

of oleic acid or thoroughly rancid cod liver oil, or if the diet is rigidly freed of fats. These observations indicate that the appearance of symptoms of increased capillary permeability is dependent upon the presence of highly

unsaturated fatty acids in the vitamin E deficient diet, and that rancidity of the dietary fat does not contribute to the development of the symptoms.

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Use of Thioglycollate Media for Testing Disinfectants.*

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The results which we obtained with an *in vivo* "infection-prevention" method for evaluating skin disinfectants¹ indicated that the mercurial compounds tested were actually quite ineffective, despite their accepted high disinfecting power as determined by the standard *in vitro* methods. The conclusion was drawn that failure of growth in the test tube probably reflected only bacteriostatic action, and that dilution of the mercurial or its combination with substances present in circulating blood or lymph might free the bacteria of the mercurial and result in infection and death of a test animal.

Brewer has suggested that the addition of sodium thioglycollate to media interferes with the bacteriostatic action of mercurials.² Acting on this suggestion, the National Institute of Health has recommended that this substance be added to media used for testing the sterility of biologicals containing mercurial preservatives.

On this basis, it was decided to determine whether the addition of sodium thioglycollate to media used in testing disinfectants by an *in vitro* method would give results similar to those obtained by the "infection-prevention" method.

The mercurial compounds used in the experiments to be discussed included mercuric

chloride, mercuric oxycyanide, and aqueous solutions of metaphen, merthiolate, mercresin, and mercurochrome; the non-mercurial disinfectants were phenol, Lugol's iodine, and aqueous phemerol. A loopful of a broth culture of *Staphylococcus aureus* was placed in 5 ml of various concentrations of each of the disinfectants. After 10 minutes, these solutions were subcultured both into extract broth, and into extract broth containing 0.1% sodium thioglycollate.

The results summarized in Table I indicate that, with the non-mercurial disinfectants, essentially the same results were obtained whether or not thioglycollate was present in the medium. However, without exception, in the case of the mercurial disinfectants, the percent of positive growths was much greater when subcultures were made to the thioglycollate-containing media.

In the first experiments, the 0.1% concentration of thioglycollate was arbitrarily selected. However, the optimum concentration for inhibiting the bacteriostatic effect of the mercurial compounds was later determined to be between 0.05 and 0.10% (Table II). A greater concentration, 0.20%, retarded the growth of the test organism.

In further experiments, sodium thioglycollate was added to tubes of plain broth to give 0.1% concentration at intervals after they had been inoculated with staphylococci previously exposed to the various disinfectants for 10 minutes. It will be noted in Table III, which gives representative results of such

* Aided by a grant from Parke, Davis and Company.

¹ Nungester, W. J., and Kempf, Alice H., *J. Infect. Dis.*, 1942, **71**, 174.

² Brewer, John H., *J. A. M. A.*, 1939, **112**, 209.

TABLE I.
Comparison of Plain and Thioglycollate-Containing Media for Detecting Surviving Bacteria in Testing Disinfectants.

Disinfectant*	Concentration	No. of tests	% of tests with positive growth	
			Plain broth	Broth containing sodium thioglycollate
Lugol's Iodine	1:100	2	0	0
	1:200	5	60	60
	1:500	7	72	72
	1:1000	8	87	75
Phemerol	1:2500	4	25	10
	1:5000	10	40	50
	1:10,000	7	72	86
	1:20,000	4	100	100
Phenol	1:70	10	10	10
	1:80	9	22	22
	1:90	9	78	78
Mercuric Chloride	1:5000	8	0	88
	1:10,000	7	0	86
	1:20,000	7	43	86
	1:50,000	5	40	80
Metaphen	1:500	2	0	100
	1:1000	9	0	67
	1:5000	10	20	90
	1:10,000	7	43	86
Merthiolate	1:1000	10	20	100
	1:5000	10	60	100
	1:10,000	10	70	100
Mecresin	1:500	4	25	0
	1:25,000	5	40	60
	1:50,000	6	67	100
Mercuric Oxycyanide	1:250	6	17	83
	1:1250	3	67	100
	1:2500	5	80	100
Mercurochrome	1:50	8	50	75
	1:250	7	57	100
	1:500	6	67	100

* All the disinfectants were aqueous solutions.

experiments, that growth was obtained when as long as 5 hours had elapsed between subculture of staphylococci previously exposed to mercuric chloride and the addition of sodium thioglycollate, while tubes with no thioglycollate did not show growth. After eight hours, however, exposure to the mercuric compound apparently produced death of the organism, since the staphylococcus culture survived comparable dilution in 0.85% sodium

chloride solution for a time interval equal to the duration of the experiment. Similar results were obtained with the other mercurial disinfectants tested.

Summary. Sodium thioglycollate added to media for testing disinfectants *in vitro* apparently neutralized the bacteriostatic effect of the mercurial compounds tested and thus indicated the inadequacy of these substances as germicides.

TABLE II.
Effect of Various Concentrations of Sodium Thioglycollate in Media for Detecting Surviving Bacteria in Testing Disinfectants.

Disinfectant	Concentration	hrs:	% of thioglycollate in medium					
			0.00	0.01	0.02	0.05	0.10	0.20
			24 48	24 48	24 48	24 48	24 48	24 48
Phemerol	1:50,000		— +	— —	— —	— —	— +	— +
	1:100,000		+ +	+ +	+ +	+ +	— +	— —
	1:250,000		+ +	+ +	+ +	+ +	+ +	+ +
Phenol	1:70		— —	— —	— —	— —	— —	— —
	1:80		— —	— —	— —	— —	— —	— —
	1:90		— —	— —	+ +	— +	— +	— +
Mercuric Chloride	1:5000		— —	— —	— —	+ +	+ +	— —
	1:10,000		— —	— —	— +	+ +	+ +	— +
	1:50,000		— —	— —	— +	+ +	+ +	— +
Metaphen	1:500		— —	— —	— +	+ +	— +	— +
	1:1000		— —	— —	— +	+ +	+ +	— +
	1:5000		— —	— —	— +	+ +	+ +	— +
Merthiolate	1:1000		— —	— —	— —	+ +	+ +	— +
	1:5000		— —	— —	+ +	+ +	+ +	— +
	1:10,000		— —	— +	+ +	+ +	+ +	— +
Mercurochrome	1:50		— —	— —	+ +	+ +	— +	— +
	1:250		— —	— —	+ +	+ +	— +	— +
	1:500		— —	— +	+ +	+ +	+ +	— +

(+) indicates growth; (—) indicates no growth.

TABLE III.
Effect of Addition of Sodium Thioglycollate to Plain Broth at Intervals After Subculturing from Mercurial Solutions.

Disinfectant	Control	Interval after subculturing									
		Min					Hr				
		1	2	5	10	30	1	2	5	8	15
Mercuric Chloride, 1:5000	—	+	+	+	+	+	+	+	+	—	—
Metaphen, 1:500	—	+	+	+	+	+	+	+	—	—	—
Merthiolate, 1:1000	—		+				+		+	+	—
Mercuric Oxycyanide, 1:250	—	+	+	+	+	+	+	+	—	—	—
Mercurochrome, 1:50	—	+	+	+	+	+	+	+	—	—	—

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Antigenic Relationship Between *H. Influenzae* Type B and Pneumococcus Type VI.

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Recently, two reports were published pertaining to antigenic relationships between *Hemophilus influenzae* and pneumococcus.

¹ Chapman, O. D., and Osborne, W., *J. Bact.*, 1942, **44**, 620.

Chapman and Osborne¹ isolated a strain of *H. influenzae* type a from the spinal fluid and nasal secretion of a child suffering from a fractured skull. This particular strain gave a capsular swelling reaction with anti-