

***In Vivo* Imaging Using Positron Emission Tomography (PET)**

○ Yasuhisa Fujibayashi, Takako Furukawa, Tetsuya Mori, Hidehiko Okazawa, Yoshiharu Yonekura (Biomedical Imaging Research Center, Univ. Fukui)

Positron Emission Tomography (PET) allows us to visualize *in-vivo* dynamics of biologically active radio-labeled compound (PET-probe) in living animal as well as human noninvasively. PET-probe can be used in tracer amount, namely chemically and pharmacologically negligible levels, so that it is considered to be ideal for human studies in the very early stage of drug development, so-called “Man in First” concept. Human application of PET was started more than 30 years ago, and almost 100 PET centers are actively working in Japan now.

Recent progress in molecular biology allows us to use transgenic animals as well-defined disease models. In addition, small animal-PET machines having a resolution of 1 mm or less are now commercially available. A seamless evaluation system for pharmaco-kinetics / pharmaco-dynamics from mouse to human has been realized

PET is an imaging tool of radioactivity, so that it cannot provide any information about chemical structure / metabolism. Thus, kinetic model analysis is required for PET data interpretation in general. However, it is also possible to make a special drug design of PET probe to provide a specific biological function such as receptor density, enzyme activity, and so on.