

must be largely oxidized. The hypothesis that fat may be transformed into glucose based on such evidence is, therefore, not valid. This is a preliminary report.

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3512

pH Concentration of Intestinal Contents of Dog, with Special Reference to Inorganic Metabolism.

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Ten dogs were fed a normal diet (125 gm. meat, 100 gm. cracker meal, 30 gm. bone ash, 15 gm. lard, 300 cc. water); 3 dogs were fed a diet comparatively high in carbohydrate (25 gm. meat, 150 gm. cracker meal, 30 gm. bone ash, 30 gm. lard, 350 cc. water); 2 dogs were fed a high protein diet (300 gm. meat); and 2 a diet high in fat (50 gm. meat, 50 gm. cracker meal, 30 gm. bone ash, 180 gm. lard).

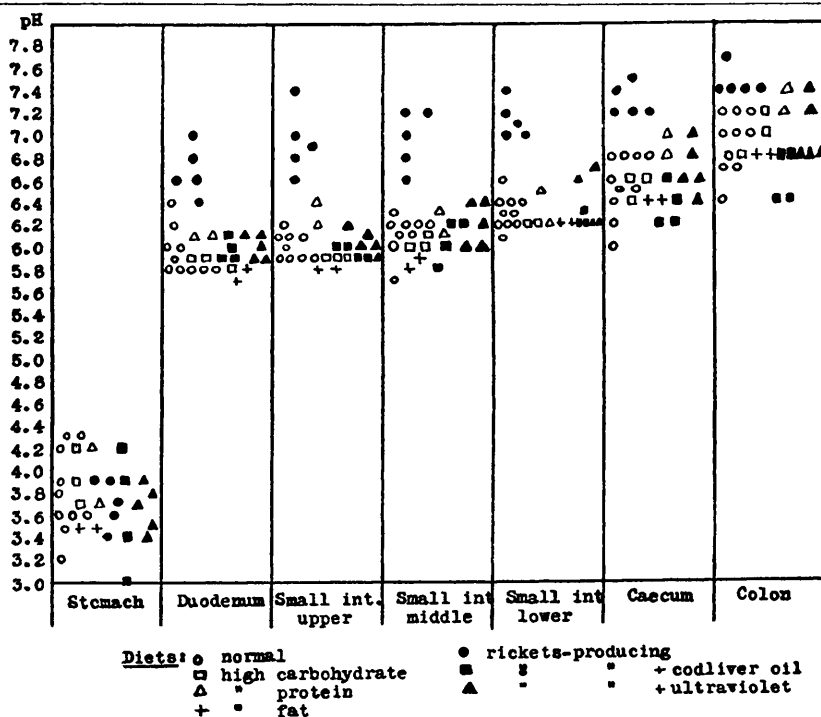
Fifteen dogs were fed a diet which has been shown by Mellanby³ to produce rickets in young dogs (175 cc. milk, 200 gm. white bread, 2 gm. NaCl). Of these, 4 were also fed 10 cc. of cod-liver oil daily; and 5 were irradiated with ultra-violet light for periods ranging from 40 min. to 3 exposures of 45 min. each on consecutive days. Four to six hours after the last feeding the dogs were killed by intravenous injection of amytal, and the alimentary canal removed. The contents of the stomach, duodenum, 2 ft. sections of the intestine, the caecum, and the colon were obtained and the pH determined.

112 determinations (15 dogs) were made both electrometrically and colorimetrically. In the other determinations the colorimetric method was used. Comparison of the two methods justifies reliance on comparative results as obtained colorimetrically. The average error of the colorimetric method, as compared with the electrometric, was 0.2 of a pH unit; the maximum difference was 0.39, and the minimum 0.1; in every case the error was minus.

The average acidities, in terms of pH, are shown in the table. The variations are indicated in the chart.

TABLE I.

No. of dogs.	Diets	Stomach	Duod.	Upper small int.	Middle small int.	Lower small int.	Caecum	Colon
10	Normal diet	3.68	5.91	5.99	6.27	6.36	6.57	6.84
3	High carboh. diet	3.93	5.87	5.90	6.03	6.20	6.53	7.00
2	High fat diet	3.50	5.75	5.80	5.85	6.20	6.40	6.80
2	High protein diet	3.95	6.00	6.30	6.23	6.45	6.90	7.30
6	Rachitic diet	3.71	6.59	6.81	6.88	7.05	7.27	7.44
4	R. + C. L. O. diet	3.40	5.97	5.92	6.02	6.11	6.32	6.52
5	R. + Irradiation	3.62	5.99	5.94	6.16	6.26	6.63	6.94



The normal diet showed acidity throughout the tract, with considerable constancy at each level. High fat, protein, or carbohydrate variations caused no notable changes, the results falling within the normal ranges.

The rickets-producing diet caused a definite rise in the pH of the contents of the intestines, even to alkalinity. Ultra-violet irradiation or cod-liver oil administration (both of which are known to be curative or preventive for rickets) to dogs on the same diet caused an acidification of the intestinal contents to the normal range. The gastric contents showed no changes.

The contents of the small intestines of rats, and the feces of rats, have been shown to have a pH above normal on a rachitic regime of the low phosphorus type, while curative procedures reduce the pH to normal.^{1, 2, 7} There is evidence that cod-liver oil, ultra-violet light, or the ingestion of acid or alkali, affect the degree of absorption of phosphate (and calcium) from the intestine.^{4, 5, 6} That the primary defect in rickets is an impairment of absorption has been argued before. These experiments add evidence for this view. The pH of the intestinal contents, with the consequent effect on the solubility of phosphate (and also of calcium, magnesium, and iron) offers a mechanism whereby the effect of such agents as light and cod-liver oil may be linked with the inorganic metabolism.

The addition of 10 gm. of calcium lactate (2 dogs) or of dibasic calcium phosphate (2 dogs) to the rickets-producing diet was also found to give the same intestinal pH values as did the normal diet. The relation of this to possible anti-rachitic effects, and the mechanism whereby the pH is controlled physiologically, are subjects for further research.

This is a preliminary report.

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3513

Biochemical Studies of Human Semen and the Mucin of the Cervix Uteri. I.

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The plug of mucous filling the cervical canal and the external os is very viscous and adhesive, and when pulled away from the cervix it forms a slimy string which is broken with difficulty. In cases