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RESEARCH AREA

In experimental cardiology models, several studies have already demonstrated that the reperfusion phase following cardiac oxygen deprivation activates processes that lead to further damage of myocardial tissue. However, there are endogenic protective mechanisms that can reduce the extent of damage. The beneficial effects of ischemic pre-, post- and remote conditioning as well as pharmacological pre- and post-conditioning have been demonstrated *in vivo* and *ex vivo* in animal models. However, failures in clinical trials show that these mechanisms are not sufficiently effective in ischemic heart patients. Preclinical data suggest that co-morbidities such as hyperlipidemia, metabolic syndrome, diabetes mellitus-induced tissue changes and drug treatment of these diseases have a strong interfering effect. The most cost-effective way to study intracellular mechanisms is to use *in vitro* cardiomyocyte models. Furthermore, the presence of ischaemia/reperfusion injury and co-morbidities poses additional risks, as the hidden side effects of many drugs are only seen in such cases.

Our research addresses the potential cardioprotective effects of microRNAs. The development of noncoding RNAs (such as microRNAs) as molecules of diagnostic and therapeutic value has in recent years brought them to the forefront of the pharmaceutical industry for the precision diagnosis and treatment of a number of diseases. In particular, to further investigate the role of mammalian metalloproteinase (MMP) enzymes in cardiac remodelling, the research group is developing MMP inhibitor molecules, which are being tested at several levels: *in silico* molecular design in collaboration with a chemistry group, *in vitro* pre-testing, screening, *ex vivo* and *in vivo* testing.

TECHNIQUES AVAILABLE IN THE LAB

- use of an *in vitro* simulated ischemia/reperfusion test system
- performing fluorescence and luminescence viability tests on isolated myocardial cells and cardiac cell lines
- construction of a primary rat cardiomyocyte model
- culture of cell lines, preparation of cell banks, frozen storage
- drug treatments in *in vitro* cell-based systems
- MMP zymography measurements to test the efficacy of matrix metalloproteinase enzyme inhibitors
- western blotting techniques for protein expression monitoring and identification
- qPCR technique to monitor and identify mRNA expression
- ELISA measurements for the identification of biomarkers

SELECTED PUBLICATIONS

Makkos A., Ágg B., Varga ZV., Giricz Z., Gyöngyösi M., Lukovic D., Schulz R., Barteková M., **Görbe A.**, Ferdinandy P. (2021) Molecular Network Approach Reveals Rictor as a Central Target of Cardiac ProtectomiRs. **Int J Mol Sci. 22(17):** 9539.

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Pálóczi, J., Szántai, Á., Kobolák, J., Bock, I., Ruivo, E., Kiss, B., Gáspár, R., Pipis, J., Ocsovszki, I., Táncos, Z., Fehér, A., Dinnyés, A., Onódi, Z., Madonna, R., Ferdinandy, P., **Görbe, A.** (2020) Systematic analysis of different pluripotent stem cell-derived cardiac myocytes as potential testing model for cardiocytoprotection. **Vascul Pharmacol 133-134:** 106781.