KATALIN GODA

University of Debrecen
Faculty of Medicine
Department of Biophysics and Cell Biology

Address: Egyetem tér 1., H-4032 Debrecen, Hungary,
Life Science Building

RESEARCH AREA

The majority of human ABC proteins are active pumps utilizing the energy of ATP hydrolysis for exporting various compounds out of cells. Certain ABC transporters including ABCB1 and ABCG2 have extremely broad substrate spectra involving xenobiotics, endobiotics and numerous chemotherapeutic compounds applied in the treatment of various diseases. Since ABCB1 and ABCG2 are expressed in tissue barriers and in drug metabolizing and drug excreting organs (e.g., liver and kidney), they are important determinants of the pharmacokinetics of chemotherapeutic compounds. In addition, ABCB1 and ABCG2 are often overexpressed in tumour cells as well as in tumour stem cells, and therefore they are key players of the chemotherapy resistance of tumours. In view of their great physiological and medical importance, ABC transporters are important targets for pharmacological modulations. Therefore, the detailed understanding of the working mechanism of ABC proteins can promote rational drug design. On the other hand, the identification of drugs that can interact with ABCB1 or ABCG2 as substrates/inhibitors may help to avoid the emergence of drug-drug interactions upon treatment of various diseases.

TECHNIQUES AVAILABLE IN THE LAB

To gain deeper insight into the working mechanism, we introduce point mutations into structurally and/or functionally important parts of the studied transporters. The functional activity of the mutant variants is studied in substrate accumulation and efflux assays using fluorescent substrates as well as in ATPase activity measurements. The conformational changes are studied by conformation sensitive antibodies, while the substrate affinity of the different conformers is monitored in confocal microscopic fluorescence co-localization assays and by fluorescence correlation spectroscopy (FCS).

SELECTED PUBLICATIONS

Gyöngy, Zs., Mocsár, G., Hegedűs, É., Stockner T., Ritter, Zs., Homolya, L., Schamberger, A.I., Orbán, I.T., Remenyik, J., Szakác,s G., **Goda, K.** (2023) Nucleotide binding is the critical regulator of ABCG2 conformational transitions. **eLife 12:** e83976.

Goda, K., Dönmez-Cakil, Y., Tarapcsák, S., Szalóki, G., Szöllősi, D., Parveen, Z., Türk, D., Szakács, G., Chiba, P., Stockner, T. (2020) Human ABCB1 with an ABCB11-like degenerate nucleotide binding site maintains transport activity by avoiding nucleotide occlusion. **PLoS Genet 16:** e1009016

Tarapcsák, S., Szalóki, G., Telbisz, Á., Gyöngy, Z., Matúz, K., Csősz, É., Nagy P., Holb, I.J, Rühl, R., Nagy, L., Szabó, G., **Goda, K.** (2017) Interactions of retinoids with the ABC transporters P-glycoprotein and Breast Cancer Resistance Protein. **Sci Rep 7:** 41376.

Bársony, O., Szalóki, G., Türk, D., Tarapcsák, S., Gutay-Tóth, Z., Bacsó, Z., Holb, I., Székvölgyi, L., Szabó, G., Csanády, L., Szakács, G., **Goda, K.** (2016) A single active catalytic site is sufficient to promote transport in P-glycoprotein. **Sci Rep 6:** 24810.

Szalóki, G., Krasznai, Z., Tóth, Á., Vízkeleti, L., Szöllősi, A., Trencsényi, G., Lajtos, I., Juhász, I., Krasznai, Z., Márián, T., Balázs, M., Szabó, G., **Goda, K.** (2014) The strong in vivo anti-tumor effect of the UIC2 monoclonal antibody is the combined result of Pgp inhibition and antibody dependent cell-mediated cytotoxicity. **PloS ONE 9:** e107875.