

Genetically-encoded antibody-based biosensors for detection of antigens

Kim Phuong Huynh Nhat

Molecular Network Control Factors Development Unit, RIKEN Center for Life Science Technologies

Fluorescence-based biosensor is a useful tool for not only detection but also real-time imaging of biological events. In this study, we utilized SNAP-tag protein and its fluorescent ligands for N-terminal fluorescent labeling of an antibody single-chain variable domain (scFv), the fusion exhibited fluorescence enhancement in the presence of antigens as a result of antigen-dependent removal of quenching effect on the labeled fluorophore. In addition, fusion of fluorescent protein to SNAP-tag-scFv resulted in double labeled biosensor. We observed FRET between fluorescent protein and labeled fluorophore, and as consequence, antigen-dependent increase of fluorescence ratio. Our strategy on antibody-based biosensor has a wide range of application because this biosensor is easy to design for various molecules with high specificity and affinity, and can be genetically encoded for live-cell imaging application. This study also demonstrates an application of protein-tag for biomolecular sensing as part of a biosensor.

(Co-author: Takayoshi Watanabe and Takahiro Hoshika)

School of Materials Science, Japan Advanced Institute of Science and Technology (JAIST)