tions, muscular dystrophy is due to lack of tocopherol alone. Factor 3-active selenium compounds do not substitute for Vit. E.

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Urinary and Fecal Excretion of Orally Administered Mg^{28}.* (23929)

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It is well recognized that magnesium is a biologically important ion. Studies of its metabolism, however, have until recently been hampered by technologic difficulties. Within the past several months a synthetic radioactive isotope of magnesium, Mg^{28}, with half-life of 21.8 hr, has become available and has made possible a reevaluation of metabolism of magnesium in human beings. The purpose of this pilot study was to follow the behavior of orally administered magnesium, using Mg^{28} as tracer. Urinary and fecal excretion of the isotope was measured.

Material and methods. Initial observations (Group A) were made in 12 hospitalized adult male convalescents from various diseases. None had any symptoms or signs of gastrointestinal disturbances, and all were on regular hospital diet. Radioactive magnesium (Mg^{28}) as magnesium chloride in an acid solution, was given in water, usually mid-morning. The dose of 10 to 25 μc was contained in 3 to 10 meq of magnesium. All urine passed within next 24 hours was collected in chemically clean glassware. Seven patients were given one dose of Mg^{28}; 4 were given 2 doses a week apart; and the twelfth patient given 3 doses of tracer at weekly intervals. Subsequent studies (Groups B, C and D) were done in 14 healthy medical students. Each student received orally 10 μc of Mg^{28} contained in 3 meq of magnesium. In 7 instances (Groups C and D) 2 gelatin capsules containing a gram of carmine were given at the same time. In addition to specimens of urine and feces collected in chemically clean glassware from all students, several venous blood specimens were obtained from 3 students in Group D. Two students (#11 and 12) were given a second dose of isotope one week after the first. Radioactivity of urine, plasma and feces was determined with a well-type scintillation counter and a scaling circuit. Stool specimens were digested in concentrated sulfuric and nitric acids prior to radioactivity assay. A total of 10,000 counts was made on each sample. All determinations were corrected for physical decay of isotope.

Results. The maximum 24 hour urinary excretion rate for Mg^{28} in hospitalized patients (Group A) was 6.27%; the mean, 2.11 $\pm$ 1.61%. Except in one patient, the second and third determinations of urinary excretion rate gave results closely comparable to the first.

The 24 hour urinary excretion of radioactivity in the first 9 medical students (Group

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TABLE I. Urinary and Fecal Excretion of Mg^{28} following Its Oral Administration.

Patient No.	% of dose recovered in urine				% of dose recovered in stool					
	0–24′	24–48′	48–72′	Total	0–24′	24–48′	48–72′	72–96′	96–120′	Total
Medical students										
Group C										
10	2.87	1.77			60.13	14.48	.65			75.26
11–1	4.27	2.72			.10	7.16	35.26	42.64		85.16
12–1	2.17	1.55			24.34	26.46		24.45		75.25
13	1.71	1.14			0	45.66	4.11	6.56		56.33
	2.76	2.39	Means							
Group D										
11–2	3.18	2.02	1.05	6.25	.22	1.56	11.67	32.26	37.08	82.79
12–2	3.98	3.28	.91	8.17	1.14	25.30			61.53	87.97
14	1.24	1.80	.17	3.21	41.62	14.28	3.50			59.40
	2.80	2.37	.71	Means						

B) was between 1.13 and 4.93% of total administered dose, mean value being 2.88 ± 1.27%. Maximum total radioactivity recovered in stools within the first 48 hours was 61.85%.

Four other students (Group C) were then given, in addition to the same dose of Mg^{28}, the carmine indicator. Stools were collected for 96 hours, or until red color had disappeared. Urine specimens were collected for 48 hours. Urinary excretion of radioactivity during the first 24 hours was comparable to that observed in Groups A and B; excretion of Mg^{28} during the second 24-hour period was consistently lower than that during the first 24 hours. Maximum fecal recovery rate obtained in this group was 85.16% (Table I). Radioactivity was usually greatest in stools with most intense red color.

In the final set of observations (Group D), 3 students were given the same tracer dose of Mg^{28} and the carmine dye, but urine collections were extended over 72 hours and fecal collections through 120 hours. Urinary excretion of Mg^{28} during the first 48 hours was comparable to that observed in Group C; amount of Mg^{28} excreted during 48-72 hour period was lower than that observed in either of the preceding 24-hour periods. Maximum percentage of radioactivity recovered in stools was 87.97. In one subject (#12-2) 96% of radioactivity administered was recovered in stool and urine.

Blood specimens were obtained at 2, 4, 6 and 8 hours after oral administration of Mg^{28} to 3 students in Group D. Calculations, based on specific activity of material administered, showed that rise in serum magnesium concentration attributable to orally administered material was on the order of 0.75 to 3.85 x 10^{-5} meq/l; the highest concentration in each subject was found at 4 hours (Table II).

Comments. In the therapy of eclamptogenic toxemia, Pritchard(1) reported that *oral* administration of approximately 300 to 600 meq of magnesium sulfate increased urinary excretion of magnesium by less than 5% of injected dose. Previous studies had shown that when magnesium sulfate is administered *parenterally* it is excreted solely by the kidneys, 70 to 90% being so eliminated(2). There was no evidence that any of the injected magnesium was excreted by way of the feces(3).

The results of our study are compatible with those reported by Pritchard(1), and extend his observations. Urinary excretion of a single dose of orally administered Mg^{28} was less than 10% and did not appear to be complete within 72 hours, although maximal excretion occurred during the first 24 hours. Since it has previously been shown that almost the entire dose of *parenterally* adminis-

TABLE II. Plasma Radioactivity Concentration following Oral Administration of Mg^{28}.

Subject	Hr after oral ingestion			
	2	4	6	8
11–2	1.05*	3.85	3.46	2.73
12–2	1.10	2.26	1.96	1.07
14	.75	1.12	1.09	

* All values = × 10^{-5} meq/l and are based on specific activity of material administered.

tered magnesium is excreted by the kidney, one may conclude that the low urinary excretion of *orally* administered Mg^{28} is due to poor gastrointestinal absorption of this material. The very slight rise in serum magnesium concentration following oral dose of magnesium also suggests poor gastrointestinal absorption, as does the recovery of 83 and 88% of total administered dose in the feces in the 2 medical students (#11 and 12).

Summary. A tracer dose of Mg^{28} (10 to 25 μc contained in 3 to 10 meq of magnesium) was administered orally to 26 subjects, and serial specimens of blood, urine and feces were assayed for radioactivity. Urinary excretion within 72 hours accounted for less than 10% of total dose of Mg^{28}; the maximal excretion (6.3%) occurred during the first 24-hour period. Maximal concentration of radioactivity in plasma occurred at 4 hours, but the actual increase in serum magnesium was negligible. Fecal excretion within 120 hours accounted for 60 to 88% of administered dose. Low renal excretion of magnesium is believed due to poor gastrointestinal absorption of this material.

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Effect of Experimentally Induced Fever on Alimentary Lipemia. (23930)

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The discovery of Hahn(1) that intravenous injection of heparin rapidly clears the turbidity of alimentary lipemia has been amply confirmed. Clearing occurs similarly when the serum of heparinized animals is mixed with lipemic serum and with fat emulsions *in vitro,* but not when heparin is added directly(2). This observation led to the conclusion that heparin does not act as such, but produces a clearing factor in the body. Release of heparin by shock and by histamine injection has a similar clearing effect(3).

The fortuitous observation that plasma of a patient with familial hyperlipemia cleared repeatedly during several bouts of fever caused by idiopathic pericarditis suggested that a rise in body temperature may similarly release the clearing factor. It was, therefore, attempted to investigate the possible effect of experimentally induced fever on alimentary lipemia in the dog.

Material and method. A) *In vivo studies.* 105 mongrel dogs of either sex, weighing 10 to 15 kg were fasted for 48 hours. The animals were then fed 10 egg yolks either alone or added to a mixture of small pieces of cooked meat and oat meal. To prevent regurgitation each animal received 50-60 mg of Thorazine intramuscularly immediately after eating. The animals were divided into 6 groups: 1) 25 dogs serving as controls were fed the egg yolk meal as indicated above. 2) 30 dogs received 0.5-0.7 cc of typhoid and paratyphoid vaccine (Parke, Davis and Co.) subcutaneously. 3) 11 animals were given 100 γ of Piromen (Travenol Laboratory, Inc.)† intravenously 1½ hours after test meal. 4) 25 dogs were injected with 25 mg of heparin intravenously after similar time interval. 5) 8 dogs received simultaneously injections of 0.5-0.7 cc of typhoid and paratyphoid vaccine subcutaneously and 25 mg

* Deceased.

† Piromen is non-protein, bacterial component, containing mixture of nucleic acids and polysaccharide complex.