

similar way. Parallel with the deterioration of the complement and in the inverse proportion, the amount of the dialyzable protein fraction increases. The analysis of this phenomenon which will be described in detail elsewhere, led to the conclusion that the serum of a pregnant woman, treated in the way described above, acquires the ability of digesting itself. Moreover any normal serum placed in contact with "sensitized" placenta acquires the same property, so that the Abderhalden reaction would seem to be composed of two phases: the one—specific—the sensitization of placenta; the other—non-specific—the autodigestion of the serum as a result of the presence of sensitized placenta. Thus the assumption of specific proteolytic ferments of Abderhalden becomes unnecessary.

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**Studies on so-called protective ferments. III. The Abderhalden reaction is not an adsorption phenomenon.**

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In the current literature attention has been directed by Plaut,<sup>1</sup> Kjergaard,<sup>2</sup> Herzfeld,<sup>3</sup> Peiper,<sup>4</sup> Flatow<sup>5</sup> and others to the fact that kaolin or starch as well as placenta protein if mixed in suitable proportions with any fresh serum is able to produce the appearance of dialyzable substances in the serum. There is no doubt that these experiments show that by the simple adsorption of inorganic substances as well as placenta, serum may be so changed as to give off dialyzable substances. The conclusion however of these authors that therefore the Abderhalden reaction is not specific was premature. For we know that for instance in immunity work, complement may be fixed or inactivated by many inorganic and almost any organic substances (this is why in

<sup>1</sup> Plaut, *Münch. med. Woch.*, 1914, No. 5, p. 238.

<sup>2</sup> Kjergaard, *Zeit. f. Imfs. Orig.*, XXII, No. 1, p. 31.

<sup>3</sup> Herzfeld, *Bioch. Zeitschr.*, 1914, I.

<sup>4</sup> Peiper, *D. Med. Woch.*, 1914, No. 29, p. 1467.

<sup>5</sup> Flatow, *Münch. med. Woch.*, 1914, No. 21, p. 1168.

preparing reagents for the final test it is essential to titrate them or to find a suitable dose which will not fix the complement by mere adsorption); but we do not doubt the specificity of the complement fixation in the Wassermann reaction for instance. Here the parallelism between the complement deviation test and the Abderhalden reaction is very striking and I shall in later publications endeavor to give the proof that this parallelism is not merely on the surface but fundamental. In my experience positive Abderhalden test is obtained invariably with sera of pregnant individuals, whereas non-pregnant women gave as a rule negative results, provided the amount of placenta used for the test was not excessive. Moreover the fact that the appearance of dialyzable substances can be invariably brought about in male serum by placenta, if the placenta was previously sensitized, led to the conclusion that it is the very union between the placenta and some part of the pregnant serum—which union is very similar to that of antigen and antibody—that brings about changes in the placenta which enable such placenta to cause the auto-digestion of any fresh serum.

As to the mechanism of such an action upon the serum, the explanation which suggests itself to me as the most probable is the following: the combination of antigen and antibody is accompanied by a physico-chemical change of the medium (such as is for instance recorded by the Meistagmin reaction) which in turn causes the falling out or adsorption of some elements of the serum which originally prevented the action of the proteolytic enzymes normally present in any fresh serum. The same mechanism explains the auto-digestion of the serum in the case of kaolin and starch, only here the inhibiting substances are filtered out from the serum by simple adsorption as for instance is shown by Jobling and Petersen.<sup>1</sup>

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<sup>1</sup> Jobling and Peterson, *Journ. of Exp. Med.*, 1914, XIX, p. 459.