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RESEARCH AREA

Using Drosophila melanogaster as a model, our research group investigates the molecular mechanisms underlying the formation, transport, and degradation of organelles within the endo-lysosomal and autophagic system. We focus on how lysosomes, endosomes, and autophagosomes are generated, positioned, and fused to ensure efficient cellular degradation. Our work has revealed novel roles of cytoskeletal proteins and fusion factors in controlling vesicle transport and membrane fusion events. By combining advanced microscopy, genetics, and biochemistry, we aim to understand how defects in these processes contribute to human diseases. Our long-term goal is to uncover the fundamental principles of lysosomal system organization and to provide mechanistic insights relevant to lysosomal and autophagy-related disorders.

TECHNIQUES AVAILABLE IN THE LAB

Students joining our group gain hands-on experience in Drosophila and cultured insect cell gene manipulation, including gene knockouts, transgenic reporter construction, and mosaic analysis. They learn confocal and transmission electron microscopy (including sample preparation), assays for autophagic degradation and endocytic uptake, as well as molecular and biochemical methods for protein interaction studies such as Western blotting, immunoprecipitation, yeast two-hybrid, PCR, molecular cloning.

SELECTED PUBLICATIONS

Hargitai, D., Nagy, A., Bodor, I., Szenci, G., Laczkó-Dobos, H., Bhattacharjee, A., Neuhauser, N., Takáts, S., Juhász, G., & **Lőrincz, P.** (2025). HOPS-dependent vesicle tethering lock inhibits endolysosomal fusions and autophagosome secretion upon the loss of Syntaxin17. **Sci Adv 11(23):** eadu9605.

Lőrincz, P., & Juhász, G. (2020). Autophagosome-Lysosome Fusion. **J Mol Biol 432(8):** 2462–2482.

Lőrincz, P., Kenéz, L. A., Tóth, S., Kiss, V., Varga, Á., Csizmadia, T., Simon-Vecsei, Z., & Juhász, G. (2019). Vps8 overexpression inhibits HOPS-dependent trafficking routes by outcompeting Vps41/Lt. **eLife 8:** e45631.

Lőrincz, P., Mauvezin, C., & Juhász, G. (2017). Exploring Autophagy in Drosophila. **Cells 6(3):** 22.

Lőrincz, P., Tóth, S., Benkő, P., Lakatos, Z., Boda, A., Glatz, G., Zobel, M., Bisi, S., Hegedűs, K., Takáts, S., Scita, G., & Juhász, G. (2017). Rab2 promotes autophagic and endocytic lysosomal degradation. **J Cell Biol 216(7):** 1937–1947.