the mother by the products of conception and the production of isoagglutinins in rats and mice receiving transplants of certain tumors.[10, 11]

11677 P

Atypical Warm Isoagglutinins.

PHILIP LEVINE,* EUGENE M. KATZIN AND LYMAN BURNHAM.

From the Division of Laboratories of the Newark Beth Israel Hospital, Newark, N. J., and the Englewood Hospital, Englewood, N. J.

Zacho[1] reported an instance of premature separation of the placenta with a transfusion-accident, attributable to an atypical isoagglutinin active on the donor's cells. This agglutinin had the unique property of greater activity at 37° C than at lower temperature. Although Zacho's case was the first and only published instance of this sort, it is likely that hitherto antibodies of this character may have been overlooked. In support of this, case reports are presented of 5 patients whose blood recently investigated were found to contain such agglutinins. A brief discussion of the properties and the origin of these agglutinins forms the basis of this communication.

One of these cases was observed in a patient† (B.M.) transfused 6 times because of bleeding from a duodenal ulcer. Apparently, this agglutinin was induced as a result of the antigenic stimulus of repeated transfusions. No such history could be elicited in the remaining 4 instances, nor in the case of Zacho, all of which were observed in women suffering from a variety of complications of pregnancy.

In one patient (G.B.) who gave a history of 2 miscarriages, the present pregnancy was complicated by death of the fetus during labor. A second patient (H.H.) had 3 consecutive miscarriages and in the present pregnancy delivery was by Caesarian section because of uterine inertia. A third patient (D.D.) who suffered from persistent vomiting from the fourth to the seventh months had fever

10 Gorer, P. A., *J. Path. and Bact.*, 1937, **44**, 691.

11 Lumsden, *Am. J. Cancer*, 1938, **32**, 395.

* Aided by a grant from the Blood Transfusion Betterment Association of New York City.

1 Zacho, A., *Z. f. Rassen phys.*, 1936, **8**, 1.

† B. M. is a patient of Dr. Abell, Louisville, Kentucky. The study of this blood was made possible by Dr. D. C. Bull.

TABLE I.
Tests with Serum B.M. (Group O).

Read after 1½ hours at °C	Red Blood Cells of Group O					
	1	2	3	4	5	6
20	0	0	tr.	f.tr.	0	0
25	±	tr.	±	tr.	0	0
37	+	+	+±	+	±	0

TABLE II.
Tests with Serum H.H. (Group A).

Read after 1½ hours at °C	Red Blood Cells of Group					
	O 11	O 12	O 13	A 14	A 15	A 16
20	0	0	±	0	±	0
37	+	0	+±	+	+±	+

and premature rupture of the membranes a few days before delivery which was followed by a parametritis. The fourth patient (A.H.) died of an induced septic abortion. (Zacho's patient gave a history of 4 consecutive stillbirths preceding the last pregnancy.)

The correlation of atypical agglutinins in general with certain complications of pregnancy has been mentioned elsewhere.[2]

The characteristic reactions of these agglutinins in two cases are shown in Tables I and II.

The results with serum G.B. were similar to those indicated in Tables I and II. Serum A.H. gave most contrasting results in tests at 37° C and 25° C at which temperature the serum was practically inactive; at 20° C or lower, stronger reactions of a different specificity were observed indicating the presence also of cold-agglutinins. To a lesser degree, similar observations apply also to serum D.L.

When the test mixtures were centrifuged at low speed for one minute without previous incubation and read by resuspending the sedimented cells, reactions were observed which paralleled those seen in the series incubated at 37° C. Accordingly, the application of this rapid test is sufficiently sensitive for the selection of compatible donors.

In 2 cases tested, the agglutinin was specifically absorbable at 37° C by sensitive but not by resistant blood; absorption by sensitive blood at icebox temperature was incomplete.

There is sufficient evidence that these agglutinins exhibit a specificity different from that of the anti-M, anti-N, or anti-P. The agglutinins in one serum (H.H.) were shown in tests done jointly

[2] Levine, P., and Katzin, E. M., PROC. SOC. EXP. BIOL. AND MED., 1940, **45**, 343.

with Dr. A. S. Wiener to run parallel to the anti-Rh of Landsteiner and Wiener.[3] cf[4]

These antibodies were designated as warm-agglutinins[2] in order to differentiate them from atypical agglutinins that act at 20° C but not at 37° C, and from those which act equally well at both temperatures.

As to the origin of the warm-isoagglutinins in the pregnant women, it is assumed that they are one of several varieties of antibodies resulting from isoimmunization of the mother by the products of conception.[5] As originally stated by Levine and Stetson, it is believed that the fetus inherits certain dominant agglutinable substances from the father which if lacking in the mother may stimulate her to produce isoantibodies.

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Action of Sulfapyridine upon Pulmonary Lesion of Experimental Pneumococcal Pneumonia.

W. BARRY WOOD, JR.* (Introduced by J. F. Enders)

From the Department of Bacteriology and Immunology, Harvard University Medical School.

The action of type specific antiserum upon the pulmonary lesion of lobar pneumonia has been described in a previous paper.[1] Pneumonia was produced experimentally in white rats by intrabronchial inoculation of type I pneumococci suspended in mucin. The disease was uniformly fatal in untreated animals, and pneumococci were found to spread through the lung by way of edema fluid at the advancing margin of the lesion. Type specific antiserum penetrated the pneumonic lesion and apparently stopped its spread by agglutinating and immobilizing the invading organisms in the outer edema zone. The fixed pneumococci were then overtaken and were rapidly phagocytized by leucocytes.

Although sulfapyridine has proven beyond any doubt to be effec-

[3] Landsteiner, K., and Wiener, A. S., PROC. SOC. EXP. BIOL. AND MED., 1940, **43**, 223.

[4] Wiener, A. S., and Peters, H. R., *Ann. Int. Med.*, 1940, **13**, 2306.

[5] Levine, P., and Stetson, R. E., *J. Am. Med. Assn.*, 1939, **113**, 126.

* Fellow in the Medical Sciences of the National Research Council.

[1] Wood, W. B., Jr., *Science*, 1940, **92**, 2375, p. 15.