

MEMORANDUM

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

DATE: June 16, 1958

TO: BNL Committee for the Use of
Isotopes in Humans
FROM: W. Wolins, M. D.
E. A. Popenoe, Ph.D.
SUBJECT: Project H-53
Tracer studies of glycoprotein
metabolism

Authorization is requested to administer to adult human subjects 200 microcuries of C^{14} in the form of uniformly labeled $C^{14}D$ - glucose in a single intravenous injection. Glucose can be expected to be a rapidly metabolized compound. Although there seems to be no data available on retention of C^{14} from glucose in man, the experiments of Steele (Summary of a Conference on the Toxicity of C^{14} , Argonne National Laboratory, Jan. 15-16, 1952 by A. M. Brues and D. L. Buchanan) on the retention from uniformly labeled sucrose in mice are pertinent. Sucrose would be expected to be metabolized at approximately the same rate as is glucose. Steele found that 20 per cent of the isotope was excreted within the first hour, 85 per cent within the first day, and 98 per cent within the first week. 99 per cent was excreted within 36 days, 92 per cent as CO_2 and the remainder about evenly divided between urine and feces. The results of detailed tissue analyses throughout the period of the experiment showed that no tissue or organ at any time exceeded three times the mean body specific activity at that time. Because of the lower metabolic rate of humans, it is probable that the retention after short times would be about twice as great but should approach the retention in mice after longer periods. The excretion by humans of C^{14} from glucose would certainly be no slower than that from 2- C^{14} -glycine (N. I. Berlin, B. M. Tolber, and J. H. Lawrence, J. Clin. Invest. XXX, 73 (1951)), i.e., 40-50 per cent within 24 hours, 80 per cent within 20 days, and 95 per cent within 60 days. If completely retained and evenly distributed, single doses of 200 microcuries would deliver no more than 0.06 r per week. Similarly, Eder calculated (Project H-44) that if a 50 kg patient were given 500 microcuries of C^{14} and it were completely retained, the exposure would be 0.15 rep per week. Since Berlin has calculated that the first 200-day exposure after administration of 100 microcuries of 2- C^{14} -glycine results in delivery of 0.22 rep, it may be anticipated that no

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more than 0.44 rep would be sustained in these experiments over a period of 200 days. As has been the practice of the hospital, these experiments will be conducted in adequately ventilated rooms in which the patient will remain for a few hours. Hazards to attendant personnel are not such as to require any further precautions. (cf. Authorization H-41 to Dr. W. W. Shreeve).

APPROVED:

Lee E. Farr
L. E. Farr, M. D.

E. E. Stickley
E. E. Stickley, Ph. D.

Walton W. Shreeve
W. W. Shreeve, M. D., Ph.D.

Robert A. Conard
Robert A. Conard, M. D.

Donald C. Borg
Donald C. Borg, M. D.

James S. Robertson
James S. Robertson, M.D., Ph.D.