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January 20, 1953

The Medical Research Center
Brookhaven National Laboratory
Upton, L. I., New York

Dr. Lee Farr

Dr. J.S. Robertson

Quarterly Report from
Biophysics and Physiology

W. Steinfield

An attempt has been made to assay the clinical effectiveness of Krypton 87 in suppressing pleural and peritoneal effusions secondary to cancer. A total of 25 treatments were given to six patients - as pneumoperitoneum and pneumothorax. Treatments are well tolerated and temporary beneficial results were noted in the cases of pleural effusion. However, the specific activity obtained with Krypton is probably too low to make it a satisfactory therapeutic tool.

In connection with the brain tumor problem uranium arsphenamine was prepared and its distribution studied. The dissimilar distribution of the uranium and arsphenamine in the vervous system supports other evidence that this supposed compound is probably a double colloid instead of an organic molecular entity.

E. Stickley

Slow neutron attenuation measurements were made in tissue and tissue-equivalent systems, using indium and gold foils, and ionization chamber techniques. Beam conditions include the convergent geometry obtaining at the therapy site, and the collimated two-inch square beam. Materials used included tissue-equivalend plastic and tissue-equivalent liquid mixtures. Half value attenuation lengths varied with the experimental conditions from 0.59 inch to 0.64 inch. Back scatter ratio at rear of the treated mass was in the range 0.33 to 0.50. Neutron depth dose curves have been developed from phantom and in vivo exposures.

Mice with induced brain tumors were given the B (n,) treatment in the 2 x 2 inch collimated neutron beam. The treatment was minimal, but definite effect was noted.

Means were devised and tested for irradiating mice (whole-body) at the Medical facility with accurately timed exposures. The method requires only a simple set-up, but permits successive runs without requiring pile shut-down between exposures. A permanent facility of this type is being designed, to accomodate both the neutron and boron toxicity studies, and the experimental irradiation of induced mouse brain tumors.

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C. Lewallen

A program for measurement of disappearance notes of Na and K from plasma on patients in the euthythroid and myxedematous states has been initiated. Standard solutions for determination of sodium, potassium, antipyrine, total serum protein, and chloride have been made up and methods completed.

J.L. Gamble Jr.

Publications:

BNL-1239 (with J.S. Robertson)
The Volume of Distribution of Radioactive Chloride in Dogs; comparison with Sodium, Bromide, and Inulin Spaces.

(will be Am J Phys. Dec. 1952) Abstract NSA 6-6079

BNL-1326 (with J.S. Robertson, C.A. Harrigan, C.G. Foster, and L.E. Farr)
Chloride, Bromide, Sodium and Sucrose Spaces in Humans
(accepted by JCI)

D.C. Tosteson

Publications:
Potassuim Exchange in the Red Blood Cells of the Duck
(with J.S. Robertson)
[redacted]tract submitted to Fed Proc

Work along the lines previously discussed in studies of potassuim exchange in the red cells of sickle-cell anemia patients and of ducks is continuing.

J.S. Robertson

Publications:
Joint author on above papers.
BNL-1330 (with H. Sanders)
An 800,000 R/hr Co^{60} Gamma Source
(being processed as a BNL report)

One sodium study in a nephrotic child was done.
An attempt is being made to recover the boron from the urines collected after the last two-brain-tumor irradiations.
Development of trituim method continues.
An article on the use of tracers in the analysis of three-compartment systems is in preparation.

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