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Dextrose in Malnutrition.

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(Introduced by P. C. Jeans.)

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It has been observed that children with malnutrition and an accompanying diarrhea usually have a markedly impaired ability to digest fats and complex carbohydrates, even though these children may not exhibit all the symptoms characteristic of celiac disease. In view of these findings it seemed possible that the ability to utilize fats and starches might be impaired in malnutrition of less severe degree.

To test this hypothesis, 5 children from 8-13 years old and from 10-20% underweight were used as subjects. These children were underweight presumably because of lack of proper food. Four of the 5 had hypertrophied tonsils; no other abnormality was observed. Three types of diet were used: a "normal diet," similar to the customary hospital diet; a "fat diet" containing increased amounts of butter and cream, and with a F.A:G ratio of 1.5:1, supposedly below the ketogenic level. The third or "dextrose diet" was the diet used in the treatment of celiac disease in this clinic; rich in protein, minerals and vitamins, very low in fat, and containing the carbohydrate almost wholly in the form of dextrose. The quantities of dextrose ingested daily varied from 220 gm. for the smallest child, to 445 gm. for the largest boy. Each child was given at least 2 diets, one child received each of the 3 in turn. The pertinent data as to gains in weight are shown in Table I.

TABLE I.
Gain in Weight in Relation to Type of Diet and Caloric Intake.

	40 to 50 cal. per lb.				50 to 60 cal. per lb.			
			Av. intake				Av. intake	
Type of Diet	No. periods	Av. days per period	cal. per lb. per day	Av. gain lb. per day	No. periods	Av. days per period	cal. per lb. per day	Av. gain lb. per day
"Fat"	4	9	48.1	.02	7	9	55.4	.31
Normal	2	10	43.6	.04	3	11	52.0	.19
Dextrose	5	10	46.6	.04	6	9	53.3	.45
	4*	12	46.6	.17				

*Omitting one 3-day period wherein diet was decreased 500 calories.

Consistent and satisfactory gains were rarely observed on any diet if the caloric intake was below 45 calories per pound body weight; regular gains were the rule whenever the daily intake was greater

than 50 calories per pound. With any caloric intake, however, the largest and most consistent gains were made when the children were given the dextrose diet. To achieve a similar gain from the fat diet, from 250 to 500 additional calories per day were needed. Undoubtedly, during the first few days of the dextrose diet, a considerable portion of the weight gain could be ascribed to water retention; the gain thus made was not subsequently lost, however, and the very high nitrogen retentions observed indicate that this first water storage was soon replaced by nitrogenous tissue. When the children became normal in weight, a change to the general hospital diet did not occasion any loss of weight.

No child showed a glycosuria at any time during the study. One of the 5 children excreted more than 100 mg. of "acetone bodies" daily when given the "fat diet". Sugar tolerance curves at the end of each dietary period were as predicted; the highest rise of blood sugar after the fat diet, the lowest after the dextrose diet. No ill effects of any kind were observed from the ingestion of these large amounts of dextrose.

It is concluded that a diet rich in protein, minerals and vitamins, low in fat and containing its carbohydrate largely in the form of dextrose is best suited to produce rapid and consistent gain in weight of undernourished children. The caloric intake should be above 50 calories per pound of body weight.

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Retention of Calcium by Infants Fed Evaporated Milk Containing Cod Liver Oil Concentrate.

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This report concerns the quantities of calcium retained and the growth in length and weight of 5 white infants fed evaporated milk containing the unsaponifiable fraction of cod liver oil (Zucker concentrate) in an amount which allowed 400 U.S.P. units of vitamin D to the reconstituted quart. When the experiment was started one infant was 11 weeks, one 6 weeks, and the remaining 3 infants 10 to 20 days of age. The vitamin D intake of the youngest infants was 245 units daily; the maximum intake was 400 units a day. The intakes and retentions of calcium per kilogram of body weight are