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Studies on the peritoneal fluid in anaphylactic shock.

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In recent years stress has been laid in particular upon changes in the physical and chemical reactions of the body fluids in anaphylactic shock and it has become evident that more or less profound changes can be demonstrated. A number of years ago Segale[1] investigated changes of the osmotic pressure of the blood in shocked animals and found that in dogs, rabbits and guinea pigs there occurred a marked fall of the freezing point of the serum during shock, which fall lasted over a considerable period of time—even twenty-four hours. As we were unable to find in literature any confirmation of these observations we undertook, at least in the case of the guinea pig, to confirm Segale's results.

We used animals sensitized to egg white and reinjected them intraperitoneally after three weeks or more. At the same time that the sensitized animals received the second injection, we injected normal animals with an equal amount of egg white. The animals were bled at periods varying from 15 minutes to 5 hours after the injections and the freezing point of the serum was determined. The average Δ of the 32 normal animals was —0.578° while that of 34 readings of shocked animals was —0.574°. It appears, therefore, that Segale's observations are not correct, at least as far as concerns the guinea pigs.

We thought it might be of interest to determine whether we could find any difference between the Δ of fluid which had been injected into the peritoneal cavity of normal and of shocked animals. Again we used animals sensitized to egg white; gave a second injection three to six weeks after the first injection, consisting of 6 cc. of a 50 per cent egg white intraperitoneally and also 30 cc. of sodium chloride solution. The animals were killed at periods varying from 12 to 15′ up to 120′ after injection; the abdominal cavity opened and the fluid collected. At the

[1] Segale, *Pathologica*, 1911, iii, 323; 1912, iv, 12.

same time normal animals were injected intraperitoneally with 6 cc. of a 50 per cent egg white and 30 cc. of sodium chloride solution, and the fluid collected after similar periods.

The average of the results of the determinations of the freezing point are given in Table I.

TABLE I.

Sensitized Animals			Control Animals	
Time between injection and recovery of fluid	Δ	Number of animals	Δ	Number of animals
15′	—0.562°	129	—0.551°	117
30′	—0.586°	21	—0.571°	18
60′	—0.581°	14	—0.558°	16
120′	—0.565°	16	—0.540°	18
All Periods	—0.566°	180	—0.553°	167

It is apparent from the above table that the fluid in the peritoneal cavity of the shocked animals shows at all periods a more marked lowering of Δ than that of the control animals; that this phenomenon is not a brief and momentary reaction, but that it is still marked at one and two hours after the shocking injection; and that possibly there is a tapering-off at the two hour period.

It is evident then, that absorption of materials from or movement into the peritoneal cavity in shocked animals is not the same as in normal animals. It is possible that the difference in the freezing point might be due to a difference in the absorption of the sodium chloride in the two series of animals. The following table shows the average results of the determination of chlorides in the recovered fluids.

TABLE II.

	Shocked Animals		Control Animals	
	NaCl—mg.	Number of animals	NaCl—mg.	Number of animals
30′ series.....	795	14	800	15
All series.....	757	95	748	96

The slight differences noted here are certainly within the limits of experimental error, and do not account for the differences in freezing point in the two series.

We do not find that there is any difference in the amounts of fluid absorbed in the two series—of the total of 36 cc. of fluid

injected in the series in which thirty minutes or more elapsed between injection and removal of the fluid, we recovered an average of 25.7 cc. of fluid from 32 shocked animals, and 25.3 cc. of fluid in 38 control animals.

Since in our experiments we can exclude the possible factor of changed osmotic pressure of the serum in shocked animals as an influence upon the osmotic pressure of the fluid introduced into the peritoneal cavity, we believe that these experiments give what seems to be direct evidence that in anaphylactic shock the permeability of cells or cell membranes is definitely affected.

At the present time then, while it is probable that in animals in anaphylactic shock there is a changed activity of the permeability of the cells or cell membrane (that is, the peritoneum) we cannot state whether this change is in relation to organic or inorganic substance, to crystalloids or to colloids. Certainly the changed permeability does not affect the sodium chloride, and apparently from a limited number of experiments it does not affect the phosphates. It seems, therefore, more likely that permeability in relation to certain organic substances, either in dissolved or colloid state, may be affected.

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A note on the antigenic properties of the filtrate of typhoid saline vaccine.

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It was recently shown by Perlzweig and Steffen[1] that the immunizing antigen of the pneumococcus may be extracted from the bacterial cells by 70 per cent alcohol, physiological salt solution and by water. They found that the supernatant fluid of old

[1] Perlzweig, W. A., and Steffen, G. I., PROC. SOC. EXP. BIOL. AND MED., 1923, xx, 378, and *J. Exp. Med.*, 1923, xxxviii, 163.