# Chemical biology tools based on self-localizing molecules

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Creating molecular tools that are useful for studying and controlling biological processes in living cells is a key component of chemical biology. Our research group is particularly interested in developing small-molecule tools that enable the manipulation of signaling pathways at specific intracellular locations. The self-localizing ligand-induced protein translocation (SLIPT) technique is a novel chemical approach we developed for controlling protein localization and signaling processes in living mammalian cells. This method uses synthetic ligands, termed self-localizing ligands (SLs), which are designed to localize to specific subcellular regions in mammalian cells spontaneously. SLs bind their target proteins and relocate (tether) them rapidly from the cytoplasm to their localization sites in a "single ligand-single protein" manner. In the first part of my talk, I will present the basic principle and current applications of our SLIPT tools[1–5] and discuss how the SLIPT approach is useful as a chemical biology tool to study cell signaling.

Furthermore, the design strategies we established to develop SLs can be applied to generate novel synthetic fluorescent probes with subcellular localization properties. Such self-localizing fluorescent molecules can be easy-to-use probes for visualizing organelle morphology and dynamics in living cells. In the second part of my talk, I will introduce a new series of fluorescent Golgi-staining probes that we recently developed to overcome the limitations of existing ceramide-based probes.[6]

**References**

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