***Lecture 9 Blood transfusion***

***DUantigen:***

The phenomenon of a weaker than expected D antigen is called **DU**. For practical purposes, D**U**is defined as a red cell sample carrying D antigen detectable only by application of the indirect antihuman globulin test. D**U** is not a different antigen,but it is a differing expression of the D antigen e.g. D**U** is a weak form of D antigen.

Determining the D**U** status of a red cell sample is essential for donor blood, because blood for transfusion is considered Rhesus positive when the D**U** test is positive. Thus any donor blood sample that types negative for the D antigen by the slide and rapid tube methods must be tested further by an indirect antihuman globulin technique. If both tests are negative, the donor sample is Rhesus negative.

 Recipient with D**U**antigen is considered Rhesus negative for transfusion purposes.

The D**U**test is important as a part of routine blood banking. Mistyping of a donor could result in sensitization of an Rhesus negative blood recipient. See diagram

Anti D slide& Anti D, indirect Interpretation

Tube method AHG test

Donor Blood +ve Not tested Rh+ve

Sample +ve Rh+ve

-ve

-ve Rh-ve

Recipient Blood +ve Not tested Rh+ve

Sample

Not tested Rh-ve

-ve +ve Rh-ve

 -ve Rh-ve

**Testing of Donated Blood:**

**DETERMINATION OF ABO GROUP:**

Should be determined by testing red cells with Anti-A, Anti-B, Anti-AB reagents (by tube or microplate method or gel technology by any validated manual or automated methods) and by testing serum or plasma for expected & unexpected antibodies with known type A, B and O pool cells.

**Other Blood Group Systems**

**The Kell, Duffy and Kidd System:**

Clinically, the Kell, Duffy and Kidd systems have much in common. The antibodies formed against the antigens of these systems are usually IgG with an optimal activity at 37°C. They are best demonstrated in the indirect coombs test . All antibodies against Kell (Anti-K), Duffy (Anti-Fy), and Kidd (Anti-JK) antigens can cause hemolytic disease of the newborn and hemolytic transfusion reactions.

 ***: The P System***

The P system composed of 2 alleles P1 and P2 Anti P1 antibodies are cold agglutinins and are present as naturally occurring antibodies in the majority of P1 negative individuals.

 ***: The Ii System***

The Ii system is characterized by 2 antigen, I and i.

The I antigen is present on the red blood cells of every normal adult, while absent on the red blood cells of cord blood. In contrast, the I antigen is present on cord red cells, while only exceptionally found on red blood cells of normal adults. The I antigen appears on the red blood cells only after the first 18 months of life. Anti-1 antibodies present (as auto antibodies) in small amount in the serum of most normal individuals, and they strongly increased in amount in the serum of patients with mycoplasma pneumonia. In these latter cases they may cause a serious acquired auto immune hemolytic anemia of the cold type.Anti-I antibodies are cold agglutinins forming agglutinates at 4°C.The agglutinates. Disappear when warmed up to 37°C and reappear when cooled down again to 4°C. They are IgM complement-fixing antibodies. Anti-I antibodies are found as cold agglutinins in the serum of patients with infectious mononucleosis.

***Lewis system:***

The Lewis antigens are located on soluble glcosphingolipids found in saliva and plasma and are secondarily absorbed to the red cell membrane from the plasma. After transfusion of red cells, donor red cells convertto the Lewis type of the recipient owing to the continuous exchange of glycosphingolipids between the plasma and red cell membrane.

Lewis antibodies are naturally occurring and are usually IgM and complement binding.