

patients suffering from hypertension contains an excess of a vasoconstrictor which, like angiotonin, is potentiated in the presence of the blood of nephrectomized animals,¹² it is not unlikely that the increased arterial pressure and altered renal hemodynamics of hypertension may be the result of the unopposed action of angiotonin.

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Relationship of Vitamin A Blood Level in the Rat to Vitamin A Intake and to Liver Storage.

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This study was undertaken to determine whether the concentration of vitamin A in the blood has any relationship to the vitamin A intake and to the storage in the liver. Groups of albino rats, 3 to 4 weeks of age, were fed amounts of vitamin A ranging from 0 to 1000 international units daily. The vitamin A supplement used for rats receiving 100 units or less daily was a reference cod liver oil obtained from the United States Pharmacopeia Committee, whereas rats receiving 1000 units were given a vitamin A concentrate. After the rats received these preparations for 6 weeks, the vitamin A content of their bloods and livers was determined 24 hours after the last dose of the vitamin.

The method employed for the vitamin A determination of the blood and liver was based on the Price-Carr reaction. As the diet was devoid of carotene, this substance was not found in the blood or livers of the rats. The vitamin A in the blood was extracted directly with petroleum ether and alcohol as recommended by Clausen and McCoord,¹ whereas the liver was treated by a preliminary saponification. The extracts were evaporated in nitrogen, taken up with chloroform and then treated with antimony trichloride. The intensity of the resulting blue color was measured at 620 $m\mu$ with the use of an Evelyn Photoelectric Colorimeter.² The reading was translated into biological units (international) by re-

¹² Page, I. H., *J. Exp. Med.*, 1940, **72**, 301.

¹ Clausen, S. W., and McCoord, A. B., *J. Pediatrics*, 1938, **13**, 635.

² Dann, W. J., and Evelyn, K. A., *Biochem. J.*, 1939, **32**, 1008; Kimble, M. S., *J. Lab. Clin. Med.*, 1939, **24**, 1055.

TABLE I.
Relationship of Vitamin A Blood Level in the Rat to Vitamin A Intake and to Liver Storage.

No. of Vitamin A units given daily for 6 weeks	No. of Animals	Avg wt		No. of Vitamin A units per 100 cc of blood plasma		Avg No. of Vitamin A units per liver	Avg No. of Vitamin A units per gram of liver
		At beginning of study, g	At end of 6 weeks, g	Avg	Range		
0	13	45	98	0	—	0	0
1	11	44	119	7	5-11	0	0
2	31	40	140	14	5-42	0	0
10	31	40	159	45	9-53	0	0
25	16	41	172	69	37-103	24	3
50	15	41	172	100	91-102	228	34
100	21	42	173	112	81-152	710	113
1000	26	43	177	110	68-142	10,000	1270

ferring to a calibration curve obtained with a sample of halibut liver oil of known biological potency.

The relationship of the vitamin A blood level to vitamin A intake and to liver storage may be noted in Table I. It will be observed that when the intake was less than 50 units daily the vitamin A concentration of the blood was directly related to the vitamin A intake. Thus, groups of rats receiving 0, 1, 2, 10, 25, and 50 units daily had average blood levels of 0, 7, 14, 35, 69, and 100 units, respectively, per 100 cc of blood plasma. Increasing the feeding above 50 units daily had no appreciable effect on the vitamin A level of the blood, the average value being 112 units for rats receiving 100 units daily and 110 units for those receiving 1000 units daily. Thus, maximal blood concentrations of vitamin A were obtained with an intake of 50 units daily. In this connection it should be added that McCoord and Luce-Clausen³ found that supplementing the basal Sherman B diet with halibut liver oil did not affect the vitamin A concentration of the blood in rats. Since one-third of the Sherman B diet consists of dry milk, it therefore contains an appreciable quantity of vitamin A. It is possible, in view of our experiments, that the vitamin A intake of the rats receiving the basal Sherman B diet alone was 50 units or more daily and that adding extra quantities of vitamin A to this diet had, therefore, no effect on the blood level.

No vitamin A was detected in the livers of rats receiving 10 units or less daily. When the intake was 25 units or more, vitamin A was found in the liver, the amount stored being directly related to the

³ McCoord, A. B., and Luce-Clausen, E. M., *J. Nutrition*, 1934, **7**, 557.

intake. The concentration of the vitamin A in the liver, therefore may be compared with that in the blood; in the latter a maximal level was reached with an intake of 50 units, whereas in the liver the concentration continued to mount as the intake was increased.

Blood concentrations of less than 37 units per 100 cc of plasma were associated with no liver storage; those between 37 and 53 units were accompanied by little or no liver storage; whereas blood levels above 53 units were always associated with vitamin A in the liver, the amount stored, however, varying considerably and having no relation to the absolute blood level. These findings therefore indicate that the blood level may be of value in ascertaining whether there is any storage of vitamin A in the liver, the chief reservoir of this vitamin in the body. Further experiments concerning the relationship of blood level to storage are being carried out and will be reported at a later date.

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Specific Cause and Nature of Ulcerative Enteritis of Quail.*

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In a former communication¹ I have identified a previously unrecognized, Gram-negative, anaerobic bacillus as the specific cause of ulcerative enteritis of quail (so-called "quail disease"). I also gave details of the technic by which the organism may be demonstrated in suitable material, directed attention to the chronic carrier as a factor in maintaining and spreading the infection and recorded observations indicating transmission of the infection to young quail chicks through eggs laid by carriers.

The purposes of the present communication are: (a) to correct and contradict a statement in the previous paper relative to spore

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¹ Bass, Charles C., *Proc. Soc. Exp. Biol. and Med.*, 1939, **42**, 377.