

## INTERNAL DOSIMETRY OF $^{75}\text{Se}$ -METHIONINE

R. E. JOHNSTON, J. R. MATHER and A. B. BRILL

Division of Nuclear Medicine and Biophysics, Vanderbilt University School of Medicine,  
Nashville, Tennessee, U.S.A.

**Abstract**— $^{75}\text{Se}$ -methionine is in limited use for radioisotopic visualization of the pancreas and parathyroid glands. Also,  $^{75}\text{Se}$  in the form of sodium selenate is a promising means for estimating the extracellular fluid volume. Some dosimetry studies have been reported, but present estimates of the pertinent radiologic dosimetric factors show discrepancies. It is thus important to determine more accurately the radiation hazard of  $^{75}\text{Se}$  in order to assist in the evaluation of its usefulness in medical diagnostic procedures.

A detailed determination of the  $\gamma$ -coefficient and average  $\beta$ -energy per disintegration has been carried out using experimental data whenever possible, and theoretical values where experimental data are unavailable. The  $\gamma$ -coefficient was calculated to be 1.925 r/mCi hr at 1 cm; the average energy from electrons and  $\beta$ -type radiation ( $\bar{E}\beta$ ), was calculated to be 12.8 keV/dis.

Some biological distribution studies in animals limited to short time periods (<24 hr) have been reported. We have made a long term investigation (70 days) of  $^{75}\text{Se}$ -methionine metabolism in rats. These investigations show a disproportionality high amount of  $^{75}\text{Se}$  in the gonads which only becomes apparent after about 15 days. Since the gonadal deposition of this radioactive element could be a function of the stage of reproductive ability of the organism, experiments have been conducted to evaluate the gonadal uptake and retention as a function of age of the organism.

Results of these experiments and the relation to radiation dose in humans will be presented.