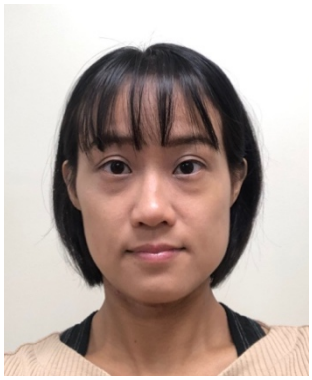
FASSBERG SEMINAR SERIES



Mako Kamiya
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Rapid cancer imaging by rationally designed fluorescence probes

It has been a long-term goal to develop cancer-imaging techniques that have sufficient specificity and sensitivity, since early detection and complete resection are an important prognosticator for cancer treatment. Since fluorescence-guided diagnosis is one of the most powerful techniques for real-time in situ cancer detection, we have focused on developing activatable fluorescent probes targeted to enzymes that are overexpressed in cancer.

We first focused on cancer-associated aminopeptidases as imaging targets, and prepared a series of fluorogenic substrates for various aminopeptidases based on the concept of intramolecular spirocyclization. Then, we applied these probes to the resected specimen from cancer patients, followed by the subsequent assessment of fluorescence signals. As a result, we found that gGlu-HMRG (a probe for □-glutamyltranspeptidase (GGT)) can be selectively activated at certain types of cancers such as breast cancer, and EP-HMRG (a probe for dipeptidylpeptidase-IV (DPP-IV)) is effective for detecting esophageal cancer in resected tissue from patients.

In order to expand the target cancer, we recently focused on cancer-associated carboxypeptidases (CPs). Especially, we focused on the glutamate CP activity of prostate-specific membrane antigen (PSMA), which is overexpressed in prostate cancer. Based on our finding that aryl-glutamate conjugates with an azoformyl linker are recognized by PSMA, we developed a first-in-class activatable fluorescence probe for CP activity of PSMA. We confirmed that the developed probe allowed us to visualize the CP activity of PSMA in living cells and in clinical specimens from prostate cancer patients, and is expected to be useful for rapid intraoperative detection and diagnosis of prostate cancer.

We believe that the fluorescence-guided diagnosis by our activatable probes can be used as an imaging guidance during surgical procedures to help surgeons for efficient tumor inspection.

Host: Grazvydas Lukinavicius

Tuesday / 15.10.2019 / 11:00

Max Planck Institute for Biophysical Chemistry
Large Seminar Room / Administration Building