wittmann, T., Fekete, É., Bagyánszki, M. (2012) Gut region-specific diabetic damage to the capillary endothelium adjacent to the myenteric plexus. **Microcirculation** **19**: 316-326.