occurs between the encephalomyelitic and the poliomyelitic virus diseases although they exhibit certain similarities with respect to epidemiology and pathology. The horse, therefore, need not be considered a possible reservoir for poliomyelitis in man.

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Reaction of the Perfused Isolated Lung of Sensitized Guinea Pig to Horse Serum.

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There has been great need of a simple method of studying objectively the response of the bronchial smooth muscle of the sensitized guinea pig to antigens. Older methods of observing changes in bronchial tone in intact animals are not only difficult of application to small animals but are often complicated by changes in circulation which make the interpretation of such observations uncertain. More recently Koessler and Lewis[1] obtained striking graphs in the sensitized guinea pig by studying the changes in intrapulmonary pressure and the corresponding variations in ventilation depending upon varying degrees of bronchospasm produced by the injection of horse serum into horse serum sensitive guinea pigs. Similar responses may be obtained by perfusing the isolated sensitized lung of the rabbit (Sollmann and von Oettingen[2]) and of the guinea pig (McDowall and Thornton[3]). This method is superior to the use of ring preparations of tracheal or bronchial muscle because by means of it a study can be made of the reactivity of the smaller bronchioles which play the major part in bronchial reactions.

This method has been applied by us to a study of the reactivity of the bronchial smooth muscle of guinea pigs sensitized to horse serum. The procedure consists essentially of perfusing the bronchi through the trachea, the fluid making its exit through scarifications on the lung surface. The arrangement of apparatus and the technical details are described by Sollmann and von Oettingen,[2] and

[1] Koessler, K. K., and Lewis, J. H., *Arch. Int. Med.*, 1927, **39**, 163.

[2] Sollmann, T., and von Oettingen, W. F., PROC. SOC. EXP. BIOL. AND MED., 1928, **25**, 692.

[3] McDowall, R. J. S., and Thornton, J. W., *J. Physiol.*, 1930, **70**.

Warnant.[4] We have used the perfusion fluid recommended by McDowall and Thornton. It has the following composition, the amount of each salt being expressed in %: NaCl 0.659, KCl 0.046, $CaCl_2$ 0.005, $MgCl_2$ 0.009, NaH_2PO_4 0.01, Na_2HPO_4 0.008, $NaHCO_3$ 0.252. Such a modified Locke's solution is less likely to cause spasm of the bronchi because it contains less calcium and a small percentage of magnesium and its content in buffer salts keeps the hydrogen ion concentration constant for long periods of time.

The rate of flow through the bronchial tree was measured by recording the amount of fluid which filtered from the lung. Alterations of capacity through edema and stretching have been estimated to be negligible in a lung with so small a volume as that of the guinea pig lung. The normal unsensitized lung is only little influenced by the introduction of horse serum into the perfusion system. In some experiments, however, the outflow was reduced about 15 cc. per minute, indicating that some bronchoconstriction may occur in the normal bronchi, due to the slight toxicity of the horse serum and its content in tricresol used to preserve it. We have found that a 0.25% tricresol solution will alone cause bronchospasm, whereas fresh human serum produces no effect.

Contrasted with these responses, which may be regarded as normal, the bronchi of the sensitized animal go into rapid and violent constriction as soon as the injected horse serum reaches them. The amount of fluid which flows through the bronchial tree may fall from 50 or more cc. per minute to a few cc. The addition of 10 or more mg. of epinephrine at this point will not suffice to produce bronchial relaxtion.

This reaction appears to be specific for the injection of a 1% solution of crystalline egg albumen before the horse serum is added produces no bronchoconstriction. The method also affords an opportunity of demonstrating the phenomenon of desensitization in the isolated sensitized lung. If, after the bronchi are relaxed following the initial injection of horse serum, a second dose is introduced, no further bronchoconstriction takes place. In both of these respects the perfused isolated lung of the sensitized guinea pig reacts in a similar manner to the excised uterus as shown by Dale in his studies of anaphylaxis.

[4] Warnant, H., *Arch. internat de pharmacodyn, et de therapie,* 1930, **37**, 61.