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Reduction of the Absorption and Retention of Strontium in Rats

THE absorption and retention of dietary strontium can be reduced by supplementing the diet with an equimolar mixture of barium and sodium sulphates^{1,2}, calcium phosphates³, or sodium alginate^{4,5}. The possibility of remedial measures to protect a population exposed to a high concentration of strontium-90 in the diet makes these results particularly interesting. Promising results have been obtained from each of the dietary supplementations, and the purpose of the present investigation was to compare the effectiveness of the different treatments in rats of the same strain and age in similar conditions.

Sixty-three female albino rats, 8–9 weeks old and weighing about 130 g, were used. All rats had been fed the standard diet (1.0 g calcium, 0.5 g phosphorus/100 g diet) with water *ad lib.* since weaning. They were divided into seven groups of nine animals each and fed for 8 days on the standard diet or diets supplemented with the additives shown in Table 1. On the sixth day, the rats were placed in separate metabolism cages and given tracer amounts of almost carrier-free strontium-85 and calcium-47 in the drinking water for 2 days before they were killed on the eighth day. Urine was collected from each rat during the last 3 days of the experiment and the gut was removed after death, before drying and ashing the separate carcasses. All assays of radioactivity were made on a single channel gamma scintillation counter⁶.

The results are shown in Table 1. The amounts of strontium-85 in the carcass and in the urine plus carcass are measures of the body retention and the absorption of the radioactive marker, respectively. For calcium-47, however, when dietary calcium is increased by supplementation with calcium and phosphorus, the body retention and absorption of the marker decreases, and the fall in the percentage of calcium-47 in the carcass and in the urine plus carcass which we observed is to be expected.

Table 2 shows the comparative absorption and retention of strontium relative to that in the control animals (no supplementation). It should be noted that the

Table 2. ABSORPTION AND RETENTION OF STRONTIUM-85

Supplement	⁸⁵ Sr per cent absorbed	control Retained
Sulphates	46	46
Phosphate	27	29
Alginate 1	33	37
Alginate 2	25	26
Alginate	19	15
Alginate + phosphate	15	13

sulphate and phosphate supplementations were equimolar (60 mmoles/l.).

The decreased retention and absorption of strontium-85 shown in Table 2 were achieved with only about 30 per cent change in the absorption and retention of calcium. The combined therapy with alginate and calcium phosphate supplementation gave the greatest reduction in the strontium absorbed or retained that we have obtained so far from any dietary supplementation.

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PATHOLOGY

Adverse Effects on Offspring of Tranquillizing Drugs during Pregnancy

It has recently been shown that the injection of certain tranquillizing drugs during pregnancy produces loss of weight and defects of maze learning depending on the stage of pregnancy in which the injections are given¹. The same workers obtained inconclusive evidence of the effect of tranquillizers on conditioned avoidance training. The present study investigates further the possible effect on conditioning of such treatment and attempts to verify the effects on weight.

Twelve groups of female rats were used in a 4 × 3 factorial design. One independent variable, the drug administered, involved four groups—experimental subjects the mothers of which were given reserpine (Res), meprobamate (Mep), chlorpromazine (Chl), or distilled

Table 1. EFFECT OF DIETARY SUPPLEMENTS ON THE MEAN CONTENT OF STRONTIUM-85 AND CALCIUM-47 IN THE CARCASS AND URINE PLUS CARCASS OF 8 WEEK OLD RATS

Group	Total dietary		Additive/ 100 g diet	Carcass ⁸⁵ Sr	Percentage of oral dose		
	Ca (g/100 g diet)	P (g/100 g diet)			⁴⁷ Ca	Urine + carcass ⁸⁵ Sr	⁴⁷ Ca
Control	1.0	0.5	—	11.5 (0.7) ‡	35.4 (2.5)	15.0 (0.8)	40.5 (2.4)
BaSO ₄ + Na ₂ SO ₄	1.0	0.5	5.7 g SO ₄	5.3 (0.3)	32.7 (0.7)	6.9 (0.3)	36.0 (0.4)
KH ₂ PO ₄ + CaCl ₂	2.5	2.4	5.7 g PO ₄	3.3 (0.3)	9.9 (0.8)	4.1 (0.4)	10.3 (0.8)
Na alginate 1 (B.D.H.)*	1.0	0.5	10 g	4.2 (0.2)	27.0 (1.1)	5.0 (0.2)	28.6 (1.0)
Na alginate 2 ('Manucol' SS/LD/2)†	1.0	0.5	10 g	3.0 (0.2)	27.3 (0.9)	3.7 (0.2)	28.6 (1.0)
Na alginate 2	1.0	0.5	20 g	1.7 (0.1)	22.3 (0.9)	2.9 (0.2)	24.1 (0.7)
Na alginate 2 and KH ₂ PO ₄ + CaCl ₂	2.5	2.4	10 g + 5.7 g PO ₄	1.5 (0.1)	9.6 (0.5)	2.3 (0.2)	10.4 (0.5)

* British Drug Houses (batch No. 2492290).

† Alginate Industries, Ltd., London.

‡ Figures in parentheses are standard errors of the mean.