the trauma) accumulation radioisotope was very slow initially and it gradually increased for months which showed initial slow phase of phosphate metabolism and gradually accelerated metabolic process of the bone tissue, which could not be visualized by X-ray.

It was found that the bone-scanning was useful, in clinical cases to evaluate the condition of healing process of the bone such as in cases of false joint.

Animal Experiments:

In rats the half-circle of femurs were severed. The bone X-ray and radioautograph were taken chronological from 2 days to 8 weeks after surgery. Early days after surgery there was not remarkable accumulation of radioisotope. However it was gradually increased after the biginning of ossification. The healing process of bone was complated 8 weeks after surgery and there was abnormal accumulation of radioisotope.

We beleive chronological bone-scanning was very useful to evaluate the metabolic state of bone tissue after the bone-fracture and the surgery of bones, which may not be visualized bone X-ray.

Factors Influencing the Uptake of ^{169}Yb, ^{67}Ga and ^{111}In into Bone

A. Ando, T. Hiraki, S. Sanada, K. Hisada and I. Ando
Schools of Paramedicine and Medicine, Kanazawa University

There is no great difference of the tumor uptake rate between ^{169}Yb, ^{67}Ga and ^{111}In. But we reported recenly that ^{169}Yb was rapidly cleared from the blood and most was taken into the bones, and on the other hand, a small amount of ^{111}In was taken up into the bones, and ^{67}Ga showed an intermediate behavior between ^{169}Yb and ^{111}In. And the merked difference in the biological properties between these elements was based on the difference in bone affinity. To explain these facts, we examined the adsorption test of several elements (including ^{67}Ga, ^{169}Yb and ^{111}In) to the hydroxyapatite crystel (as a substitution for the bones) in the protein solution (albumin and transferrin) and 0.01 mole phosphosaline buffer (pH 7.3), to the cation exchange resin in this buffer solution. The results have been sammarized as follows: iron had a strong binding power with transferrin and was not adsorbed into the hydroxyapatite crystal. Among the elements which do not have strong binding power with protein, ^{169}Yb and ^{67}Ga were almost quantitatively adsorbed into the hydroxyapatite crystal, but ^{111}In was not adsorbed as much as ^{169}Yb (or ^{67}Ga). From these results, it is thought that the elements which had a strong binding power with protein were not adsorbed into the hydroxyapatite crystel. The adsorption rate of ^{111}In to the hydroxyapatite crystal in the protein solution and butter solution was smaller than those of ^{67}Ga and ^{169}Yb. Against the cation exchange resin, the same affinity was observed as was seen in the hydroxyapatite crystal. It might be deduced as followings. A reason for the strong affinity of ^{169}Yb to the bone is attributed to the fact that ^{169}Yb stays mostly as cation form in the blood, as only a small amount of ^{111}In stays in cation form in the blood, ^{111}In shows a weak affinity to the bone, and ^{67}Ga shows an intermediate affinity.