

Whatever these may be, it is evident that they have not played a detectable rôle in the experiments here reported.

Summary. 1. The growth in body weight of female rats thymectomized at the age of 8 days and followed to the age of 6 months is the same as that of sham operated littermate controls. 2. The response of hypophysectomized-thymectomized female rats to a preparation of the pituitary growth hormone is the same as that of similarly treated hypophysectomized littermate controls which had been subjected to a sham thymectomy. 3. The response of plateaued thymectomized female rats with intact pituitaries to a potent growth hormone preparation of the anterior pituitary is the same as that of sham operated littermate controls. 4. Under the conditions of this experiment, therefore, the thymus gland was not necessary either for the growth in weight of otherwise normal animals or for the marked increase in body weight produced by the administration of anterior pituitary growth hormone.

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Absorption of 2-Methyl-1,4-Naphthoquinone and Phthiol by Bile Fistula Rats.*

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It is now well established that deoxycholic acid is necessary for the absorption of vitamin K. The fact that certain water soluble compounds possess vitamin K activity has raised the question as to whether or not these substances are absorbed from the intestinal tract in the absence of bile. Smith and Owen¹ have shown that oral administration of 4-amino-2-methyl-1-naphthol to patients suffering from chronic obstructive jaundice led to an increase in the level of prothrombin. Similar results were reported by Warner and Flynn² on administration of the potassium salt of the disulfuric acid ester of 2-methyl-1,4-naphtho-hydroquinone to vitamin K depleted bile-

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¹ Smith, H. P., and Owen, C. A., *J. Biol. Chem.*, 1940, **134**, 783.

² Warner, E. D., and Flynn, J. E., *Proc. Soc. Exp. Biol. and Med.*, 1940, **44**, 607.

obstructed rats. The present experiments are in harmony with these two observations, although the compounds used and the experimental technic employed were somewhat different.

Choledochocolonostomized rats were maintained on a low vitamin K diet and were kept in cages with wide mesh screen bottoms to prevent their having access to their feces. Three to 6 weeks following the operation there was a decrease in the prothrombin content of the blood. For the prothrombin estimations, blood was obtained by heart puncture. In this connection it should be pointed out that it is not feasible to obtain blood in this manner when the prothrombin levels are much lower than about 50%, due to the possibility of hemorrhage. The prothrombin levels were estimated according to the method of Almquist and Klose,³ modified so that only 0.5 cc of blood was required. When the prothrombin level had fallen to about 50%, the compound under test was administered orally. The data are given in Table I.

The data indicate that both phthiolol and 2-methyl-1,4-naphthoquinone are absorbed from the intestinal tract of bile fistula rats, and that deoxycholic acid is not necessary to insure the absorption of these compounds. Failure of deoxycholic acid alone to lead to an increase in prothrombin is due to the absence of vitamin K in the diet. Unless the test substances are administered at intervals of several days, the prothrombin levels in the experimental rats return to the low levels.

The experiments indicate the feasibility of using the compounds tested orally in order to raise the prothrombin level of the blood.

TABLE I.
Absorption of Phthiolol and 2-Methyl-1,4-Naphthoquinone by Bile Fistula Rats.

Substance administered	No. of animals	Avg No. of days after operation	Avg prothrombin level before test, %	Avg prothrombin level after test, %
I	8	38	52	100
II	8	32	54	100
III	7	35	55	100
IV	8	33	50	100
V	8	31	54	54

I. Each animal given 1 mg of 2-methyl-1,4-naphthoquinone orally.

II. Each animal given 1 mg of the choleic acid of 2-methyl-1,4-naphthoquinone prepared according to Almquist and Klose⁴ orally.

III. Each animal given 1 mg of 2-methyl-1,4-naphthoquinone plus 5 mg of deoxycholic acid orally.

IV. Each animal given 1 mg of phthiolol orally.

V. Each animal given 5 mg of deoxycholic acid orally.

³ Almquist, H. J., and Klose, A. A., *Biochem. J.*, 1939, **33**, 1055.

⁴ Almquist, H. J., and Klose, A. A., *J. Am. Chem. Soc.*, 1939, **61**, 745.