HEMATOLOGY
&LYMPH SYSTEM

physiology sheet

Number	10
Done BY	لينا اللواما
Correction	Rahaf AL-Qaryouti
Doctor	Saleem

Flashback

Blood groups:

1) Classical blood groups:
A,B,AB,O which are **genetically inherited antigens** and don't change until death.

Antibodiesare produced **two months after birth**

(so in new borns there are no antibodies)

2) Minor blood groups are : MM,MN,NN,PP,NP

*They are under the control of an autosomal locus and inherited like the AB group (no dominance or recessiveness) but independent of the ABO system

3)Rh blood groups are: Rh+, rh- (pay attention if it is capital or small litter)

*People who are Rh+ have D antigens on their RBC in addition to classic blood group

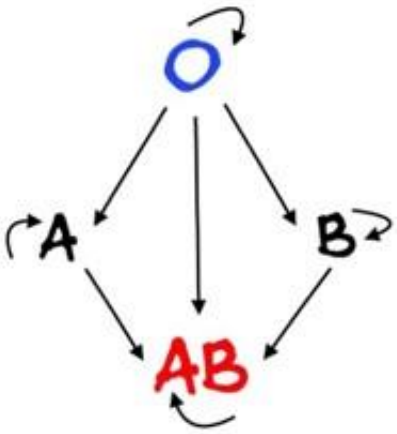
*50% of Europeans are Rh+

*In both of Rh+,rh-,there are no antibodies but if blood is donated from Rh+ to rh- the person who is rh- will produce antibodies toward the D antigen of Rh+ blood which will cause agglutination

Agglutination: the rxn between the antibodies and the antigens on RBCs

Aggregation: clumping of platelets that leads to clot formation

Blood Group	Percentage Worldwide
A	41%
B	10%
AB	4%
O	45%
Rh	85%



** **O** is universal **donor** while **AB** is universal **recipient**but they are not always universal donor or recipient as more than 3 bags will cause death due to agglutination

Indications for blood transfusion:

1-To restore blood volume(ex: in accidents)

2-Provide RBCs (in the case of anemia)

3-Increase blood coagulability

4-Replace blood in infants with rh- 5-Supply antibodies , proteins & WBCs

*Nowadays we have machines to separate RBCs ,WBCs, platelets ,plasma each alone

*We use **ACD** (Acid Citrate Dextrose) aka **CPD** (Citrate Phosphate Dextrose)as **anticoagulants** for stored blood but not heparin or others

Complications of blood transfusion:

Early:

1-Hemolytic reaction (immediate or delayed)

2-Reaction due to infected blood or allergic reaction to WBCs or platelets

3-Circulatory overload(if transfused blood was more than 5L)

4-Citrate toxicity and hyperkalemia

5-clotting abnormalities after massive transfusion

Late:

1-Transmission of serious diseases (hepatitis,malaria,AIDS,syphilis)

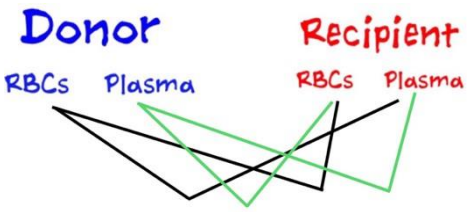
2-Transfusional iron overload

3- Immune sensitization ***Cross matching***:

If we have a donor blood and recipient blood , we should:

1)Mix plasma from donor with RBCs and plasma from recipient

2)Mix RBC from donor with RBCs and plasma from recipient so we can exclude any incompatibility *especially in minor blood groups* as minor and classical groups may cause clumping



*Blood is stored at 4 ◌˚C, above it ,blood will be rotten while below it ,the membranes of RBCs will be ruptured

*iIn emergency case (no time to cross matching)we will give Orh- to patients but if it is not available ,we give ORh+

*In blood bank , the Na+/K+ pump is weakened so Na+ will enter and K+ will leave so the cell will swell and become fragile , also the heart will be in danger due to high K+ concentration in plasma(hyperkalamia) which affects ventricles *If we transfuse blood that has been stored for 2 weeks at 4 Celsius , we will have 80%surviving cells and every day after that 1%of them undergo hemolysis

***Fresh** blood (not from blood bank) is used to donate **WBCs** or **platelets** *plasma can be stored for many months

TRUE OR FAULSE Questions:

1) Donor blood is collected to heparin which act as anticoagulant (F)

2)Most ABO incompatible blood transfusions are due to failure of check identity. (T)

3) Anti-A and Anti- B are often absent in serum of group O babies (T)

4) After blood has been stored for 3 weeks, at least , 70% of the transfused RBC will be retained in circulation 24hr after transfusion (T)

5)From the following blood groups

AMNRh+ from mother and ANNRh+ from father , child is OMNrh Is

the father real or not?

*it is real and here is the explanation:

Phenotype	ANNRh+ (father)	AMNRh+ (mother)
Possible Genotype	AANNRhRh AANNRhrh AONNRhRh AONNRhrh	AAMNRhRh AAMNRhrh AOMNRhRh AOMNRhrh

So the genotype of the child(OMNrh) will be a result if the genotype of father is AONNRhrh and for mother is AOMNRhrh.