

such case have we failed to find a discrepancy. The abnormal alveolar/plasma ratio persists for some days. This would make it seem unlikely that the disturbance was due to the fixation of  $\text{CO}_2$  by the accession of alkali to the blood. It persists after all obvious hyperpnea is gone, so that an increase of the sensibility of the respiratory center can not be offered as a definite explanation as yet. The fault is not in the choice of the Fridericia method as it has also been observed with the Plesch-Higgins method. It seems unlikely that it is dependent on personal factors because of the absolute constancy of its relation to rapid changes in blood reaction and its absence at all other times. We are continuing studies to determine the cause of the phenomenon.

We believe that alveolar methods do not indicate accurately the reaction of the blood after recovery from acidosis. We also suggest that the value of respiratory quotients at such times may be questionable.

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##### **Active immunization with sensitized and non-sensitized bacteria.**

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In a previous communication<sup>1</sup> we reported that the serum of rabbits which had been injected with sensitized vaccine or living cultures of *Streptococcus viridans*, did not contain agglutinins, complement fixing antibodies or protective antibodies. Later similar results were obtained with sensitized vaccines of pneumococci, with the exception that the serum of animals inoculated with sensitized living pneumococci showed a rapid production of these antibodies. We then attempted to determine whether there was evidence of active immunity even though no antibodies could be demonstrated in the serum. It has been found impossible to immunize mice with green streptococci. Rats may be immunized with green streptococci, but the virulence of these organisms is so low that it is impossible to compare the results of immunity

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<sup>1</sup> Homer F. Swift and Ralph A. Kinsella, PROC. SOC. EXP. BIOL. AND MED., 1915-16, XIII, 103.

with the different forms of vaccines. For comparative study pneumococci are more satisfactory because of the high virulence of these organisms. Throughout the work type I pneumococcus has been used.

Four types of vaccine have been studied, (*A*) plain stock vaccine, killed at 56°; (*B*) sensitized stock vaccine, killed at 56°; (*C*) freshly prepared sensitized vaccine, killed at 56°; and (*D*) an alcohol precipitate of sensitized vaccine similar to that used by Gay in the preparation of typhoid vaccine.

Immunization was carried out by intraperitoneal injection of increasing quantities at three or four day intervals. Immunity has been studied in mice, guinea pigs and rats.

Mice immunized with three injections and tested from seven to eleven days after the last immunizing dose, showed immunity from all types of vaccines. The mice immunized with vaccine *D* were uniformly less immune than those with the other vaccines. There were only slight differences in the animals immunized with plain and sensitized vaccine, and in different experiments the results varied so that neither vaccine can be said to be better.

Guinea pigs received five immunizing injections in two and a half weeks. In series *A* there was moderate active immunity; series *B* very slight; and in series *C* none. The serum from two animals in each series was tested for antibodies and only in the serum of series *A* were agglutinins demonstrated.

Rats were found to be the most satisfactory animals for comparative studies. It was found that in six to ten days after the last immunizing dose, there was a higher degree of immunity in the plain vaccine series, but that this fell off rapidly. On the contrary, in the series immunized with freshly sensitized vaccine, the immunity though present was less marked early but increased after twelve to sixteen days. There was no parallelism between the degree of active immunity and the amount of agglutinin and bacteriotropin in the serum of the immune rats. Agglutinin was demonstrated only in the serum of series *A* rats. Bacteriotropins were much stronger in the series *A* rats than in the serum of series *C*. It is, therefore, evident that animals may possess a high degree of active immunity and still show practically no antibodies in their serum.

It is suggested that the immunity is due in part to a tissue immunity and not due entirely to antibodies circulating in the blood serum.

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**The influence upon the Ehrlich sarcoma of stimulation or depression of the oxidative processes in mice.**

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As far as the reports in the literature show, no one has investigated the effect of drugs which increase or decrease the oxidative processes of the organism upon the transplanted tumors of mice.

Through the courtesy of Dr. A. S. Loevenhart, both iodozobenzoic and iodoxybenzoic acids, which are oxidative stimulants, were obtained. These acids were converted into their sodium salts and injected into mice both before and after inoculation with tumor. In one group of animals, sodium iodozobenzoate in doses of 0.015 gm. was injected subcutaneously every day for six days previous to inoculation with tumor, while in a second group the same drug in similar dose was injected for eight days after inoculation. A third group received six injections of sodium iodoxybenzoate in dosage of 0.002 gm. previous to inoculation, while the animals of a fourth group received eight injections of similar dosage after inoculation. A fifth group of control animals remained untreated.

As an oxidative depressant sodium cyanid was used. One series of animals received seven injections of 0.00062 gm. previous to inoculation, while another received seven injections of similar dosage after inoculation; a third untreated group served as controls.

All the animals were inoculated by needle with 0.003 gm. of the Ehrlich mouse sarcoma.

Neither of these two procedures influenced the percentage of takes or the rate of growth.

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<sup>1</sup> Loevenhart, A. S., Harvey Lectures, 1914-15, X, 280.