ficial capillaries become perfectly bloodless, while in others, the flow of blood corpuscles is greatly retarded. No such contraction or retardation can be noted, however, in the deeper capillaries and arterioles supplying the muscles of the tongue.

These observations show that the same contrast between the effects of epinephrine on the superficial vessels and in the deeper vessels takes place in the frog as has been observed in mammals.

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Inhibiting Effects of Lipoids upon Actions of Antiseptics.

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Although many experiments have been performed which have shown that the antiseptics have a weaker action in blood serum and tissue juice than in water salt solution or bouillon, this diminution of action has always been ascribed to the presence of the proteins. However, since these fluids also contain lipoids, and since, as has been shown by Cruikshank,[1] Loewe[2] and others, the lipoids may play a decided rôle in altering the distribution coefficient of the antiseptic dyes, we have studied the effects of the mere presence of lipoids upon the action of various antiseptics. In the experiments which we have performed, we have found that when cultures of *Staphylococcus aureus* and *Bacillus coli* are exposed to the action of various antiseptics (acriflavine, pyridium, phenol, bichloride of mercury) in suspensions of 0.5% lecithin or kephalin, or of .05% cholesterol, the antiseptic activity was greatly weakened; and this decrease of effectiveness is of about a degree similar to that which is brought about by the presence of an equal concentration of protein, though usually somewhat less marked. Since blood plasma contains .25% lecithin and .18% cholesterol, suspensions which we have used are quite comparable to blood plasma.

The table below gives the greatest dilution in Clark's buffer solutions ($Na_2HPO_4+KH_2PO_4$ at pH 7.4) of the antiseptics which inhibited the growth of transplants to agar after the bacteria have been exposed to the action of the antiseptic for 3 hours. The experiments with pyridium were done in Locke's solution as the antiseptic is precipitated by the phosphate buffer at pH 7.4.

[1] Cruickshank, J., *J. Path. and Bact.*, 1920, xxiii, 230.

[2] Loewe, S., *Biochem. Z.*, 1922, cxxvii, 231.

TABLE I.

Staphylococcus aureus.

	Neutral Acriflavine	Pyridium	$HgCl_2$
Control	1:8,000	1:8,000	1:750,000
0.5% Lecithin	1:4,000	1:2,000 growth+	1:16,000
0.5% Cephalin	1:4,000	1:2,000 growth+	1:4,000
0.05% Cholesterol	1:4,000		

Bacillus coli.

	Neutral Acriflavine	Pyridium
Control	1:8,000	1:8,000
0.5% Lecithin	1:1,000	1:2,000
0.5% Cephalin	1:1,000	growth in 1:2,000
0.05% Cholesterol	1:8,000	

Longer exposure to these antiseptics gave commensurate results except in the case of acriflavine and cholesterol, in which the control showed no growth in 1:54,000 after 12 hours and 1:500,000 after 24 hours, while in the presence of .05% cholesterol, inhibition occurred in 1:16,000 after 12 hours, and in 1:100,000 after 24 hours.

These results were obtained even in the absence of any visible flocculation of the lipoid suspension.

We have also observed with the ultramicroscope the effect of antiseptic on lipoid emulsions. The quinine series give blue or greenish Tyndall cones, though no particles can be seen. Lecithin emulsion shows large slowly moving particles. With addition of quinine, for instance, the particles may be seen to form large clumps, and clots are formed, while the blue Tyndall cone becomes weaker, and if sufficient lecithin is added, disappears. Similar results are obtained with the yellow cone of acriflavine.

Mercury is the only heavy metal which does not precipitate a lecithin emulsion, and no change in the ultramicroscopic picture is seen when $HgCl_2$ is added. However, the striking decrease in the effective antiseptic concentration shows that the bichloride is combined in some way. $AgNO_3$ rapidly produces clots.

Cholesterol shows an immediate and striking effect on the Tyndall cones of quinine, ethyl hydrocuprein, eucupin and vuzin, of fluorescein and eosin, and of acriflavine and rivanol. The cholesterol particles are small, bright and rapidly moving. The above antiseptics combine quickly with these particles, losing their fluorescent property. $HgCl_2$ and $AgNO_3$ cause the rapid formation of clots.

It may be noted that in our experiments with the basic antiseptics, acriflavine and pyridium, we found the Gram positive *Staphylococcus aureus* and the Gram negative *Bacillus coli* equally sensitive to the dyes. This harmonizes with the results of Hirschfelder, Jensen and Swanson,[3] and of Skinner and Burke,[4] and is in striking contrast with the oft repeated claims of Churchman,[5] that Gram positive microorganisms are more sensitive to basic dyes and the Gram negative ones more sensitive to the acid dyes.

Our experiments indicate that the effect of the lipoids as well as of the proteins of blood plasma, serum and tissues, must be taken into account, as well as that of the proteins, in the study of the action of antiseptics.

We take pleasure in acknowledging our indebtedness to Dr. R. A. Gortner for the privilege of using the Szigmondy slit ultramicroscope and for his aid in this part of the work.

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Iodine Content of Milk Powder.

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A sample of powdered whole milk from Indiana (goitrous region) was found to contain 166 parts of iodine per billion; and a sample of lactic acid milk from the same source was found to contain 44 parts per billion.

These values may be compared with 62 parts per billion (dry basis) for milk from Berne, Switzerland (goitrous region) and 400 parts per billion for milk from the California Coast where the feed was bathed by sea spray (non-goitrous region).

[3] Hirschfelder, A. D., Jensen, H. H., and Swanson, W. W., PROC. SOC. EXP. BIOL. AND MED., 1923, xx, 402.

[4] Burke, V., and Skinner, C. E., *J. Exp. Med.*, 1924, xxxix, 613.

[5] Churchman, J., *J. Exp. Med.*, 1912, xvi, 221; 1913, xvii, 373; 1921, xxxiii, 569; *J. Am. Med. Assn.*, 1918, lxx, 1047; 1921, lxxvii, 24; 1922, lxxix, 1657; PROC. SOC. EXP. BIOL. AND MED., 1923, xx, 402.