Influence of Concentration of the Vitamin B Complex on Protein Efficiency of Blood Fibrin.* (18177)

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In a recent communication(1) it was demonstrated that with casein as the protein in the ration, increasing the concentration of various components of the vitamin B complex resulted in marked increases in growth and pronounced increases in food utilization. However, increases in nitrogen retention and protein synthesis occurred only within a narrow range of the low concentrations of the B vitamins. The marked increases in growth were due largely to fat synthesis from the carbohydrate (cerelose) in the rations. On a low 7.1% casein level some growth was possible but only when the various components of the vitamin B complex were raised to high concentrations. On the same low protein intake and on low concentrations of the B vitamins, only maintenance was possible. In the study referred to the Wistar strain albino rats were fed *ad libitum* and the increased growth was associated with increased food intake, stimulated by the higher concentrations of the vitamin B complex components.

In this investigation blood fibrin (Armour) having a protein content of 91% was chosen for study. Three concentrations of the B vitamins were used and the food intake was controlled to the maximum that was consumed daily by each animal, which was 6 g.

TABLE I. Composition of Vitamin B Complex Mixtures.

	1	2	3
Thiamine	5 γ	15 γ	25 γ
Riboflavin	5	15	25
Pyridoxine	5	15	25
Niacin	5	15	25
Calcium pantothenate	50	100	150
p-Aminobenzoic acid	500	2 mg	3 mg
Inositol	150	600 γ	1
Choline chloride	6 mg	6 mg	6

The rats were started on experiments when about 28 days of age and each weighed about 50 g. The rations consisted of various levels of blood fibrin; cellu flour, 2; Sure's salts No. 1(2), 4; vegetable shortening, 8; cod liver oil, 2; wheat germ oil, 1; and the rest of the rations was the carbohydrate, cerelose. The composition of the vitamin B complex (VBC) mixtures are given in Table I and referred to as VBC 1, 2, and 3. The results are summarized in Table II. The blood

TABLE II. Influence of Concentration of Vitamin B Complex on Protein Efficiency of Blood Fibrin Controlled Food Intake. (Avg results of 8 animals on each group, 4 ♂'s and 4 ♀'s).

Protein	VBC mixtures	Protein in ration, %	Total food intake, g	Experimental period, days	Gain in body wt, g	Protein intake, g	Protein efficiency ratio*	Increase, %
Blood fibrin	1	10	456	76	41.0	41.5	.99 ± .14†	
9.1% protein	2	10	456	76	49.7	41.5	1.20 ± .13	21.2
	3	10	456	76	57.3	41.5	1.38 ± .11	41.4
13.65%	1	15	456	76	52.5	62.3	.84 ± .21	
protein	2	15	456	76	76.3	62.3	1.22 ± .07	45.1
	3	15	456	76	76.9	62.3	1.23 ± .17	46.2
18.2%	1	20	456	76	43.5	83.0	.52 ± .17	
protein	2	20	456	76	69.7	83.0	.84 ± .10	61.5
	3	20	456	76	66.1	83.0	.80 ± .07	53.9
	1	20	582	97	45.0	105.9	.42 ± .16	
	2	20	582	97	76.1	105.9	.72 ± .08	71.4
	3	20	582	97	77.7	105.9	.73 ± .05	73.8

* Gain in body wt per g protein intake.
† Stand. dev. of the means.

intake, introduced 9.1, 13.65, and 18.2% fibrin, fed at 10, 15, and 20% planes of protein in the rations, respectively.

It will be noted from Table II that, on the 10% blood fibrin ration, during an experimental period of 76 days, on the same 456 g food intake, a change from VBC 1 to VBC 2 produced an increase of 21.2% in the protein efficiency ratio (PER), as indicated by gains in body weight per gram of protein intake; and a change of VBC 1 to VBC 3 produced an increase of 41.4% in the PER. On the rations containing 15 and 20% blood fibrin, on the same food intake, there were pronounced increases in the PER, *i.e.*, an increase of 45.1 to 71.4%, when the VBC 1 was changed to VBC 2, but no further increases in PER when VBC 1 was further increased to VBC 3.

Summary. When blood fibrin (Armour) was the protein in the ration, on controlled food intake, increasing the concentration of mixtures of various components of the vitamin B complex, resulted in marked increases in the protein efficiency ratio, expressed as gains in body weight per gram of protein intake.

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Beta-Hyperglobulinemia Produced by Cholesterol Feeding in the Rabbit.* (18178)

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Recent work(1) has focused attention on the possibility that deposition of cholesterol in atherosclerosis is correlated, not with analytically demonstrable hypercholesterolemia, but rather with the circulation of relatively large aggregates of cholesterol or cholesterol combined with protein as a lipoprotein. That clinical hypercholesterolemia is often accompanied by hyperglobulinemia, including rise in beta-globulin, has been found in diabetes, obstructive jaundice and myxedema. Dubach and Hill(2) have shown analytically that the hypercholesterolemia produced in rabbits by cholesterol feeding is accompanied by increase in serum globulin. The experiments herein reported show that the hyperglobulinemia resulting from cholesterol feeding in rabbits is due almost entirely to increase in beta-globulin.

Procedure. 28 rabbits 6 to 8 weeks old were fed a basic diet of Rockland Farms pellets for periods varying between 5 weeks and 27 months. The cholesterol ration for each week was dissolved in ether and poured over the pellets. Following evaporation of the ether, the rabbits readily ate the cholesterol-coated pellets. The rabbits consumed between 3 and 20 g of cholesterol per week. Total protein, albumin and globulin were determined by precipitating with 23% Na_2SO_4 followed by micro-Kjeldahl as in(3). Electrophoretic separations were made at pH 8.56 in barbiturate buffer. Cholesterol was determined by a modification of the method of Bloor, Pelkan and Allen(4). Readings were made at wave length 420 mu. Phospholipid

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