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Temporary Agglutinability of Red Blood Cells.

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As a result of studies on atypical isoagglutination it was concluded that the atypical feature is an unusual isoagglutinin acting at room temperature (20°-25°) on cells of the same blood group, or on cells of group O. These atypical agglutinins which occur in about 3% of normal individuals, possess a distinct specificity, the great majority describing the subgroups A^1 and A^2, or the agglutinable substance known as P. Landsteiner and Levine[1] emphasized that the atypical property is a peculiarity, not of the blood cell, which could be readily grouped, but of the agglutinin in the serum. Consequently these atypical reactions do not interfere with the scheme of the 4 blood groups.

In the blood to be reported, however, the results indicate that in this instance (a patient of group O) the exceptional property is the agglutinability of the cell which could be demonstrated by its sensitivity to an agglutinin present in about 15% of the sera, irrespective of the blood group. This peculiar property of the cell could be demonstrated during the illness of the patient, but not after recovery. From this it was concluded that the agglutinable property was induced by the specific nature of the illness (soluble products of pneumococcus type I) or by the therapeutic substances employed.

Patient A. F., age 4, developed measles on March 17, 1938, and on the following day was admitted to the Willard Parker Hospital of New York City. The patient also showed signs of otitis media, bronchopneumonia, and later also fluid in the right pleural cavity from which pneumococcus type I was cultured. The same organism was also recovered from a pharyngeal swab and from blood cultures. Within the course of 2 days, the patient received 100,000 units of horse antipneumococcal serum (Types I and II); sulfanilamide was also given. The temperature ranged between 101° and 104°. On March 31 a thoracotomy was performed.

On April 11, the patient was somewhat improved, but still running a high temperature. At this time the patient's blood was

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[1] Landsteiner, K., and Levine, Philip, *J. Immunol.*, 1929, **17**, 1.

grouped and found to belong to group O. A donor sent by the Blood Transfusion Betterment Association was found compatible in the more important cross-test, *i. e.*, the patient's serum failed to act on the cells of the prospective donor. However, on testing the serum of the donor and cells of the patient, distinct agglutination was observed. These specimens were then referred to the Blood Transfusion Betterment Association for further study.

On repeating the tests the observation made was confirmed. It could be shown that the serum of the donor agglutinated distinctly, but weakly, the cells of the patient (group O) both at room temperature (25°C) and more distinctly at 20°. When the tests were put up at 37°, no agglutination was observed. On testing the prospective donor's serum with the numerous O cells at 20°, not one was found to be sensitive to this agglutinin. This in itself was very unusual, since it was assumed from previous studies[1] that when atypical agglutinin was found, it never reacted on one blood only but invariably on several bloods. The second unusual feature was that the agglutinable property in the cells could be detected by the demonstration of the agglutinin in the sera of about 15% of all individuals irrespective of the blood group. Consequently the situation is the reverse of what was previously considered characteristic of atypical reactions, *i. e.*, rare incidence of the atypical agglutinins and wide distribution of the agglutinable factor in contrast to a high incidence of the agglutinin and an agglutinable substance specific for one blood only.

The agglutinin was found to be specifically absorbable by the sensitive cells of the patient. In view of the specific nature of the reaction, an attempt was made to determine if the factor is hereditary. This was found not to be the case, since the cells of neither the father nor the mother were sensitive to the specific agglutinin either in the direct test, or in the absorption test. Thus the agglutinable factor seems to be an induced and not a constitutional property, and this is supported by the fact that the agglutinability of the cells disappeared after the recovery of the patient.

From one case it is impossible to establish a correct explanation of this hitherto undescribed phenomenon, but as a working hypothesis it is conceivable that disease products, horse serum, sulfanilamide, or possibly other medications, by the specific absorption to the red cells or some other mechanism could so alter the blood as to render them susceptible to the action of a physiologically occurring agglutinin of wide distribution. This hypothesis is compatible with the fact that the reaction was still observed in cells which were washed several times in a large volume of saline and also that the prop-

erty could no longer be found in the red cells 4 months later, after which interval the original sensitive red cells presumably had been displaced from the circulation by a new supply.

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Correlation Between Blood Ascorbic Acid and the Dichlorophenolindophenol Intradermal Test.

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Rotter[1] suggested as a skin test the intradermal injection of a dilute solution of dichlorophenolindophenol as an index of the vitamin C saturation of the body tissues. Working on guinea pigs, he noted that the color of the dye injected intradermally decolorized much more rapidly in the normal than in the scorbutic animals. Similar results were also obtained in human beings. He concluded that if decolorization of the dye occurred in less than 5 minutes vitamin C "saturation" of the body tissues was present, whereas a decolorization time of 5-10 minutes was considered normal and more than 10 minutes indicated hypovitaminosis. Corroborative results were also obtained, in a study of 103 cases, by Portnoy and Wilkinson,[2] who, however, recognized that the decolorization of the dichlorophenolindophenol solution might not necessarily be due to specific reduction by ascorbic acid and that other substances such as glutathione might also have some part in the reaction. The advantages of a skin test as a rapid method for determining the degree of saturation of vitamin C in the body tissues are obvious. For this reason, it was thought advisable to evaluate the intradermal test on a series of 50 patients.

A series of 50 adult female patients, in all of whom active tuberculosis was present, were selected. All were on a diet rich in vitamin C. The technic employed was as follows: the fasting ascorbic acid content of whole blood was determined using the method of

1 Rotter, H., *Wein. Klin. Wochenschr.*, 1938, **51**, 205.

2 Portnoy, B., and Wilkinson, J. F., *Brit. Med. J.*, 1938, **1**, 328.