

S19-6 The Study of Metallomics Imaging Using Electron Tracking Compton Camera (ETCC)

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Monitoring the dynamic state of trace metals in living organisms or artificially-synthesized metal complex compounds is thought to provide effective insight into understanding the physiological effect, pharmacological effect, and toxicity as they relate to trace metals. However, it has been difficult to obtain this information since we did not have a good method to analyze dynamic state in vivo. Recently, we have developed the “Electron Tracking Compton Camera (ETCC)”, which is capable of measuring multiple-nuclide simultaneously without consideration of radionuclide energy. By using this camera, it may be possible to image 1/10 or less, radiation dose of Positron emission tomography (PET), and to visualize a wide range in-vivo dynamic displacement within a single cell using a 1/1000 or less, weak radiation dose. Using ETCC, Mn-54, Fe-59, Au-198 and Zn-65, all of which are radioactive metals, were administered to living plants and animals in order to image dynamic state and distribution. To be more precise, by having Mn-54 absorbed into a plant stem, we have succeeded in obtaining images of radioactivity localized where energy metabolism actively occurs. Furthermore, we have synthesized multiple imaging probes for ETCC with the introduction of radionuclides, and imaged their dynamic state and distribution. From the results, we predict that this device will become a powerful tool in the metallomics imaging study. At the symposium, we will show our recent developments using actually-obtained images.