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BROOKHAVEN NATIONAL LABORATORY

MEMORANDUM

DATE: August 2, 1956

REPOSITORY Records Holding Area Bldg. 494
COLLECTION Protocols - Clinical
BOX No. 4
FOLDER Human Protocols 1950-1963

TO: Committee for the Use of Isotopes in Humans

FROM: H. A. Eder, M.D.

SUBJECT: Study of cholesterol metabolism in hospitalized patients. Project H-44

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Request is made for the authorization for the use of acetate 2-C^{14} in selected hospitalized patients.

I. Isotope

A. Physical characteristics: C^{14} has a T/2 of Ca. 5,000 yrs. Its decay scheme is $C^{14} \longrightarrow N^{14} + \beta$ (E max. .155 MEV.)

B. It is proposed to administer sodium acetate 2-C^{14}. The most extensive study of the metabolic fate of this compound has been reported by Hellman et al. (Radioisotope Techniques, Proceedings of the Isotopes Techniques Conference, Oxford, July, 1951)

They have shown that nearly 70% of the administered compound is expired as CO_2. About 10% can be accounted for in urine and feces after 10 days. After 8 months they recovered about 2% of the dose in the body of a patient who died. About 50% of the dose has a T/2 of 1 day or less. About 80% of the dose is excreted in 10 days. It has been assumed that the remaining 20% has a T/2 of 180 days.

If a 50 kg. patient were given 500 μC and it were completely retained, the exposure would be 0.15 rep/week. On the basis of the above data the exposure would be as follows: Dose for the first week, 0.088 rep., total dose, 1.55 rep. This dose is well within the maximum permissible dose of 0.3 rep. per week.

II. Specific proposal

It is proposed to administer 500 μC of sodium acetate 2-C^{14} to , age 42, on Ward 304. This patient has a lymphosarcoma at the mesentery. This was diagnosed at operation, December, 1955. Following operation, she developed chylous ascites. She is now relatively asymptomatic.

During the first 3 hours when it is anticipated that 30-40% of the administered dose will be present in the expired CO_2, the patient will be kept in the air conditioned radiation room. Under these circumstances

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the concentration in the air will not exceed the maximal permissible concentration of 10^{-6} μC per ml. of air.

After this period the patient will be transferred to a hospital room in which a blower with its inlet at the patient's bedside and outlet to the outside has been installed.

This study is being undertaken in order to study the incorporation of acetate into the free and ester cholesterol of the various lipoprotein classes. Since certain of these classes have a low cholesterol content, it is necessary to use fairly large doses of C^{14} in order to obtain satisfactory counting. (Removal of large samples of blood would not be desirable in this study.) Furthermore, there is evidence that the activity of the serum cholesterol must be followed for as long as a month in order to make a satisfactory calculation of turnover. This also requires the use of adequate amounts of isotope.

It is requested, therefore, that permission be given to administer the isotope acetate 2-C^{14} to selected individuals in tracer amounts which in no case will exceed 0.3 rep/wk.

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