polysaccharide, is added to the resuspended agglutinated cells and the mixture agitated for a moment. Reagglutination rapidly takes place and the entire mass of cells falls to the bottom in large clumps. Since this does not occur when pneumococcus II M, III M, or I S (formerly I R) is added, it is difficult to avoid the conclusion that chemical combination of multivalent polysaccharide on the newly added I cells takes place with multivalent antibody on the previously agglutinated and resuspended cells. Thus the entire process of agglutination may be accounted for on a chemical basis, a conclusion already reached by Topley, Wilson and Duncan[5] in a test of Marrack's views.

8949 C

Factors Influencing Nembutal Anaesthesia.

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(Introduced by H. B. Williams.)

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In work recently reported from these laboratories,[1] it was found that the injection of glucose in normal-fed rabbits did not materially shorten the period of depression of nembutal anaesthesia. Fasting for 20 hours increased the duration of the anaesthesia appreciably. There was no correlation between the susceptibility to the drug and the blood sugar levels, either before the administration of the drug or at the time of greatest depression. Although the sugar level was not changed at the time of maximum depression there was a very definite drop in this level at the time of recovery.

Since the drop in the blood sugar level at the time of recovery from nembutal anaesthesia was shown only for normal-fed animals, the question arose as to the reaction of starved animals under the same conditions. It was also necessary to make a more complete study of the changes in the blood sugar level throughout the entire experimental period. The work presented in this paper is an extension of the previous work along these lines.

[5] Topley, W. W. C., Wilson, J., and Duncan, J. T., *Brit. J. Exp. Path.*, 1935, **16**, 116.

[1] Blackberg, S. N., and Hrubetz, M. C., PROC. SOC. EXP. BIOL. AND MED., 1936, **34**, 65.

Recovery sugars were done on both normal-fed and starved rabbits. Blood samples were taken at the time of deepest depression and upon complete recovery. The sugar values were determined by the Somogyi Micro Method.[2] Table I again shows the fall in the blood sugar level at the time of recovery for the normal-fed animals. With the starved group the fall obtained was less but since the difference between the initial and final values is more than 3 times the deviation of the difference,

$$\varepsilon_d = \sqrt{\varepsilon^2_{a_M} - \varepsilon^2_{b_M}},$$

its significance is statistically indicated.

TABLE I.
The Blood Sugar Level at the Time of Depression and Recovery from Nembutal Anaesthesia.

	Normal-fed group			Starved group		
	Initial	Anaesthesia	Recovery	Initial	Anaesthesia	Recovery
No. of observ.	136	133	45	44	43	40
Mean	110	110	95	97	101	87
Mean dev.	13	17	10	10	10	16
Mean dev. of mean	1.1	1.4	1.4	1.5	1.5	2.5

In order to ascertain the level of the blood sugar throughout the experimental period, the time curve was made on normal-fed and on starved rabbits. Samples of blood were taken before the injection and at hourly intervals for 6 hours after the injection.

TABLE II.
Time Curve for Blood Sugar Level after Nembutal.
Normal-fed.

		Time after injection in hours					
	Controls	1	2	3	4	5	6
No. of observ.	22	23	23	23	23	23	23
Mean	122	116	104	103	102	105	101
Mean dev.	22	15	11	14	12	11	14
Mean dev. of mean	5.0	3.1	2.3	2.9	2.5	2.3	2.9

TABLE III.
Time Curve for Blood Sugar Level after Nembutal.
Starved 18-24 Hours.

		Time after injection in hours					
	Controls	1	2	3	4	5	6
No. of observ.	22	22	22	22	22	22	22
Mean	105	102	103	96	98	106	107
Mean dev.	6	10	12	12	14	13	13
Mean dev. of mean	1.3	2.1	2.6	2.6	3.0	2.8	2.8

[2] Somogyi, M., *J. Biol. Chem.*, 1926, **70**, 599.

From Tables II and III it will be seen again that the normal-fed group showed a significant fall in the sugar level after the second hour. This fall corresponds to the decrease obtained at the time of recovery from the anesthesia, the duration of which averaged 2½ hours after the injection. The starved group again shows a smaller fall, but since the difference between the initial and final values is almost 2 times the deviation of the difference, the change is probably significant. The time at which this fall occurs also corresponds to the time of recovery which, in the starved group, occurred from 3 to 4 hours after the injection.

The drop in the blood sugar of normal-fed rabbits at the time of recovery from nembutal anesthesia brought the blood sugar to the initial level of the animals which were fasted 24 hours. But the normal-fed animals were recovered at the time of the drop in the blood sugar, while the fasted rabbits with the same sugar level remained anesthetized. There is, therefore, no evidence of a correlation between the blood sugar level, *per se,* and the susceptibility to nembutal. It appears that inanition has some effect other than that of lowering the blood sugar. Some of the metabolic processes are altered so as to render the animal susceptible to the drug for a much longer period of time. Since the starved group as well as the normal-fed show a fall in the sugar level at the time of recovery, it appears that the nembutal has some effect upon carbohydrate mobilization. We are at present studying the possible relationship between liver function and this increased susceptibility to nembutal anesthesia.

8950 P

A Contribution to Drug Allergy: Antipyrine.

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Landsteiner and Lampl[1] showed that new protein antigens could be formed through the chemical union between chemically simple drugs, such as anilin, and a protein. This is true for precipitin reactions in rabbits, as well as for shock experiments with guinea pigs (Landsteiner[2]). The sensitized animals do not react to an

[1] Landsteiner and Lampl, *Z. Immun. Forsch.*, 1917, **21**, 193.

[2] Landsteiner, *J. Exp. Med.*, 1924, **39**, 621.