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RESEARCH AREA

The actin cytoskeleton as a structural and functional unit of cells plays essential roles in virtually all cellular processes. Its functioning relies on the large inventory of actin-binding proteins and their functional couplings. Central to our research, we investigate the mechanisms underlying the functioning of the actin cytoskeleton by studying the structural features, activities, and interactions of actin and actin-binding proteins.

Our experimental approach allows us to explore the molecular relationships that regulate the organization of actin networks, so it has biomedical potential. It can contribute to a better understanding of the relevant diseases.

Our laboratory focuses on the following major research problems:

- (1) Mechanisms governing the assembly of thin filaments
- (2) Functional coordination of actin-microtubule cytoskeleton dynamics

TECHNIQUES AVAILABLE IN THE LAB

Protein expression and purification (recombinant – E.coli and from tissue), protein biophysical and biochemical approaches, fluorescent modification of proteins, spectroscopy (UV-VIS absorption, fluorescence), light- and fluorescence microscopy (total internal reflection fluorescence microscopy), gel electrophoresis, Western blot, liquid chromatography (size-exclusion and affinity chromatography), sedimentation (preparative centrifugation), bioinformatics, image analysis, statistics.

SELECTED PUBLICATIONS

Telek, E., Karádi, K., Kardos, J., Kengyel, A., Fekete, Zs., Halász, H., Nyitrai, M., **Bugyi, B.**, Lukács, A. (2021) The C-terminal tail extension of myosin 16 acts as a molten globule, including intrinsically disordered regions, and interacts with the N-terminal ankyrin. *J Biol Chem* **297**: 16 p.

Vemula, V., Huber, T., Ušaj, M., **Bugyi, B.**, Mansson, A. (2021) Myosin and gelsolin cooperate in actin filament severing and actomyosin motor activity. *J Biol Chem* **296**: 16 p.

Bugyi, B., Kellermayer, M. (2020) The discovery of actin: “to see what everyone else has seen, and to think what nobody has thought”. *J Muscle Res and Cell Motil* **41**: 3-9.

Pintér, R., Huber, T., Bukovics, P., Gaszler, P., Vig, AT., Tóth, MÁ., Gázsó-Gerhát, G., Farkas, D., Migh, E., Mihály, J., **Bugyi, B.** (2020) The Activities of the Gelsolin Homology Domains of Flightless-I in Actin Dynamics. *Front Mol Biosci* **7**: 18 p.

Tóth, MÁ., Majoros, KA., Vig, AT., Migh, E., Nyitrai, M., Mihály, J., **Bugyi, B.** (2016) Biochemical Activities of the Wiskott-Aldrich Syndrome Homology Region 2 Domains of Sarcomere Length Short.: WH2 domains in sarcomeric actin regulation. *J Biol Chem* **291**: 667-680.

Bugyi, B., Carlier, MF. (2010) Control of actin filament treadmilling in cell motility. *Annu Rev Biophys* **39**: 449-470.