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The acetylation of sulphanilamide by mammary tissue of lactating goats

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ACETYLATION of sulphonamides is usually considered to occur in the liver and possibly in the kidney and spleen. However in both humans and cows, after oral or parenteral administration of sulphanilamide, acetylated sulphanilamide has been demonstrated in milk (Pinto,[1] Hac *et al.*,[2] Zipkin *et al.*,[3] Schuhardt *et al.*,[4] and Egetoft and Rasmussen[5]). Since the concentration of the acetylated compound is always higher in the milk than in the plasma, its excretion is not due to a simple diffusion from the plasma to milk as is the case with sulphanilamide itself which is found in the same concentration in milk and in plasma (Rasmussen[6]).

We have also done further experiments in goats, where the concentration of sulphanilamide in the milk of the two glands was varied by infusing the drug into the artery of one gland (Linzell[7]), and which shows that the concentration of the acetylated compound is independent of the sulphanilamide concentration. Furthermore the intravenous injection of acetylated sulphanilamide itself shows that it is concentrated in milk. However, there remains the possibility that mammary tissue can also acetylate sulphanilamide as well as concentrate it and the experiments now presented demonstrate that this is so.

Sulphanilamide was estimated by the method of Bratton and Marshall[8] modified for milk by Rasmussen.[9] The acetylated fraction was identified by paper chromatography and estimated from the difference between the total sulphonamide (after acid hydrolysis) and the free sulphonamide.

Four mammary glands of lactating goats were perfused in isolation by the method of Hardwick and Linzell[10] with 1 l. of homologous whole blood and with an artificial kidney (18–20 l.) in the circuit. Sulphanilamide was added to the blood and kidney fluid at various concentrations. Table 1 summarizes the results. As found in goats *in vivo* sulphanilamide readily passed into the milk where the

TABLE 1. CONCENTRATIONS OF SULPHONAMIDES IN BLOOD PLASMA AND MILK FROM ISOLATED PERFUSED GOAT MAMMARY GLANDS

Experiment No.	Blood plasma			Milk		
	Sulphanilamide			Sulphanilamide		
	free μg/ml	acetylated μg/ml	% Acetylated	free μg/ml	acetylated μg/ml	% Acetylated
1	13·4	trace	—	12·0	>2	>15
2	40·0	trace	—	37·6	4·4	11
3	48·3	0·0	0	45·2	5·5	11
4a	84·0	0·0	0	88·0	22·0	20
4b	125·0	0·0	0	223·0	22·0	9

Sulphanilamide was added after several hours of perfusion and allowed to circulate for 3–6 hr. The maximum concentration of acetylated sulphonamide was reached in 1–2 hr.

concentration was in all cases except one of the same order as in the plasma. In all four experiments, acetylated sulphanilamide (9–20 per cent of the total) was detected in the milk but only in two experiments were traces found in the blood plasma, thus showing that goat mammary tissue can acetylate sulphanilamide.

This observation may be of interest in view of the importance of acetyl-CoA in mammary metabolism.

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