

Developing Organic Molecular Systems Toward Functional Biomimicry

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Organic small molecules are indispensable tools for interrogating biological systems. π -Conjugated frameworks enable fluorescence imaging of dynamic cellular processes, while self-assembled small-molecule architectures can mimic selected functions of biological macromolecules, providing tunable minimalist platforms to dissect complex biochemical behavior. Both directions rely on rational scaffold design that bridges fundamental organic chemistry and biological function.

In this seminar, I will first introduce my previous work on fluorescent small-molecule probes for cellular imaging. I will then present our recent results on light-responsive synthetic lipid systems for membrane-mimetic applications, including light-driven artificial assemblies and optical regulation of membrane dynamics.

References

Lee, Y.; Fracassi, A.; Devaraj, N. K. *; "Control of giant vesicle assemblies by stimuli-responsive lipids", *Chem. Commun.*, **2024**, 60, 3930.

Lee, Y.; Fracassi, A.; Devaraj, N. K. *; "Light-driven membrane assembly, shape-shifting, and tissue formation in chemically responsive synthetic cells", *J. Am. Chem. Soc.*, **2023**, 145, 25815.

Lee, Y.; Devaraj, N. K. *; "Lipase mimetic cyclodextrins", *Chem. Sci.*, **2021**, 12, 1090.

Lee, Y.; Cho, W.; Sung, J.; Kim, E.; Park, S. B.*; "Monochromophoric Design Strategy for Tetrazine-Based Colorful Bioorthogonal Probes with a Single Fluorescent Core Skeleton." *J. Am. Chem. Soc.*, **2018**, 140, 974.