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Influence of Thyroid Hormone on the Formation of Bile Acids

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It has long been recognized that an inverse relationship exists between plasma cholesterol level and thyroid activity¹. As the bile acids have been shown^{2,3} to be the main metabolic end-products of cholesterol in the rat we have studied the influence of thyroid activity on the excretion of bile acids in bile fistula rats. Thompson and Vars⁴ studying the same problem found lower values of cholic acid in the hyperthyroid and hypothyroid rats than in the euthyroid animals. In their experiments they did not determine taurochenodesoxycholic acid, the second bile acid of quantitative importance in the rat⁵. In the present work taurocholic and taurochenodesoxycholic acids have been determined with the technique used in a previous work from this laboratory in which the quantitative excretion of bile acids

in normal bile fistula rats were studied⁶. The rats were made hyper- and hypothyroid by including 0.4 % thyroid or 0.5 % propylthiouracil, respectively, in the diet. The bile was collected for five days following operation. In Table 1 are given the values obtained for the excretion of taurocholic and taurochenodesoxycholic acids during the time of collection. In the hypothyroid group there is a large reduction of the total excretion of bile acids. In the hyperthyroid group the total excretion remains unchanged as compared to the control rats. In the hypothyroid group the excretion of taurochenodesoxycholic acid is less than 10 % of the total excretion, whereas the normal rats had about 20 %. On the other hand in the hyperthyroid group taurochenodesoxycholic acid constitutes between 70 and 80 % of the total excretion. Thus the excretion of bile acids in hyperthyroid rats is not decreased but the composition is changed in that taurocholic acid is markedly decreased but taurochenodesoxycholic acid increased.

Further data will be presented.

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Table 1. Excretion of Na-taurocholate (TC) and Na-taurochenodesoxycholate (TCD). The total excretion (TC+TCD) is given as mg per 100 g body weight. The rats weighed 180—250 g.

Hours After operation	Hypothyrr. (4 rats)		Controls (4 rats)		Hyperthyrr. (4 rats)	
	TC+TCD Mg	TCD % of total excretion	TC+TCD Mg	TCD % of total excretion	TC+TCD Mg	TCD % of total excretion
0—6	10.4	6.5	8.5	12.6	15.5	50.6
6—12	5.7	12.5	3.1	14.7	4.9	48.9
12—18	1.4	15.7	2.8	11.8	3.5	72.0
18—24	1.2	5.5	2.1	15.4	5.0	80.5
24—48	8.7	4.1	20.4	18.4	25.2	69.5
48—72	12.7	6.2	22.8	28.6	22.2	71.3
72—96	13.7	12.7	17.3	24.8	19.9	70.0
96—120	10.2	6.5	19.7	22.9	19.8	67.7