

blood and if the titer of anti-Rh iso-antibodies in her body should be high enough, hemolysis of the donor's Rh-positive red blood cells will take place (even though the bloods are of the same blood group), giving rise to an intragroup hemolytic transfusion reaction. The same is true of certain nonpregnant individuals who are Rh negative and are given transfusions of Rh-positive blood. The first transfusion may sensitize the recipient so that the blood of subsequent transfusions will be hemolyzed.

"However, the problem is not so simple, for the Rh factor is not a single entity, but comprises at least five distinct varieties of Rh agglutinogens. . . . The practical importance of this finding is that there are three principal varieties of anti-Rh sera and unless all bloods are tested with all three types of sera, some Rh-positive bloods may be classified as Rh negative. . . .

"In addition, the subject has become even more complex since the discovery of the Hr (or St) factor, which is an antigen shared by bloods of several of the Rh types, namely, Rh-negative bloods, those containing properties Rh₁, Rh₂, and Rh₃, and heterozygous Rh, and Rh' bloods; while Hr is absent from homozygous Rh, and Rh' bloods. The significant feature of this is that just as an Rh-negative individual may be sensitized against Rh-positive blood, so may an Hr-negative individual be sensitized against Hr-positive blood. Furthermore, an Hr-negative individual is always Rh positive. Therefore, one is not justified in feeling completely secure when transfusing an Rh-positive individual. This is seen from the case to be presented in which a transfusion reaction occurred in an Rh-positive individual, who was given Rh-negative blood, the reverse of the usual combination which causes trouble. . . .

"A case is reported in which the

Hr factor appeared to be responsible for an intragroup hemolytic transfusion reaction.

"The use of Rh-negative blood is not the complete answer for the prevention of intragroup hemolytic transfusion reactions.

"The value of the biologic test in preventing dangerous transfusion reactions is reiterated."

A. W. K.

DEGOWIN, E. L.: *Isoimmunity to the Rh Factor as a Cause of Blood Transfusion Reactions*. J. Lab. Clin. Med. 30: 99-106 (Feb.) 1944

"Some individuals whose blood Rh negative would seem to possess the potentiality of developing anti-Rh agglutinins by either of two mechanisms: by receiving blood in repeated transfusions from Rh-positive donors or by bearing children whose blood is Rh positive. . . . Actually, although the combination of Rh-positive child and Rh-negative mother occurs in about 10 per cent of 10 pregnancies, only 1 pregnancy in 400 results in hemolytic disease of the child. It has also been noted that not all Rh-negative recipients are immunized by repeated transfusions of Rh-positive blood. . . .

"During a period of eighteen months (March 1, 1943, to Sept. 1, 1944) a series of 5,386 consecutive blood transfusions was given to patients in the State University of Iowa Hospitals. . . . Transfusions were given without regard to the Rh type of the donor or the recipient. . . .

"The incidence of reactions due to all causes was as follows:

Transfusions without reactions	5,200
Transfusions with reactions of all types	186 (3.4%)
Total transfusions	5,386

"In the 186 reactions of all types but six were found which could be attributed to isoimmunity to the Rh ag-

glutigen. This constitutes an incidence of reactions due to the Rh factor of 0.1 per cent in the 5,386 blood transfusions. . . . Sensitization to the Rh factor was attributed to multiple transfusions in four instances; pregnancies were responsible in the other two. There was one fatality. . . .

"No patient in this series developed isoimmunity with less than four transfusions. . . .

"From the analysis of transfusion reactions and the case histories of patients showing isoimmunity, it is evident that transfusion reactions due to sensitivity to the Rh factor cannot be differentiated by clinical symptoms and signs from those due to other causes. . . .

"There are many obstacles which present difficulty in the search for incompatibilities to the Rh factor in a blood transfusion service. The first is the lack of adequate sources of Rh-typing sera. . . . The problem is still further complicated by the demonstration by Wiener of at least three antisera which are required to determine with certainty that cells from any source are Rh negative.

"There is a disturbing lack of adequate methods of demonstrating anti-Rh antibodies in the laboratory. . . . Where isoimmunity to the Rh factor probably exists, no agglutinin can be demonstrated in many instances by the methods now in use. . . .

"The time required for incubation of cell-serum suspensions for the demonstration of the anti-Rh agglutinin (from thirty to sixty minutes) imposes a serious delay if the transfusion is required as emergency treatment. In view of the incidence of isoimmunity to the Rh factor presented in this paper, it is the practice of staff members of the Blood Transfusion Service to forego the incubation of cell suspensions preliminary to urgent transfu-

sions. The delay is considered more dangerous than the possibility of a reaction from Rh-incompatible blood.

A. W. F.

SELF, EDWARD B.; THALHIMER, WILLIAM, AND SCUDDER, JOHN: *Pooled Human Serum*. *Ann. Surg.* 121: 338-351 (March) 1945.

"SERUM versus PLASMA

"The writers wish to emphasize at this point that we hold no brief for either one of these blood substitutes as opposed to the other. We believe that each has a place in the treatment of patients and that the blood bank of the future will dispense both substances. Personal experience with the use of dried and liquid pooled plasma on similar types of patients has been had, and it is fair to say that plasma and serum are equally efficacious clinically. They can be used interchangeably without noticeable difference. The chemical similarity and like origin of each makes it at once illogical to assume striking differences between them. It is true, however, that each possesses certain advantages which the other does not.

"A comparison of 157 transfusions of liquid serum with 157 of liquid plasma and 71 transfusions of dried serum with an equal number of dried plasma reveals a significant difference in reaction rate—24.6 per cent for serum and 5.3 per cent for plasma (Table III).

"ADVANTAGES

Plasma:

1. Lower incidence of reactions.
2. Greater yield (2-4 per cent!).
3. Contains fibrinogen and prothrombin.
4. More easily prepared as a by-product of a blood bank. Blood can be used as blood, or later processed into plasma.