and was efficiently high from 30 minutes to 60 minutes after the injection of Sn-PYP, which an average of 90% was achieved in 19 cases after the interval of 30 min. On the other hand, the dose-dependance of injected Sn-PYP was not clarified.

Although there are still many points to be clarified as to binding mechanism of pertechnetate-RBC complex, the in vivo labeling method seems to be able to be used with the sufficient labeling efficiency and technical easiness.

**A High Tumor/Blood Ratio Complex of $^{99m}$Tc-Bleomycin (Tc-BLM)**


*Kyoto University, Faculty of Pharmaceutical Sciences
**Kyoto University School of Medicine

The usefulness of Tc-BLM in tumor diagnosis has been considered to be greatly dependent on the chemical state of labeled complex; this can be controlled by labeling condition, mainly the amount of SnCl₂ and pH of the labeling condition. These parameters were studied in detail.

Tc-BLM complex were analyzed by thin layer chromatography (MeOH : 10% NH₄OAc, 1 : 1) and electrophoresis (EP) (pH 7.0 phosphate buffer, 500 V, 1 hr). Tissue distribution was studied with Ehrlich tumor bearing mice. Studies have shown that a stable Tc-BLM, in which Tc in a tetra valent state, without being hydrolyzed was needed for a high tumor to blood ratio. Hydrolysis of Tc is influenced by the amount of SnCl₂ and pH of the labeling solution. So, the use of a minute amount of SnCl₂ and its quick addition into the mixture of BLM and $^{99m}$TeO₄⁻ is required to minimize the hydrolysis phenomenon. Under this condition, the pH effect is studied and an electrically neutral complex formation is obtained at pH 6.

The neutral complex is stable against hydrolysis. This feature can theoretically be explained; at this pH, according to the pKₐ value of BLM, the third N atom of BLM can be strongly co-ordinated.

In vivo distribution of the neutral complex is analyzed and the highest tumor/blood ratio is achieved (tumor/blood, 2.5 at 3 hr).

It is concluded that this Tc-BLM complex prepared under very strictly controlled condition such as a minute accurate amount of SnCl₂ and very narrow pH range is the most valuable one for a clinical use.

**The Preparation of $^{11}$C-Methyl Iodide and its Use in the Synthesis of $^{11}$C-Caffeine**


*Kyoto University School of Medicine, **National Institute of Radiological Sciences

Caffeine was labeled with $^{11}$C using $^{11}$CH₃I and its distribution in mice was studies.

$^{11}$CO₂ produced in the NIRS Medical Cyclotron in a (p, a) reaction, was reduced to $^{11}$CH₃OH by LiAlH₄. $^{11}$CH₃OH was converted by HI to $^{11}$CH₃I which is useful for methylation several groups present in many natural substances. The preparation of $^{11}$CH₃I was completed in 25 min after the EOB by using the remote-controlled techniques and the radiochemical yield was 64%.

Caffeine was labeled by action of $^{11}$CH₃I on theophylline. After purification by passing through on a alumina column, $^{11}$C-caffeine was dissolved in physiologic saline. The overall time for the synthesis and purification was about 45 min with 40% radiochemical yield. The radiochemical purity was checked by thin layer chromatography on silica gel (solvent : CHCl₃ : CH₃OH = 19 : 1)