Poster

PYP-tag Ligands with Noncanonical Reactive Groups for Fluorogenic Protein Labeling

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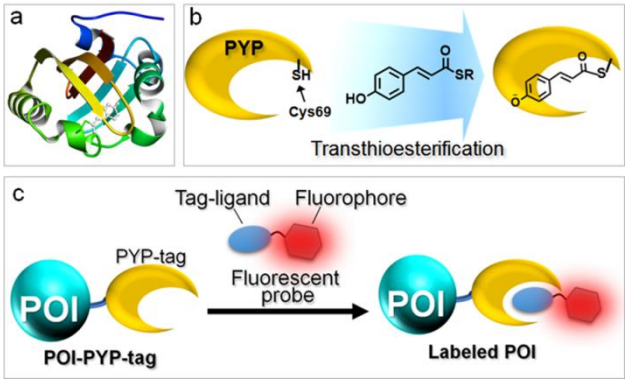
The monitoring of intracellular biomolecules such as proteins has provided deep insights into the understanding of various biological functions and phenomena. From this viewpoint, fluorescence imaging technology in combination with a diverse variety of fluorescent labels for proteins is widely employed to visualize and monitor protein functions. Our laboratory earlier developed a protein-labeling system based on the PYP-tag (Photoactive yellow protein) and its fluorogenic probes.[1] PYP-tag is a small water soluble protein (14 kDa) originated from *Halorhodospira halophila*, and known to covalently bind to the thioester derivatives of cinnamic acid or coumarin. In order to further explore and widen the scope of PYP-tag, we were interested in the development of ligands carrying reactive sites other than thioester for this protein-tag. In this perspective, we have synthesized PYP-tag ligands having electrophilic methyl ketone group as a reaction site for Cys residue of PYP. Interestingly, these probes acted not only as a ligand for PYP-tag but also perform the role of fluorogenic moiety and thus, enabling the quick imaging of proteins of interest. In the conference, the photophysical and labeling studies of these newly developed probes and the details of live-cell imaging will be presented.



(a) PYP structure (PDB ID: 1otb) with ligand bound state. (b) Transthioesterification reaction of *p*-coumaric thioester with PYP. (c) Schematic illustration of PYP-tag/fluorescent probe based strategy for protein-labeling.

References:

1 Hori, Y.; Ueno, H.; Mizukami, S.; Kikuchi, K. *J. Am. Chem. Soc*. **2009**, *131*, 16610-16611.
2 Hirayama, S.; Hori, Y.; Benedek, Z.; Suzuki, T.; Kikuchi, K. *Nat. Chem. Biol*. **2016**, *12*, 853-859.