cavity, 3'20"; candidiasis, with cavity, 3'32"; without cavity 3'06", and suppuration, with cavity 3'22"; without cavity, 3'03".— Brown-Pearce cancer showed remarkable delay—5'32"—.

There was considerable differences in the pattern of blood radioactivity curves, depending on solvent of radioisotope and history of the pulmonary diseases.

Travel of Oxygen in the Body as Studied by the Use of $^{15}$O$_2$

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How the oxygen travels in the body after it enters into the blood through lungs, how long does it take to complete for to be metabolized oxygen in the tissue mitochondria as a hydrogen acceptor to produce water, is one of the most interesting problems in the physiology. Oxygen-15 is supposed to be a very convenient isotope for this purpose.

A dog was made to respirate air containing oxygen-15. Specific activity of the oxygen-15 in the blood and the serum was pursued.

The dog was anesthetized with Nembutal and endotracheal intubation was performed. The dog used, weighed from 10 to 20 Kg. Before and after the experiments the functional residual capacity, a single breath ventilation, oxygen consumption, nitrogen clearance curve and difference of oxygen concentration in the artery and the vein were measured. From these data we can calculate the specific activity of oxygen-15 in the alveolar space, hemoglobin and the total amount of oxygen-15 which enters into the body.

A endotracheal tube was attached with the valve separating the inspiratory and the expiratory gas. The dog was allowed to breathe normally a constant amount of oxygen-15 continuously through the open circuit of oxygen-15, which was prepared in the 26' cyclotron.

After the inhalation of air containing oxygen-15, the blood was taken from the femoral vein. The blood was centrifuged and then the red blood cell and the serum were separated. The specific activity was counted by the welltype scintillation counter.

The specific activity of blood were reached to a constant height after 10 minutes. Appearance of oxygen-15 occurred in the serum after about 40 seconds. It was checked that the isotope in the serum came from water and not from the oxygen-15 physically dissolved. Oxygen-15 in the serum was determined by distillation method.

The specific activity of water in the serum before and after distillation were the same.

When oxygen-15 entered into the body, it was metabolized in the mitochondria of the tissue, returned into the blood as water. Specific activity of carbon dioxide in the expiratory gas was too minute to detect. So that the action of carbonic anhydrase was negligible.

Travel of oxygen in the body is carried out as follows, oxygen in the air is combined with hemoglobin in the lung, oxygen with the hemoglobin is transfered into mitochondria of the tissue. The metabolically derived water is produced in the respiratory chain by catalysis of cytocrom oxidase. A part of the produced water enters rapidly into the blood.