Rh System

Mansour Mohamed Omer El-Sharief

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Rh BLOOD GROUP SYSTEM

- discovered in 1940 by Landsteiner & Wiener
- most complex erythrocyte antigen system; located on chromosome 1
- found exclusively on surface of RBC → integral part of red cell membrane
- primary antigen → if present, consider Rh (+)
- lack corresponding naturally-occurring antibodies in serum

Rh BLOOD GROUP SYSTEM

CLASSIFICATION/NOMENCLATURE SYSTEM

Fischer & Race

- Three alleles: D/d, C/c and E/e
- Five antigens: D, C, E, c, e
- d → no D locus → no antigenic products

Rosenfeld

- Numerical system
- Rh1 to Rh5

- The Rh system is the second most important blood group system in transfusion medicine because:
- Rh-positive RBCs frequently immunize Rh-negative individuals through transfusion and pregnancy.

- The *RhD gene may be either present or* absent, giving the Rh D+ or Rh D- phenotype, respectively.
- Anti-D is responsible for most of the clinical problems associated with the system.

- The antigens C, c, E, and e are less immunogenic and become important in patient care only after the corresponding antibody develops.

- Anti-C, anti-c, anti-E and anti-e are occasionally seen and may cause both transfusion reactions and haemolytic disease of the newborn.
- In the Rh system, different common antigen combinations or haplotypes are possible.

CDE nomenclature	Short symbol	Rh D status
cde/cde	rr	Negative
CDe/cde	R_1r	Positive
CDe/CDe	R_1R_1	Positive
cDE/cde	R_2r	Positive
CDe/cDE	R_1R_2	Positive
cDE/cDE	R_2R_2	Positive

- The letter "d" is commonly used to designate the lack of D, but there is no d antigen.
- Approximately 85% of the Caucasian population is Rh-positive, and 15% is Rh-negative.

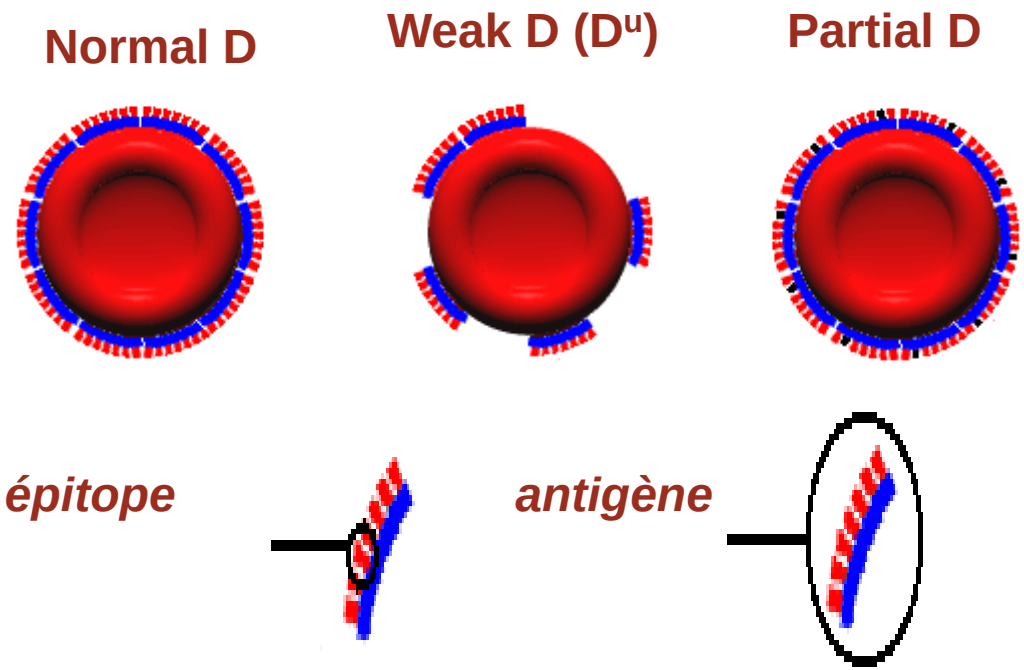
Weak D Antigen (D^u)

- weak or absent red cell agglutination by anti-D → detected only with use of anti-human globulin reagent → use bovine anti-D
- weakened form caused by either:
- 1- a piece of the D antigen is missing

  2- Inheritance of a gene coding for less D antigen

- A D+ person who lacks part of the D epitope and makes an antibody to the missing portion appears to make anti-D to normal D antigen because normal D+ RBCs carry all D epitopes.

- D variants : discordant results with different reagents !



THANK YOU