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RESEARCH AREA

Our group has been conducting research in the field of cardiac arrhythmias for decades. Our research interest includes 1) the investigation of novel antiarrhythmic drug candidates that may be used to treat atrial fibrillation, 2) studies aiming to better understand the mechanisms of sudden cardiac death in athletes, and the importance of various cardiac ionic currents that play a role in the repolarization reserve of the heart, as well as 3) developing novel animal models that can be used for more reliable prediction of drug-induced proarrhythmic side-effects. In our latest research topic we are aiming to investigate the potential cardiac electrophysiological effetcs of the 'so-called' sodium-glucose-cotransporter-2 (SGLT-2) inhibitors, a group of drugs originally used as antidiabetics, considering that these drugs have recently been recommended as first-line agents in the therapy of chronic heart failure by the latest guidelines, though, their electrophysiological effects are still not sufficiently understood.

TECHNIQUES AVAILABLE IN THE LAB

The cardiac electrophysiological methods applied in our lab includes 1) in-vivo ECG studies performed in awake and anesthetized animal models (rat, rabbit, dog), epicardial monophasic action potential and local activation time mapping and arrhythmia provocation tests, 2) ex-vivo Langendorff-perfused drug testing and 3) in-vitro action potential and ion current measurements done by intracellular microelectrode and patch-clamp techniques. These methods provide a comprehensive picture about the electrophysiological (anti/proarrhythmic) effects of the tested drugs, and also about the electrophysiological alterations of certain medical conditions.

SELECTED PUBLICATIONS

Kohajda, Z., Virág L., **Hornyik, T.**, Husti, Z., Sztojkov-Ivanov, A., Nagy, N., Horváth, A., Varga, R., Prorok, J., Szlovák, J., Tóth, N., Gazdag, P., Topal, L., Naveed, M., Árpádffy-Lovas, T., Pászti, B., Magyar, T., Koncz, I., Déri, S., Demeter-Haludka, V., Aigner, Z., Ördög, B., Patfalusi, M., Tálosi, L., Tiszlavicz, L., Földesi, I., Jost, N., Baczkó, I., Varró, A. (2022) In vivo and cellular antiarrhythmic and cardiac electrophysiological effects of desethylamiodarone in dog cardiac preparations. **Br J Pharmacol 179:** 3382-3402.

Castiglione, A.*, **Hornyik, T.***, Wülfers, EM., Giammarino, L., Edler, I., Jowais, JJ., Rieder, M., Perez-Feliz, S., Koren, G., Bősze, Z., Varró, A., Zehender, M., Brunner, M., Bode, C., Liin, SI., Larsson, HP., Baczkó, I., Odening, KE. (2022) Docosahexaenoic acid normalizes QT interval in long QT type 2 transgenic rabbit models in a genotype-specific fashion. **Europace 24:** 511-522.

Varga, RS., **Hornyik, T.**, Husti, Z., Kohajda, Z., Krajsovszky, G., Nagy, N., Jost, N., Virág, L., Tálosi, L., Mátyus, P., Varró, A., Baczkó, I. (2021) Antiarrhythmic and cardiac electrophysiological effects of SZV-270, a novel compound with combined Class I/B and Class III effects, in rabbits and dogs. **Can J Physiol Pharmacol 99:** 89-101.

Baczkó, I.*, **Hornyik, T.***, Brunner, M., Koren, G., Odening, KE. (2020) Transgenic Rabbit Models in Proarrhythmia Research. **Front Pharmacol 11:** 853.

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