Molecular system for multiple detection of enzymes inside the cells

Project description

Regulation of biochemical processes inside a cell is intensively studied area of chemical biology with aim to elucidate relationship between (de)activation of various proteins and cells transformation or apoptosis. The elucidation of this relationship belongs to crucial knowledge in mosaic of factors causing a start of various diseases, mechanism of drugs action, resistance to therapy or e.g. self-regulation processes of cells to prevent a disease development.

The project is focused on development of molecular systems for simultaneous/sequential detection of relevant enzymes inside the cells.

The system will be constructed from peptide linkers for specific interaction with the enzymes and several fluorescent dyes/quenchers. Interaction of appropriate enzyme with specific linker should cause a change of fluorescence characteristic for its presence. Combination of various changes should be characteristic for presence of more enzymes.

Developing skills:

- organic synthesis, mainly solid-phase synthesis
- fluorescent spectroscopy
- enzymology

Requirements:

- experience in organic synthesis
- basic knowledge in analytical chemistry
- basic knowledge in biochemistry
- experience with Scifinder and other sources for literature search
- self-motivation and responsibility for pushing project ahead

Literature:

He, L. et al. *Cytometry Part A* **2006**, 69A:477-486.

Sakamaki, K. et al. *PlosOne* **2012**, 7(11), e50218.

Zhang, X.Z. et al. *Chem. Commun.* **2015**, 51, 14520-14523.

Zhang, X.Z. et al. *Anal. Chem*. **2017**, 89, 4349−4354.

Okorochenkova, Y.; Hlavac, J. *Dyes Pigments* **2017**, 143, 232-238.