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The Respiration in Plasma in Disease Due to Filtrable Virus.

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(Introduced by McKim Marriott.)

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In 1927 Kempner,[1] working in Warburg's Institute, demonstrated the disappearance of oxygen and the development of CO_2 in the plasma of chickens suffering from fowl-plague. He obtained the plasma by adding heparin to whole blood taken at the height of the disease. The plasma was placed in Warburg's manometric apparatus, saturated with a mixture of CO_2 and O_2 and kept at constant temperature. Readings were done for several hours and changes in pressure noted. Since the plasma from normal chickens did not show respiration and the changes observed were sufficiently great to be outside of experimental error, Kempner concluded that the respiration was connected with the metabolism of the virus.

Using Warburg's apparatus and the technic described above, we repeated the experiments using plasma obtained from pigs injected with hog-cholera. It was impossible to obtain virus of fowl-plague either in the United States or in Canada. Plasma from cases of measles was similarly used as there is considerable evidence for its being a virus disease. In addition plasma from miscellaneous affections, including rheumatic fever, was similarly studied.

Our results were as follows: (a) Experiments with normal human or animal plasma did not show a disappearance of oxygen. (b) A suspension of red cells from chickens was similarly used. Respiration was measured and found to occur in agreement with the values obtained by Warburg[2] for goose-blood cells. (c) Hog cholera plasma was obtained from experimentally infected hogs at the height of the disease. The animals were killed by cutting their throats and the blood caught directly in large sterile test-tubes containing heparin. Autopsy in each case showed that the animal had been suffering from hog cholera. Blood from 15 hogs was used and in most instances duplicate experiments were done. No disappearance of oxygen or appearance of carbon dioxide was noted and under anaerobic conditions no glycolysis took place. (d) An epidemic of measles during the spring of 1928 furnished the material

[1] Kempner, W., *Klin. Woshenschr.*, 1927, vi, 2386.

[2] Warburg, O., *Über den Stoffwechsel der Tumoren*, 1926, F. Springer, Berlin, p. 199.

for the study. The blood was obtained either in the pre-eruptive state when Koplik spots were present or during the early eruptive stage. Bacteriological culture of the blood on various media recommended for the growth of organisms from measles, showed no growth. Plasma from 15 cases was used and no changes in pressure under either aerobic or anaerobic conditions were noted. (e) Several experiments were done with plasma obtained from miscellaneous diseases of doubtful etiology and among them were 5 cases of rheumatic fever. Negative results were again obtained and bacteriological culture showed no organisms.

In none of the experiments were the changes greater than those due to experimental error.

We conclude that in our experiment respiration as measured by Warburg's method is not a general finding in plasma infected with filtrable viruses and that the virus character of the disease cannot be demonstrated by this method.

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Studies in Carbohydrate Utilization by Organisms of the Genus Mycobacterium.

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By means of direct quantitative carbohydrate determinations employing the Shaffer-Hartmann blood sugar method I have shown there is a rather wide utilization of carbohydrates by organisms of the genus Mycobacterium.

The reaction changes both in plain broth and carbohydrate broth cultures of the organisms of this genus are toward progressive increase in alkalinity. The reaction change is less rapid in the presence of utilizable carbohydrates. This increase in alkalinity whether in plain broth or carbohydrate broth cultures has been shown to be associated with an increase in the ammonia content of the media. This increase in ammonia is in most cases approximately equivalent