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Received May 2, 1951. P.S.E.B.M., 1961, v107.

Tetracycline Accelerates Elimination of Strontium from Bones in Mice.* (26684)

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The antibiotic tetracycline, identified in tissues by its golden fluorescence, is preferentially deposited in growing bone(1), and has been shown to inhibit skeletal formation in the chick embryo(2). It has been hypothesized that the tetracyclines interfere with cellular and enzymatic processes by virtue of their affinity for inorganic cations, especially calcium and magnesium(3). We have investigated the effects of tetracycline on strontium metabolism in adult mice, using Sr-85, a gamma emitter, as tracer. Aside from its importance in radioactive fallout (as the isotope Sr-90), strontium has gained increasing attention as a tracer for studying bone metabolism, being handled in the body qualitatively similarly to calcium(4).

In this experiment, 19 Swiss Webster mice were given single injections of $Sr^{85}(NO_3)_2$, 1 μc each, specific activity 200 μc/mg. The control group, consisting of 10 animals, received no other treatment. The 9 mice in the second group were given daily injections of tetracycline, 150 mg/kg, starting on the 4th day prior to Sr-85 injection, and continuing to the 25th day after Sr-85 injection, when all the animals were sacrificed. The amount of Sr-85 in each mouse each day was measured with an external gamma detector (NaI scintillation counter). Average values of total body Sr-85 against time are shown in Fig. 1. Each curve has a fast component, representing direct excretion from the body of a portion of the initial dose, and a slower component, representing gradual elimination of the portion incorporated into bone. Extrapolation of the slow exponential yields the fraction of the original dose which was deposited in bone. At autopsy, no significant

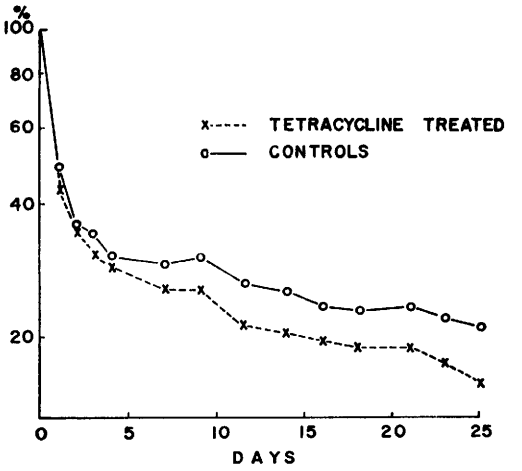

FIG. 1. Turnover of Sr^{85} in tetracycline treated mice.

* Supported by Am. Cancer Soc. Grant T134 and Damon Dunyon Fund.

TABLE I.

	Control	Tetracycline	P
Half-time in days of fast component	.65 ± .17	.61 ± .12	.58
% of dose incorporated in bone	35 ± 7	33 ± 4	.55
Half-time in days of slow component (elimination of Sr-85 from bone)	35 ± 4	22 ± 2	.01
% of dose in whole mouse on 25th day	21 ± 4	16 ± 2	.01
% of dose in femurs on 25th day	1.65 ± .43	1.16 ± .06	.01

Sr-85 was present in any tissue except bone. The Sr-85 content of femurs from each mouse was determined. Comparison of the two group averages (± S.D.) is set forth below. P is the probability of the difference between groups having occurred by chance.

It appears then that under the conditions of this experiment parenterally administered tetracycline accelerates elimination of strontium from bones, while not significantly affecting the amount deposited in bones. Dosage and time dependence of this effect is being further studied.

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Received May 4, 1961. P.S.E.B.M., 1961, v107.

Glucose Uptake by Epididymal Fat Pads from Rats Fed Glucose, Lactose or a Glucose-Galactose Mixture. (26685)

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The carcass fat content of growing and mature rats fed glucose is about 40% greater than that of those fed lactose. This difference persists even if the weight of the glucose-fed animals is kept equal to that of the lactose-fed group by food restriction(1). Fat deposition in rats fed prehydrolyzed lactose, *i.e.*, a 50-50 mixture of glucose and galactose, is also higher than in lactose-fed rats(1).

Recent research(2) indicates that conversion of blood glucose to lipid by adipose tissue is of importance to an understanding of the biochemical basis for obesity. Interest in the mechanism responsible for differences in fat deposition led us to compare rate of glucose uptake by the adipose tissue from rats fed various carbohydrates.

Materials and methods. Male Sprague Dawley rats were fed a diet containing glucose, lactose or a 50-50 mixture of glucose and galactose, 52; casein, 24; fat, a mixture of vegetable oils and oleo oil, 20; salt mixture, Hubbel, Mendel, and Wakeman, 4; plus an adequate vitamin mixture(1).

The epididymal fat pads from rats, killed by a blow on the head, were placed as rapidly as possible in 5 ml of Krebs-Ringer bicarbonate solution at 37° with a glucose concentration of 5 μM per ml, contained in a 50 ml Erlenmeyer flask. When added, insulin concentration was 0.1 unit per ml. Weight of the tissue was estimated by weighing the flask plus contents to the nearest 10 mg before and after addition of the tissue. After exposing to a water saturated mixture of 95% O_2-5% CO_2 at 37° for 5 minutes the flasks were kept at 37° with gentle agitation at 60 cycles per minute for 3 hours. Glucose was determined by Nelson's method(3) after deproteinization with $ZnSO_4$ and Ba $(OH)_2$; nitrogen was determined by the Kjeldahl method after defatting the tissue with ace-