## INTRACELLULAR KINETICS OF GA-67 AS STUDIED BY ISOPYCNIC RATE-ZONAL ULTRACENTRIFUGATION, USING RAT LIVER AS IN VIVO MODEL

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As reported previously, we have recently developed a new technique in fractionating all subcellular particles of the cell, by using isopycnic and rate-zonal principles originally developed by Anderson. Because of the drawback of the original procedure, i.e., the original procedure exclude cell nuclei which is heavy and with a high S values, thus continuous fractionation and complete recovery impossible. We have overcome this difficulty by supplementing the sucrose gradient with high density cesium chloride, in order to raise the density of the sucrose enough to stop cell nuclei and undisrupted cells. The results obtained thus far are very satisfactory. With this improved technique, we carried out continuous fractionation of rat liver cells in which Ga-67 citrate was administered intravenously. The intracellular localization of radioactivity at zero time and 24 hrs was studied. At time zero, the radioactivity remained in the supernatant. 24 hrs later, there was found no significant amount of radioactivity in the supernatant, and it was found that the main peak of radioactivity in lysosomal fractions. A study of carrier-protein revealed that it has about 4.9 S values at the time zero. At 24 hrs, however, all the radioactivity in the supernatant was moved to the lysosomal fraction. However, because this fraction was contaminated with heavy endoplasmic reticulum, the uptake of gallium in lysosomes or in heavy endoplasmic reticulum, or in both, is suggested. Our electron microscopic study could not deny the latter alternative. The localization study of Ga on this fractions is in progress, using EPMA (electron probe microanalyzer system), and it will be reported elsewhere.

## CLINICAL USES OF $^{123}I$ PRODUCED BY $^{124}Te(p, 2n)$ $^{123}I$ REACTION

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I-123 supplied on commercial bases has been produced by $^{122}Te(d,n)$ $^{123}I$ reaction. In this product, however, four radioimpurities consist of $^{124}I$, $^{126}I$, $^{130}I$ and $^{131}I$ are inevitable with a variety of minute contents. Recently, new $^{123}I$ product using $^{124}Te$ (p, 2n) $^{123}I$ reaction was developed, commercially available in Japan. It was reported that the new $^{123}I$ showed no discernible radioimpurity only except 2.3% of $^{124}I$ on calibration time, and also $^{123}I$ yield in higher than that of former reaction.

The purpose of this study is compar tively to examine the physical property and radioimpurity contained in both old $^{123}I$ product and new one, and to evaluate their clinical advantages. Measurements of the radioimpurity were performed by gamma-ray spectrometry and the clinical evaluation was attempted by scintigraphy on thyroid phantoms and patients.

The radioimpurity in new $^{123}I$ product was evident on two nuclides of $^{124}I$(2.4%) and $^{126}I$(0.21 %) alone. Radiation exposure doses to a patient, who was administered new $^{123}I$ product of 100uCi, were calculated 3.7 rad in thyroid and 5.0 mrad in total body. These values imply lower exposure to patients by approximate 25% and 15% reduction respectively comparing with those of old $^{123}I$ product. Concerning thyroid scintigraphy, thyroid phantoms and four patients with thyroid were examined with new and old $^{123}I$ products, by using a scintillation camera with a pin-hole collimator. The differences on quality of thyroid images were not so evident between two kinds of $^{123}I$ products except a slight increase of body background counts seen on old one. Therefore, it is concluded that the thyroid image of slightly better quality is obtained by $^{123}I$ produced by new reaction comparing with those of old one.