S29-1 Introduction and multimodal in vivo molecular imaging

◯Mikako OGAWA[1]

[1]Hamamatsu Univ. Sch. of Medicine

In vivo molecular imaging has made great progress due to advances in the engineering of imaging devices and developments in chemistry of imaging probes. Several imaging modalities such as radionuclide imaging (PET, SPECT), optical imaging, magnetic resonance imaging (MRI), ultrasonography and CT can be utilized for molecular imaging. Each modality has advantages and disadvantages depend on the character of the detecting signals. To make molecular imaging probe, we combine a targeting ligand, which bind to the specific molecule on target tissue, with signal emitting molecules. Recently, a "multimodal imaging probe", that has multiple kinds of signal emitting molecules on a targeting ligand, has emerged to take advantage of each modality. For example, optical imaging is easy-to-use, and since the fluorescent signal is controllable depends on the physiological conditions, "activatable probe" can be designed. This signal switchable character results in high target to background ratios to improve the target specificity. However, it is not quantitative because of signal attenuation especially when the target tissue is in deep. On the other hand, radionuclide imaging is superior in quantification and whole body imaging is possible even in human; however, the imaging technique is complicated and target specificity is somewhat low because of its "always ON" signal feature. That is, the mutual cooperation of optical imaging and radionuclide imaging (and MRI, CT to get additional morphological information), has great potential for simultaneous visualization, characterization, and measurement of biological processes.