

In the course of the experiment with glycogen as substrate almost 75% of the inorganic phosphate initially present has been esterified. Table V shows also that the content of inorganic phosphate increases, when hexose phosphate is used as substrate, in accordance with expectation.

Summary. The glycolytic enzyme of muscle extract after becoming inactive on standing can be reactivated by thioglycolic acid to a higher state of activity than that originally present. Lipmann's hypothesis of the enzyme being inactivated by oxidation and reactivated by reduction is corroborated and specified by the evidence that this oxidation-reduction is concerned with a sulphydryl group of the enzyme. There is evidence for the assumption that glycolytic enzyme of muscle seems to be a sulphydryl compound which loses its enzymatic property by oxidation to the disulphide state and is reactivated by reduction to the sulphydryl state.

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Pharmacological Studies on the Blood of Trachoma.

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The writer has reported his phytopharmacological studies on blood sera from various clinical conditions and described characteristic phytotoxic reactions produced by such specimens from certain diseases. These reactions were found useful in establishing a differential diagnosis and also in evaluating the results of therapeutic procedures.¹ Such specific phytotoxic reactions were particularly noted in pernicious anemia,² leprosy,³ and pemphigus.^{4, 5} This method of investigation has been repeatedly employed by Professor Leon Tscherkes of Odessa, who has confirmed Macht's findings. Some time ago, in a personal communication to the author, Professor Tscherkes wrote that he had discovered that blood sera from still another pathological condition exhibited a marked phytotoxic property for the seedlings of *Lupinus albus*—namely, trachoma. Since

¹ Macht, *Science*, 1930, **71**, 302.

² Macht and Anderson, *J. Pharmacol. and Exp. Therap.*, 1928, **34**, 365.

³ Macht, *Acta Dermat.*, 1932, **18**, 126.

⁴ Pels and Macht, *Arch. Dermat. and Syph.*, 1929, **19**, 640.

⁵ Pels and Macht, *Arch. Dermat. and Syph.*, 1931, **23**, 601.

this discovery was of considerable importance, the present writer undertook a study of blood sera from a series of trachoma cases in the United States in order to corroborate the findings of Tscherkes.

Specimens of blood from trachoma patients in all stages of the disease were obtained from different sources. A few blood sera were obtained from sporadic cases in Baltimore; for the most part, however, specimens were secured through the courtesy of public health officers in Tennessee, Kentucky and Indian Territory. According to the method described in detail elsewhere,⁶ these blood sera were tested on seedlings of *Lupinus albus*; and the phytotoxic indices of trachoma blood were compared with those given by normal human sera and by sera from various other ophthalmological diseases obtained, with permission of Professor Wilmer, from the Wilmer Institute of the Johns Hopkins University. The results obtained with specimens from 100 trachoma cases are indicated below. At the time of examination, in 30 cases, the disease had endured for periods ranging from one month to one year; in 10 cases, it had persisted from 10 to 20 years; in 8 cases for more than 20 years; and, in 3 cases, for more than 40 years. The course of the disease in the remainder of the 100 patients suffering with trachoma varied from 1 to 10 years. The average phytotoxic index of the trachoma sera studied was 47.7%, as compared with an index of 72% for normal human blood. The range of toxicity in various cases was as follows: Specimens from 2 cases gave a reading of 22%; and blood serum from another case, a phytotoxic index of 28%. The high toxicity of these sera was paralleled only by that of specimens from virulent cases of leprosy. Specimens from 17 patients exhibited phytotoxic indices ranging from 30 to 40%; and sera from 41 cases gave readings varying from 40 to 50%. This range of toxicity was comparable to that exhibited by specimens from pernicious anemia cases. The sera from 28 trachoma cases gave readings varying from 50 to 60%, exhibiting almost the same range of toxicity as is shown by specimens from the average run of pemphigus patients. Sera from 8 cases gave readings ranging from 60 to 70%; and specimens from only 3 cases exhibited indices of 70% or more—in other words, showed no toxic reaction. There was apparently no relation between the toxicity of blood specimens and the duration of the disease. Specimens from acute cases, however, seemed to exhibit a greater toxicity than sera from chronic patients. Control experiments were repeatedly made both

⁶ Macht and Livingston, *J. Gen. Physiol.*, 1922, 4, 573.

with normal blood sera and with sera from various other pathological eye conditions, particularly acute and chronic conjunctivitis. These uniformly gave readings of from 70 to 75%, or the same phytotoxic index as normal blood. Specimens of blood from three cases of glaucoma also gave normal readings of 75%.

From the standpoint of etiology and pathology of trachoma, these findings are of considerable interest, especially as the causation of that disease is still in dispute. They tend to support the view that the disease is not a simple local affection of the eyelids but is associated with profound systemic derangement in metabolism, which produces a sort of toxemia, at least as far as the toxicity of the blood serum for living plant protoplasm is concerned. Here it may be well to observe that Macht and Pels have examined the blood sera from a number of cases of pemphigus of the eye, which also gave a phytotoxic reaction. On the basis of the blood examination alone, differential diagnosis between pemphigus of the eye and trachoma is rather difficult to establish. However, pemphigus can be easily distinguished from trachoma if, on further examination, lesions are revealed on other parts of the body. A more detailed account of the present investigation will appear in the *Folia Ophthalmologica Orientalia*.

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Parasympathetic Drugs and Ovulation.*

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Studies on the nervous mechanism involved in copulatory ovulation have disclosed several interesting facts. First, the sympathetic chain has been shown not to be essential for ovulation and pregnancy in the cat¹ or rat.² Secondly, mid-brain removal or section of the brain stem immediately after copulation does not prevent ovulation in the rabbit if the anterior pituitary is left intact.³ These facts suggest that a nervous stimulus reaches the pituitary during copulation and that the pathway is probably independent of the sympathetics.

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¹ Cannon, W. B., *et al.*, *Am. J. Physiol.*, 1929, **89**, 84.

² Bacq, Z. M., *Am. J. Physiol.*, 1932, **99**, 444.

³ Fee, A. R., and Parkes, A. S., *J. Physiol.*, 1927, **67**, 383.