

FERENC FEKETE



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RESEARCH AREA

Adverse side effects in drug therapy are partly due to differences or alterations in drug metabolism. We focus on the inter-individual variability in drug metabolism. Our main interest lies in the function and regulation of cytochrome P450 (CYP) enzymes, which play a key role in the metabolism of pharmaceuticals and other xenobiotics. By assessing an individual's CYP-status, clinically relevant CYP mutations and altered CYP expression can be identified to predict poor or extensive drug metabolism that may lead to increased side-effect risk or therapeutic inefficacy. Our aim is to investigate the background of inter- and intraindividual differences in drug metabolism, to estimate individual drug-metabolizing capacity, and to apply in personalized pharmacotherapy.

We study: 1) the metabolism and pharmacokinetic interaction properties of marketed drugs and drug candidates under development; 2) the factors influencing CYP enzyme expression and activity; 3) and we provide a diagnostic background for personalized drug therapy through the assessment of individual drug-metabolizing capacity; 4) furthermore, we develop in vitro models applicable in toxicological and safety assessments.

TECHNIQUES AVAILABLE IN THE LAB

- isolation of leukocytes/PBMC (peripheral blood mononuclear cells) from blood,
- isolation of nucleic acids (RNA, DNA, miRNA) from various biological samples,
- RT-PCR and high-throughput RT-PCR for analysis of SNVs (single nucleotide variations), mRNA expression and miRNA concentration,
- isolation of primary hepatocytes, hepatic microsomes and lysosomes,
- in vitro pharmacokinetics and metabolism in hepatocytes.

SELECTED PUBLICATIONS

Fekete, F., Menus, Á., Tóth, K., Kiss, Á. F., Minus, A., Sirok, D., Belič, A., Póti, Á., Csukly, G., & Monostory, K. (2023). CYP1A2 expression rather than genotype is associated with olanzapine concentration in psychiatric patients. *Sci Rep* **13**(1): 18507.

Fekete, F., Mangó, K., Minus, A., Tóth, K., & Monostory, K. (2022). CYP1A2 mRNA Expression Rather than Genetic Variants Indicate Hepatic CYP1A2 Activity. *Pharmaceutics* **14**(3): 532.

Fekete, F., Mangó, K., Déri, M., Incze, E., Minus, A., & Monostory, K. (2021). Impact of genetic and non-genetic factors on hepatic CYP2C9 expression and activity in Hungarian subjects. *Sci Rep* **11**(1): 17081.

Déri, M., Szakál-Tóth, Z., **Fekete, F.**, Mangó, K., Incze, E., Minus, A., Merkely, B., Sax, B., & Monostory, K. (2021). CYP3A-status is associated with blood concentration and dose-requirement of tacrolimus in heart transplant recipients. *Sci Rep* **11**(1): 21389.