DETERMINATION OF BODY FAT BY CYCLOPROPANE ABSORPTION

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This procedure is based upon the fact that cyclopropane is soluble in fat but sparingly soluble in non-lipid tissue (solubility ratio approximately 52:1) A technique employing cyclopropane has been successfully developed for the in vivo determination of fat in rats by Lesser, Gerson, Arnold Blumberg and J. Murray Steele, Gold Water Hospital and New York University, College of Medicine. A report of their investigations, Federation Proc. 11: (1) :92. 1952 follows:

Total body fat of fats was determined in vivo by measurement of the quantity of cyclopropane absorbed by the animal at a known tension of the gas. A measured quantity of cyclopropane was administered to each animal in an enclosed gas chamber of known volume. The tissues of the rat were found to come into equilibrium with cyclopropane at the tension of the gas existing in the chamber in about 90-150 minutes. After this time had elapsed the concentration of cyclopropane in the chamber was determined by oxidation with iodine pent-oxide. From the solubility coefficients of cyclopropane in fat and non-lipid tissues and the concentration of cyclopropane in the chamber, the fat content of the rat was calculated. Due to its extremely high fat; water solubility ratio (approximately 52:1) about 90% of all cyclopropane in the body is present in fat once equilibrium occurs. Since relatively small amounts of cyclopropane are present in non-lipid tissues, even large errors in estimation of the cyclopropane in the non-lipid tissues cause only minor errors in the body fat determination. Values for total body fat by this method were found to approximate closely the weight of total ether extractable materials. Mean weight of fat of 10 white rats by cyclopropane absorption was 40.4 gm., by ether extraction 40.1 gm. The average deviation was $\pm$ 2.1 gm. Average fat content by both methods was 13.2% of body weight, with an average deviation of $\pm$ 0.7%.

The obvious importance of knowledge relating to the rate of fat accumulation in animals on various dietary regimes is sufficient justification for a suggestion that a comprehensive study of this method should be made.

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MR. BUTLER: Do you propose that the cyclopropane method might be appropriate for small animals?

MR. KASTELIC: I cannot answer your question since I have had absolutely no experience with the procedure. I am going to try it on some rats when I get the time.

(Following announcements the meeting recessed at 5:15 o'clock.)

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