trols, 2 showed a significant fall in plasma volume during ether anesthesia alone, 5 during the period of operation, and one, one-half hour postoperatively. In none of these controls was there a significant increase in plasma volume during any of the 3 periods studied. (3) Six patients were given desoxycorticosterone acetate subcutaneously 3 to 4 hours before anesthesia. In this group, 3 patients showed a significant increase in plasma volume during the period of anesthesia alone, one patient during the operation, and 5 patients one-half hour after the operation. There were no patients in this group who showed a significant fall in plasma volume during any of the 3 periods. (4) In this small series of patients who have undergone surgical procedures accompanied by slight blood loss, the decrease in plasma volume associated with ether anesthesia and these surgical procedures is small. This small decrease in plasma volume is not present when patients have been given desoxycorticosterone acetate subcutaneously 3 to 4 hours before operation.

11026 P

Action of Diethyl Ether on Histamine Release in Anaphylaxis.*

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Anesthesia is known to lessen the intensity of anaphylactic shock; sensitized guinea pigs, under anesthesia, are more likely to survive the injection of the antigen.[1,2] From experiments in which sensitized guinea pig uteri were suspended in urethane solution and did not contract upon addition of the antigen, Farmer[3] recently concluded that: (a) the anesthetic does not prevent the union between antigen and antibody, since the uteri did not contract either upon readministration of the antigen, when the narcotic had been washed out and the response to histamine was restored, and (b) that the anesthetic inhibits the action of histamine released in shock, while it does not interfere with its release. The following is a report on experi-

* Aided by a grant from the John and Mary R. Markle Foundation.

1 Besredka, A., *Ann. de l'Inst. Pasteur*, 1907, **21**, 957.

2 Farmer, L., *J. Immunol.*, 1937, **32**, 195.

3 Farmer, L., *Ibid.*, 1937, **33**, 9.

ments in which the action of diethyl ether on the histamine release in anaphylaxis of guinea pig tissues was studied.

One or two isolated lung lobes, one uterine horn, or one seminal vesicle from guinea pigs previously sensitized to egg-albumen, were incubated according to Schild[4] in small amounts of antigen solution at 37°C for 10 minutes. After boiling in a water bath, the incubation fluid was then assayed for histamine on the atropinized guinea pig's ileum. While these tissues released considerable amounts of histamine when in contact with the antigen proving that the animal was well sensitized and that its tissues were capable of histamine release, the other lung lobes and the second uterine horn or seminal vesicle failed to do so, when they had been previously etherized for periods of 20 to 40 minutes. Incubation in 0.25 to 3% ether in Locke's solution usually resulted in no release, or a greatly reduced one, of detectable amounts of histamine upon subsequent incubation with antigen.

When sensitized guinea pig lungs were perfused from the pulmonary artery with Locke's solution containing from 0.25 to 3% ether, in most instances injection of the antigen into the arterial cannula failed to release histamine in detectable amounts into the perfusate, as unetherized lungs do.[5,6] In these experiments, one "control" lung lobe was removed previous to the perfusion with ether solution and incubated in antigen solution. Its "shock fluid" contained histamine; so did the "shock fluid" from a uterine horn or seminal vesicle from the same animal, proving that the latter was sensitized.

When in a series of experiments the lungs were inflated and deflated by artificial respiration and gaseous ether was introduced via respiratory air, here again in most cases introduction of antigen caused no manifest histamine release. The failure to obtain such results in some instances is held to be due to mechanical factors; in these experiments, one or several of the lobes failed to be ventilated by the artificial respiration, so that certain parts of the lung tissue were probably etherized only incompletely, or not at all.

Further experiments proved that this action of ether was one upon the tissue and not upon the antigenic properties of egg-albumen, which were found to remain intact when antigen solutions, containing ether, were left standing for several hours. A subsequent publica-

4 Schild, H. O., *J. Physiol.*, 1939, **95**, 393.

5 Bartosch, R., Feldberg, W., and Nagel, E., *Pflüger's Arch.*, 1932, **230**, 129, 674.

6 Daly, I. de Burg, Peat, S., and Schild, H., *Quart. J. Exp. Physiol.*, 1935, **25**, 33.

tion will deal with the details of these studies and with a report on the action of ethyl urethane on the histamine release in anaphylaxis of guinea pig tissues.

Although earlier investigations by one of us[7] on arterial muscle, and more recent ones by Farmer,[3] on the uterus, show that some narcotics inhibit the response of smooth muscle to histamine, the results shown above seem to indicate that ether prevents the fatal anaphylactic shock in guinea pigs at least partly by suppressing the release of histamine. Such views are in contrast to Farmer's,[3] who held that anesthesia acts in the secondary stages of anaphylaxis by inhibiting the action of histamine, while it does not interfere with its release.

11027 P

Effect of Varying the Volume of Injection in Calculating Number of Infectious Particles of Vaccinia.

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In the course of certain experiments with vaccinia virus it was found that the injection of a small volume of a virus dilution gave approximately the same number of positive lesions as obtained with a much larger volume. In other words it was not the number of virus particles injected but their concentration which was important. This point was thought of sufficient interest to warrant further study. This paper is a preliminary report on the subject.

Methods and Materials. The purified vaccinia virus used in these experiments was similar to that used in previous experiments.[1] Measured amounts of this virus were rapidly frozen and dehydrated in a Flosdorf-Mudd apparatus and kept sealed in a vacuum until ready for use. The number of virus particles was calculated according to the method described by Parker.[2] For example, from Experiment 1, the log of the dilution which contains 1 particle per 0.1 cc is 6.93; therefore the number of particles in the virus suspension calculated from these data would be 10 times the antilog of 6.93 which

7 Katz, G., *Arch. f. exp. Path. u. Pharm.*, 1929, **141**, 366.

1 Sprunt, D. H., and McDearman, S., in preparation.

2 Parker, R., *J. Exp. Med.*, 1938, **67**, 725.