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RESEARCH AREA

Post-translational modifications play a central role in the regulation of cellular physiology by enabling rapid and reversible control of protein function. One such modification is ADP-ribosylation, in which ADP-ribosyltransferases – members of the PARP family – covalently attach one or more ADP-ribose units to specific amino acids of target proteins. ADP-ribosylation has been studied most extensively in the context of the DNA damage response, where it promotes chromatin remodeling and coordinates the DNA repair factors.

Recent methodological advances have substantially expanded the scope of ADP-ribosylation research and brought mono-ADP-ribosylation into focus, which has been implicated in the regulation of mRNA metabolism, the fine-tuning of innate immune signaling, and in neurogenesis. However, the underlying molecular mechanisms remain poorly characterized.

Our research group aims to identify the roles of ADP-ribosylation in these processes using molecular and genomic approaches in mouse and human cell systems, as well as *Drosophila melanogaster*.

TECHNIQUES AVAILABLE IN THE LAB

Maintenance of mammalian cell cultures, genetic modification by CRISPR/Cas9-based gene knockout or regulated overexpression of proteins. Knocking down by RNA inhibition. Cell viability assays. Purification, immunoprecipitation of macromolecules/ complexes (DNA, RNA, protein) and analysis by gel electrophoresis and blotting techniques (Western blot, Northern blot). Basic molecular biology methods such as PCR, cloning, in vitro mutagenesis, real-time RT-PCR. Examination of fluorescently labeled proteins in living cells or by immunocytochemistry with confocal microscopy.

SELECTED PUBLICATIONS

Mérey, M., Fajka-Boja, R., Imre, G., Gudmann, P., Török, Z., Mátés, L., **Czibula, Á.**, & Timinszky, G. (2025). TARG1 affects EGFR signaling through the regulation of RNA metabolism. **Sci Rep 15**(1): 23651.

Imre, N., Hetényi, A., Szabó, E., Bodnár, B., Szkalisity, A., Gróf, I., Bocsik, A., Deli, M. A., Horvath, P., **Czibula, Á.**, Monostori, É., & Martinek, T. A. (2020). Routing Nanomolar Protein Cargoes to Lipid Raft-Mediated/Caveolar Endocytosis through a Ganglioside GM1-Specific Recognition Tag. **Adv Sci 7**(4): 1902621.

Szabó, E., Hornung, Á., Monostori, É., Bocskai, M., **Czibula, Á.**, & Kovács, L. (2019). Altered Cell Surface N-Glycosylation of Resting and Activated T Cells in Systemic Lupus Erythematosus. **Int J Mol Sci 20**(18): 4455.

Szabó, E., Fajka-Boja, R., Kriston-Pál, É., Hornung, Á., Makra, I., Kudlik, G., Uher, F., Katona, R. L., Monostori, É., & **Czibula, Á.** (2015). Licensing by Inflammatory Cytokines Abolishes Heterogeneity of Immunosuppressive Function of Mesenchymal Stem Cell Population. **Stem Cells Dev 24**(18): 2171–2180.