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Peripheral Chemical Control of Pulmonary Ventilation.

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To gain further evidence on the probability of peripheral chemical control of pulmonary ventilation due to pulmonary vagal stimulation, a study was made of the latent periods and types of response following injections of sodium cyanide and sodium carbonate both in the normal and vagotomized dog. Injections were made: 1. Intravenously at the level of the heart by means of a catheter inserted into the right femoral vein or right external jugular. 2. Intra-arterially in the aorta proximal to the nutrient bronchial arteries by means of a catheter inserted upward through the left femoral artery.

Dogs under morphine and urethane anesthesia were used and respiratory movements recorded with a spirometer. 514 injections varying from ¼ cc. to 5 cc. of M/100 NaCn and from 5 cc. to 20 cc. of M Na_2CO_3 were made on 21 different animals.

The latent periods of respiratory stimulation following intravenous injections in the intact animal and corresponding injections with the same animal vagotomized were for the most part the same. In all injections the latent periods were long enough to allow the injected substances to reach the respiratory center.

Intra-arterial injections just proximal to the nutrient bronchial arteries produced respiratory effects only after large amounts had been injected. The latent periods were rather long and were the same in the intact and vagotomized animal. These results are indicative of an absence of action on the pulmonary vagal endings. However, this does not preclude the findings of Heymans and Heymans[1] that the heart and aortic arch are the seat or origin of respiratory reflexes.

The responses to intravenous and nutrient bronchial arterial injections were of the same type in both the vagotomized and intact animal as those resulting from small injections into the innominate artery, thus suggesting central action as predominant in all injections.

The similarity of results obtained by administration of sodium cyanide and of sodium carbonate before and after double vagotomy together with a failure to establish a difference in latent periods before and after vagotomy suggests the absence of or a slow response to peripheral chemical stimulation of the pulmonary vagal endings.

[1] Heymans, J. F., and C., *Arch. Int. Phar. et Ther.*, 1927, xxxiii, 366.