Rapid cancer imaging by rationally designed fluorescence probes
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It has been a long-term goal to develop tumor-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 tumor detection, we have focused on developing a new cancer-imaging method with activatable fluorescent probes targeted to enzymes that are overexpressed in tumors. For this purpose, we developed a series of fluorescence probes for aminopeptidases based on intramolecular spirocyclization reaction. By applying one of these probes to mice model of peritoneal metastasis, tiny disseminated tumors were visualized rapidly and sensitively. Also, by topical application of these probes to resected specimens from human cancer patients, it was revealed that some of our probes are valid for detecting specific cancer such as breast cancer and esophageal cancer. In this symposium, I would like to introduce the design of activatable fluorescence probes and its application to cells, mice, and patient specimens.