teins, however, it may have some special significance in relation to the phenomenon of inactivation. On drying solutions of the posterior pituitary hormones, as well as solutions of many enzymes, loss of activity is occasionally observed. It is well known that specific conditions of pH and charge favor maximum stability of these biologically active substances. The situation encountered with isoglutamine-oxytocin acetate suggests that, in general, a drying process may involve varying degrees of change in bound acid and charge, as well as in hydration, with the result that these biological substances may on occasion be left unexpectedly in a state less favorable with respect to stability.

Summary. 1) The isoglutamine isomer of oxytocin has been found to inhibit significantly the pressor activity of administered vasopressin in the anesthetized rat. 2) Various data suggest that acetic acid is lost when the polypeptide acetate is rigorously dried. Isoglutamine-oxytocin forms a crystalline flavianate salt.

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Specific Function of Bile Salts in Cholesterol Absorption.* (23979)

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It has been demonstrated that bile salts are an obligatory requirement for passage of cholesterol from lumen of the intestine to the lymph(1). However, the mechanism by which bile salts facilitate absorption of cholesterol is not clear. Several explanations have been offered. One is that bile salts dissolve cholesterol by virtue of their hydrotropic action and that this process is facilitated when cholesterol is dissolved in fat(2). It has also been suggested that bile salts are necessary for cholesterol absorption because they function as cofactor for cholesterol esterase activity(3,4). Recently(5) it was demonstrated that a metabolic pool of free cholesterol exists in the intestinal wall with which cholesterol from the lumen is mixed prior to its esterification and transfer to the lymph. The role which bile salts might have in the entrance of exogenous cholesterol-4-C^{14} into the metabolic pool of the intestinal mucosa and its subsequent transfer to the lymph was investigated.

Methods and materials. Rats with thoracic and bile duct fistulae were prepared and given saline to drink(5). Twenty-four hours after operation, each animal received by gastric intubation, 3 ml of aqueous emulsion containing cholesterol-4-C^{14} (0.5 μc) alone or in combination with one or more of blood albumin, glucose, oleic acid, sodium dehydrocho-

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TABLE I. Cholesterol-4-C^{14} Recovered from Lymph and Intestinal Wall following Feeding of Cholesterol-4-C^{14} to Bile-Lymph Fistulae Rats.

Emulsion components*	Lymph		Intestinal wall	
	C^{14}-free cholesterol	C^{14}-esterified cholesterol	C^{14}-free cholesterol	C^{14}-esterified cholesterol
	% recovered			
3.3 mg cholesterol-4-C^{14}	.0	.0	.7	.0
2.3 " cholesterol-4-C^{14} 292 " oleic acid	.0	.0	.4	.0
3.2 " cholesterol-4-C^{14} 279 " sodium taurocholate	.7	2.9	26.2	2.0
3.0 " cholesterol-4-C^{14} 279 " sodium taurocholate 292 " oleic acid	1.2	3.1	16.0	2.2
2.8 " cholesterol-4-C^{14} 279 " sodium dehydrocholate 292 " oleic acid	.0	.0	1.5	.0

* Five animals/group, sacrificed at 6 hr; emulsion also contained 150 mg glucose, 50 mg albumin.

late and sodium taurocholate as indicated in Table I. Lymph was collected from 0-6 hours after administration of test meal and then animals were sacrificed. The small intestine was removed, washed and lipid extracts of lymph and small intestine were prepared as previously described(5). Free and total cholesterol were determined chemically as well as the C^{14}-activity of the free, esterified, and total cholesterol of all extracts by methods described earlier(5).

Results. Table I. Following the feeding of a test meal containing approximately 3 mg cholesterol-4-C^{14} with or without oleic acid there was virtually no uptake of cholesterol-4-C^{14} by the intestinal wall and no transfer to the lymph. Addition of sodium taurocholate to the emulsion produced a large uptake of cholesterol-4-C^{14} (28.2%) by intestinal wall with almost all of the C^{14}-activity in the free cholesterol fraction. There was also transfer of cholesterol-4-C^{14} to the lymph (3.6%), with a major portion of the recovered cholesterol-4-C^{14} in the esterified fraction. After feeding of a complete emulsion (cholesterol-4-C^{14}, sodium taurocholate and oleic acid) there was considerable uptake of cholesterol-4-C^{14} by the intestinal wall and transfer to the lymph, but this uptake (18.2%) was less than when oleic acid was omitted from the emulsion. Feeding of a complete emulsion containing sodium dehydrocholate in place of sodium taurocholate produced no uptake of cholesterol-4-C^{14} by the intestinal wall or transfer to lymph.

Discussion. There are several factors, namely, pancreatic cholesterol esterase, fatty acids, and bile salts which are required for transfer of exogenous cholesterol from the lumen to the free cholesterol pool of mucosa and then to the lymph. Cholesterol absorption does not occur in absence of bile or pancreatic juice, but will occur in absence of dietary fat; the fatty acids presumably can arise from endogenous sources(1,5-7). Pancreatic juice may be necessary due to its content of pancreatic cholesterol esterase which may be the enzyme involved in the esterification reaction prior to transfer of cholesterol from the pool in the mucosa to the lymph. Bile salts are required for this esterification reaction *in vitro*(3).

Our study provides evidence that one specific role of bile salts is that they are necessary for entrance of exogenous cholesterol into the mucosa. This process seems to require a specific type of bile salt since dehydrocholate was ineffective in promoting transfer of cholesterol-4-C^{14} to the mucosa or lymph. It is also apparent that if exogenous cholesterol cannot enter the free cholesterol pool of the mucosa it cannot be absorbed. In connection with these findings, it was previously demonstrated that dehydrocholate was inactive in catalyzing esterification of cholesterol with fatty acid by pancreatic cholesterol

esterase; also it did not produce a hypercholesterolemic effect when added to a high cholesterol diet(3,4). Both findings would suggest that a complex of cholesterol and bile salt is formed in the lumen which then enters the intestinal wall. It appears that entrance of free cholesterol into the intestinal wall does not depend on emulsification or solubility of cholesterol in fat droplets.

Summary. Entrance of cholesterol-4-C^{14} into the free cholesterol pool of mucosa and its subsequent transfer to the lymph requires the presence of a specific type of bile salt. This process does not require the presence of dietary fatty acid. It is suggested that free cholesterol in the lumen of the intestine complexes with bile salt which then enters the free cholesterol pool of mucosa.

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Observations on Bacteriostatic and Bactericidal Action of Erythromycin.* (23980)

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Haight and Finland(1,2,3) have demonstrated that a growing culture of a sensitive strain of streptococcus is rapidly sterilized by erythromycin, whereas a fully grown culture of the same organism is insensitive to the bactericidal action of the drug. They conclude that "erythromycin may be either bacteriostatic or bactericidal depending on sensitivity of the organism and on concentration of the antibiotic. Erythromycin exerts its effect only against multiplying bacteria."

In the present work the effect of erythromycin on sensitive strains of *Staphylococcus aureus* was determined under various conditions. The results showed a striking effect of population density on bactericidal action of the drug.

Materials and methods. A strain of *S. aureus* very sensitive to erythromycin was kindly furnished by Dr. Lawrence Kunz of Mass. General Hospital. The organisms were grown on nutrient agar slants and stored in a refrigerator. Log-phase cells were obtained by inoculating Trypticase Soy broth with small numbers of cells and incubating at 37°C until a concentration of approximately 10^8 organisms/ml was obtained (Klett reading = 30). Growth was followed either turbidimetrically with Klett Electrophotometer or by viable plate counts. For the latter, 0.1 ml samples of proper dilutions of culture were spread onto blood agar plates, read after 24 hours' incubation at 37°C. Purified crystalline erythromycin (980 μg/mg) was the generous gift of Lilly Research Laboratories. Stock solutions containing 2000 μg/ml of the drug were prepared in distilled water. These solutions were tested on pour plates and found to inhibit growth of organism at concentration of less than one μg/ml. When measured by viable plate counts, the doubling times of cultures containing initially 10^5 and 10^8 organisms/ml were identical (26 min.). Furthermore, this same doubling time was obtained when growth of cultures containing 10^8 organisms/ml was followed turbidimetrically.

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