

## Turnover Studies of Sodium in Man by a Human Counting Technique

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A long term clinical observation on  $^{22}\text{Na}$  turnover in two patients were made under ordinary diet condition by the whole body and profile scanning techniques.

The retention curves of  $^{22}\text{Na}$  in the patients could be divided into two exponential function for convenience, because of the relatively few number of observations, though Richmond reported that the  $^{22}\text{Na}$  retention curves in man could be divided into 3 exponential functions. Biological half-lives of the fast and slow components of the retention curves in the patients were found to be 7.56, 206 days and 8.06, 200 days respectively. Biological half-lives of serum of the subjects were 7.60 and 7.90 days respectively.

The extrapolating values of the slow components of the patients at time zero were found to be 0.10% and 0.15% of administered

dose. These values indicated that the small amount of  $^{22}\text{Na}$  entered slow exchanging pool, presumably the skeletal system, and this was also suggested by the animal experiments. The relative distribution of  $^{22}\text{Na}$  in head, thigh and abdominal segments at various time intervals after the administration of the isotope, were calculated from the profile scanning data of the patients. Both the relative sodium content in head and thigh increased until few days, while the content in the abdominal segment decreased, then the relative distribution in the each segment became constant. This is probably due to the proportion of skeletal tissue in head and thigh is higher than the abdominal segment. It was also assumed from above results that a large portion of sodium in bone exchanges within 1 or 2 days.

## Absorption of Vitamin $\text{B}_{12}$ in Man Observed by Profile Scan

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The absorption and distribution of radioactive vitamin  $\text{B}_{12}$  were studied in human subjects with the use of human counter.

Four normal men and two patients with liver cirrhosis were studied. One  $\mu\text{Ci}$  of  $^{60}\text{Co}$ -cyanocobalamine ( $^{60}\text{Co}$ -CN  $\text{B}_{12}$ ) and/or 1.5  $\mu\text{Ci}$  of  $^{57}\text{Co}$ -coenzyme  $\text{B}_{12}$  (5, 6-dimethylbenzimidazolyl cobamide coenzyme) was administered orally to the materials in the fasting. After the ingestion of the radioactive vit.  $\text{B}_{12}$ , the longitudinal profile scans over whole body were serially carried out at 5 minutes, 2, 4, 8, and 48 hours. The human counter had been demonstrated as "MUHC" elsewhere, and it

was set for the longitudinal scan.

1) In normal subjects, the highest peak of the profile scan at 5 minutes was observed in the region of the stomach. Two hours later, the peak moved to the iliac region. There was little change in the profile between 4 and 8 hours. After 48 hours, a moderate radioactive peak was observed in the region of the liver. The radioactivity remained in the body at 48 hours was 75%, and the urinary output was 0.3% for 24 hours.

2) In a case of a normal subject injected a large dose of CN  $\text{B}_{12}$  (1,000  $\mu\text{g}$ ) at 2 hours after the ingestion of  $^{60}\text{Co}$ -CN  $\text{B}_{12}$ , the profile