were displaced by the same type of green colony described here, within 24 hours after the administration of sulfanilamide.

Merely to be mentioned in passing, but to be described in detail later, is the fact that this rather avirulent Group A Stoddard strain has been observed to transform gradually to a Group C strain fermentatively and serologically. But before reaching this status serologically, it had only the fermentative characters of a C strain, while its antecedent was characteristically A from a fermentative standpoint. But in this intermediate state, it had a maximal virulence for mice, which was not the case for the A strain either naturally or on repeated mouse passage. Both the intermediate and the C strains were typical *beta*-hemolytic streptococci.

Summary. A certain Group A hemolytic streptococcus has been observed to recapitulate a *viridans* phase capable of selection at pH 6, but not capable of stabilization as such. Temporarily stabilized strains have, however, been observed to occur naturally in clinical cases. The prompt response to sulfanilamide might become misleading, if their true nature as hemolytic streptococci was not recognized.

9775 P

Use of Calcium Chloride in Relief of Chills Following Serum Administration.

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Little attention has been devoted to the alleviation of chills, beyond such general measures as the external application of heat and the oral administration of hot fluids. In a clinical experience with chills which occasionally follow serum therapy it has become evident that these palliative measures are inadequate and that some means of prevention or control of the chill reaction would be an important adjunct to serum therapy.

In a consideration of chemical substances which might prevent or control a chill it seemed possible that soluble calcium salts, administered intravenously, might be effective. For example, calcium relieves tetany; it causes relaxation of smooth muscle, as exemplified

by its clinical use in ureteral colic, bronchial asthma,[1] etc. Calcium salts are readily available and comparatively non-toxic. Their use is not considered advisable, however, in those patients having severe myocardial damage, especially those receiving digitalis, because of the known synergism between digitalis and calcium salts.[2, 3, 4]

Since in the use of calcium compounds it seems probable that the chief action is due to the existence of free calcium ion, calcium chloride was chosen for trial. With this salt the degree of ionization is high[5] as compared with the lactate or gluconate. The intravenous administration must be carried out carefully since local extravasation may cause necrosis.[6]

Administration of calcium chloride has now been carried out in 13 patients suffering chills following antipneumococcus serum therapy. As an example of the effect obtained the result in the first case may be summarized. A white woman, aged thirty, had received antipneumococcus serum intravenously in the treatment of Type II pneumonia. Thirty minutes after serum administration her skin became cold and took on a cyanotic appearance, and shortly thereafter a generalized rigor was in progress. The usual measures for symptomatic relief, consisting of blankets and the application of heat were ineffective. The intravenous administration of 10% calcium chloride solution was begun, a total of 10 cc. being injected, during a period of 4 minutes. In less than 20 seconds from the beginning of injection the chill ceased, the patient relaxed, her skin became warm, and she volunteered the statement that she was relieved. The chill did not recur.

As yet calcium chloride has not been used except in the relief of a chill already initiated. Its possible value as a prophylactic agent is also being investigated.

A summary of the cases treated with this compound is presented in Table I.

It will be noted that in all cases which had not previously received epinephrine the chill was terminated by the administration of calcium chloride, whereas in those patients who had received epinephrine little or no symptomatic relief was obtained. It is presumed

1 Sollmann, Torald B., *A Manual of Pharmacology*, W. B. Saunders Company, 4th edition, 884-896.

2 Bower, J. O., and Mengle, H. A. K., *J. Am. Med. Assn.*, 1936, **106**, 1151.

3 Berliner, Kurt, *Am. J. Med. Sci.*, 1936, **191**, 117.

4 Lieberman, Arnold L., *J. Am. Med. Assn.*, 1931, **97**, 15.

5 Peters, John P., and Van Slyke, D. D., *Quantitative Clinical Chemistry*, Vol. 1, The Williams and Wilkins Company, 1935, 814.

6 Seelig, M. G., *J. Am. Med. Assn.*, 1925, **84**, 1413.

that this result is related to the well-known antagonism between calcium and epinephrine.[7, 8] In these studies the maximum quan-

TABLE I.
Summary of Clinical Experience in Relief of Chill Reactions by Intravenous Administration of Calcium Chloride.

Group	Case No.	$CaCl_2$ 10% cc.	Result
Epinephrine given during serum administration	1	10	Transient relief
	2	20	Relief with recurrence
	3	10	Transient relief
	4	20	Relief with recurrence
	5	15	No effect
No epinephrine	1	10	Complete relief
	2	15	" "
	3	10	" "
	4	10	Complete subjective relief, slight tremor persisted
	5	10	Complete relief
	6	10	" "
	7	20	" "
	8	20	" " slight tremor persisted

tity of 10% calcium chloride to be given with safety to an adult of average weight was fixed at 20 cc. Studies are now in progress as to the mode of action of calcium in the relief of chills and concerning its action in chills associated with other processes.

Summary. The intravenous use of calcium chloride serves to alleviate chill reactions following antipneumococcus serum therapy. The use of epinephrine during serum administration appears to inhibit this favorable action of calcium.

9776 P

Segregation of "Cleavage-Substance" in the Unfertilized Egg of *Dendraster excentricus.*

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The unfertilized eggs of the sand-dollar, Dendraster, which normally are shed from the ovaries fully mature, were sedimented by

[7] Salant, William, and Vogt, Elkin, PROC. SOC. EXP. BIOL. AND MED., 1929, **26**, 681.

[8] Jendrassik, L., and Czike, A., *Biochem. Z.*, 1928, **193**, 285.