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RESEARCH AREA

My workgroup is interested in the role the plasma membrane plays in physiological and pathological processes. Signaling of growth factor receptors involves dimerization and the formation of larger oligomers whose composition is not only influenced by the ligand itself, but by the surrounding lipid environment as well. We study how transmembrane signals induced by peptide growth factors alter these receptor clusters, how the lipid environment bears on this process, and how it can be correlated with transmembrane signaling. Biophysical properties of the cell membrane, including its potentials, fluidity and curvature, have been recognized to play important roles in tuning cellular responses and regulating transmembrane transport. We would like to use these principles to optimize the cellular uptake of cell penetrating peptides that could potentially enable the selective treatment of cells even with membrane impermeable drugs.

More details about the research interest of my research group can be found on our web page:
https://peternagygroup.com/

TECHNIQUES AVAILABLE IN THE LAB

- labeling of cells with fluorescent antibodies, peptides, transfection of cells with fluorescent proteins
- confocal microscopy
- flow cytometry
- digital image analysis
- investigation of protein clustering
- investigation of transmembrane signaling

SELECTED PUBLICATIONS

Kovács, T., Zákány, F., **Nagy, P.** (2022) It takes more than two to tango: complex, hierarchal, and membrane-modulated interactions in the regulation of receptor tyrosine kinases. **Cancers 14:** 944.

Hajdu, T., Szabó, K., Jakab, Á., Pócsi, I., Dombrádi, V., **Nagy, P.** (2021) Biophysical experiments reveal a protective role of protein phosphatase Z1 against oxidative damage of the cell membrane in Candida albicans. **Free Rad Biol Med 176:** 222-227.

Batta, G., Kárpáti, L., Henrique, G.F., Tóth, G., Tarapcsák, S., Kovács, T., Zákány, F., Mándity, I.M., **Nagy, P.** (2021) Statin-boosted cellular uptake and endosomal escape of penetratin due to reduced membrane dipole potential. **Br J Pharmacol 178:** 3667-3681.

Hajdu, T., Váradi, T., Rebenku, I., Kovács, T., Szöllősi, J., **Nagy, P.** (2020) Comprehensive model for epidermal growth factor receptor ligand binding involving conformational states of the extracellular and the kinase domains. **Front Cell Dev Biol 8:** 776.

Szendi-Szatmári, T., Szabó, Á., Szöllősi, J., **Nagy, P.** (2019) Reducing the detrimental effects of saturation phenomena in FRET microscopy. **Anal Chem 91:** 6378-6382.