



# ARJUNA NEET BATCH



## BODY FLUIDS AND ITS CIRCULATION

### LECTURE-3

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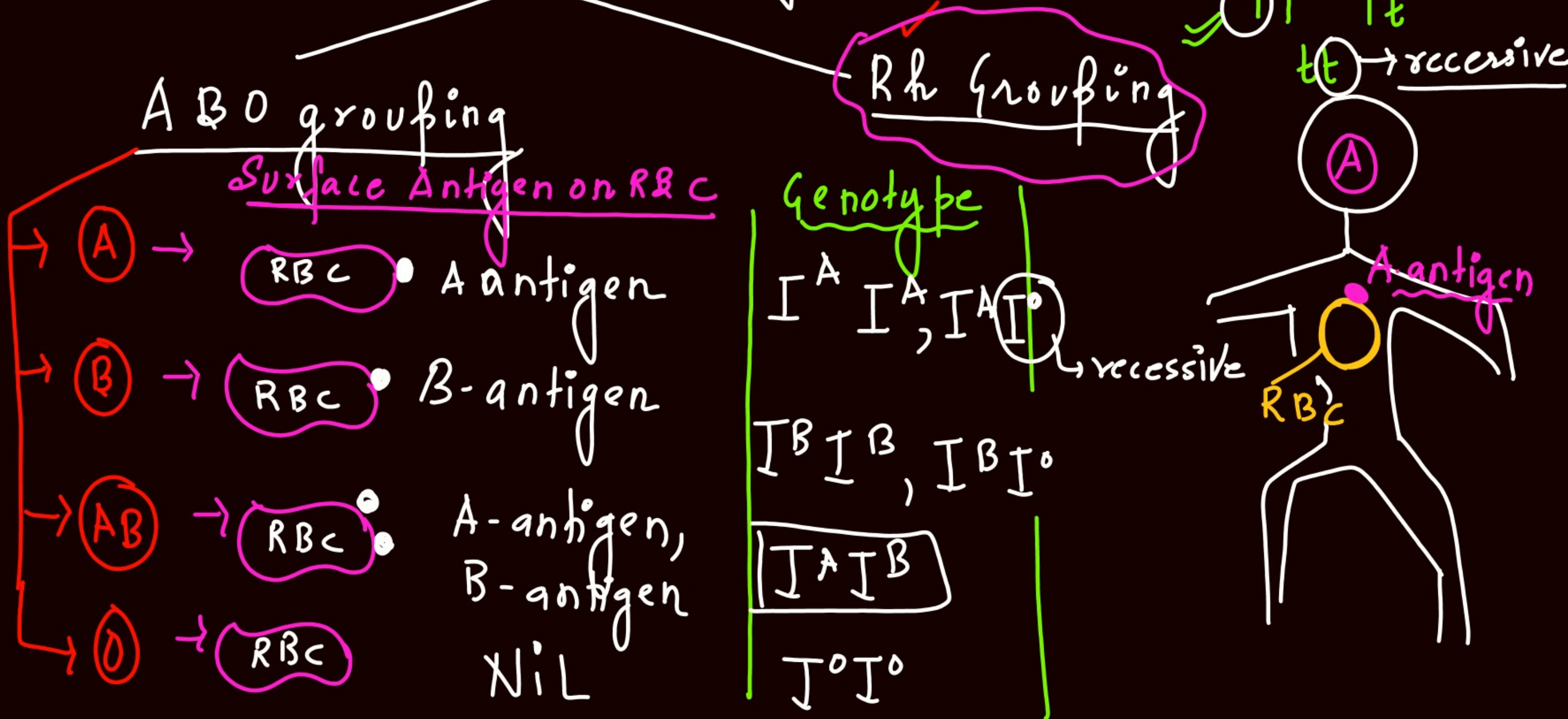
Objective of today's class



# BLOOD GROUPING LYMPH



# Blood Grouping (By Landsteiner)





# BLOOD GROUPING ✓



TABLE 18.1 Blood Groups and Donor Compatibility

Blood Group	Antigens on RBCs	Antibodies in Plasma	Donor's Group
① A	A	anti-B	A, O
② B	B	anti-A	B, O
③ AB	A, B	nil	AB, A, B, O
④ O	nil	anti-A, B	O

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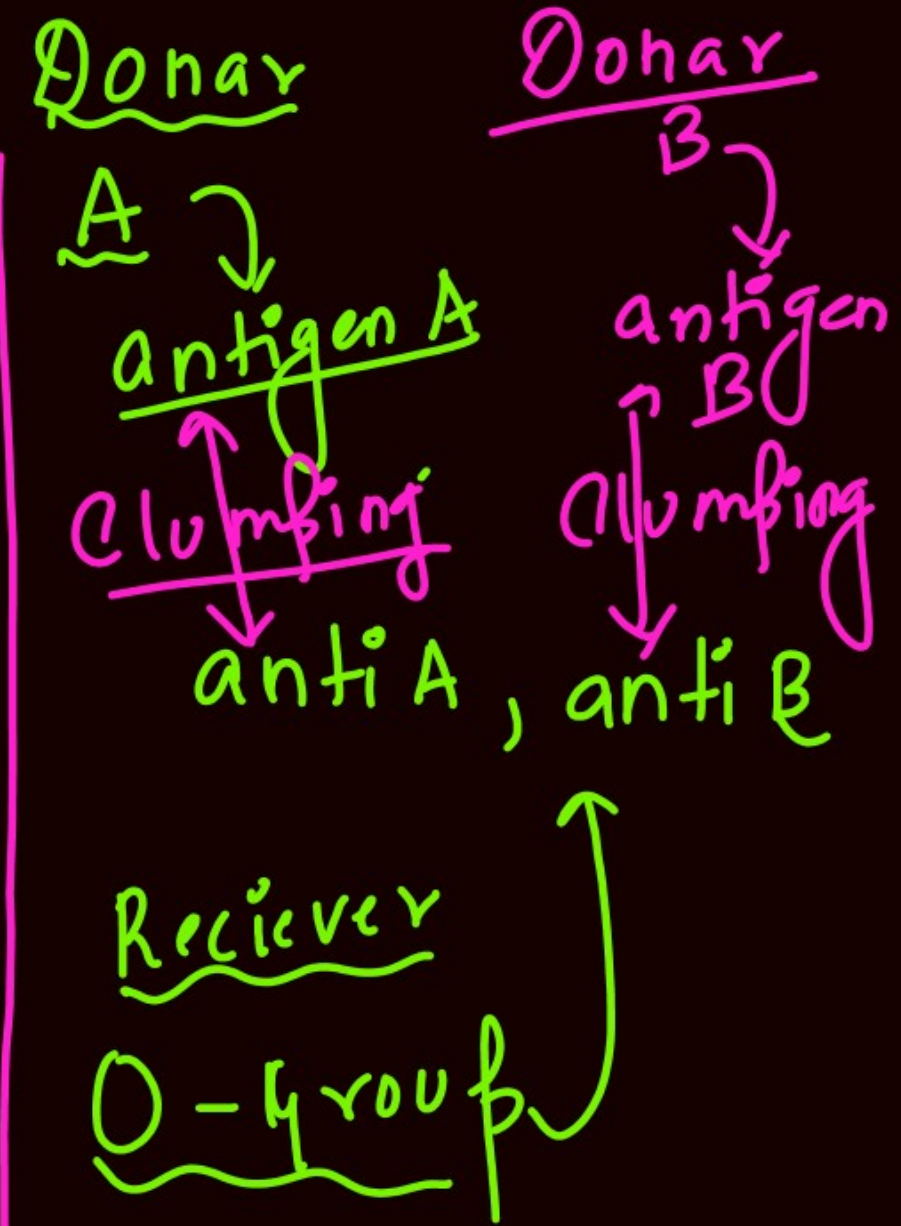
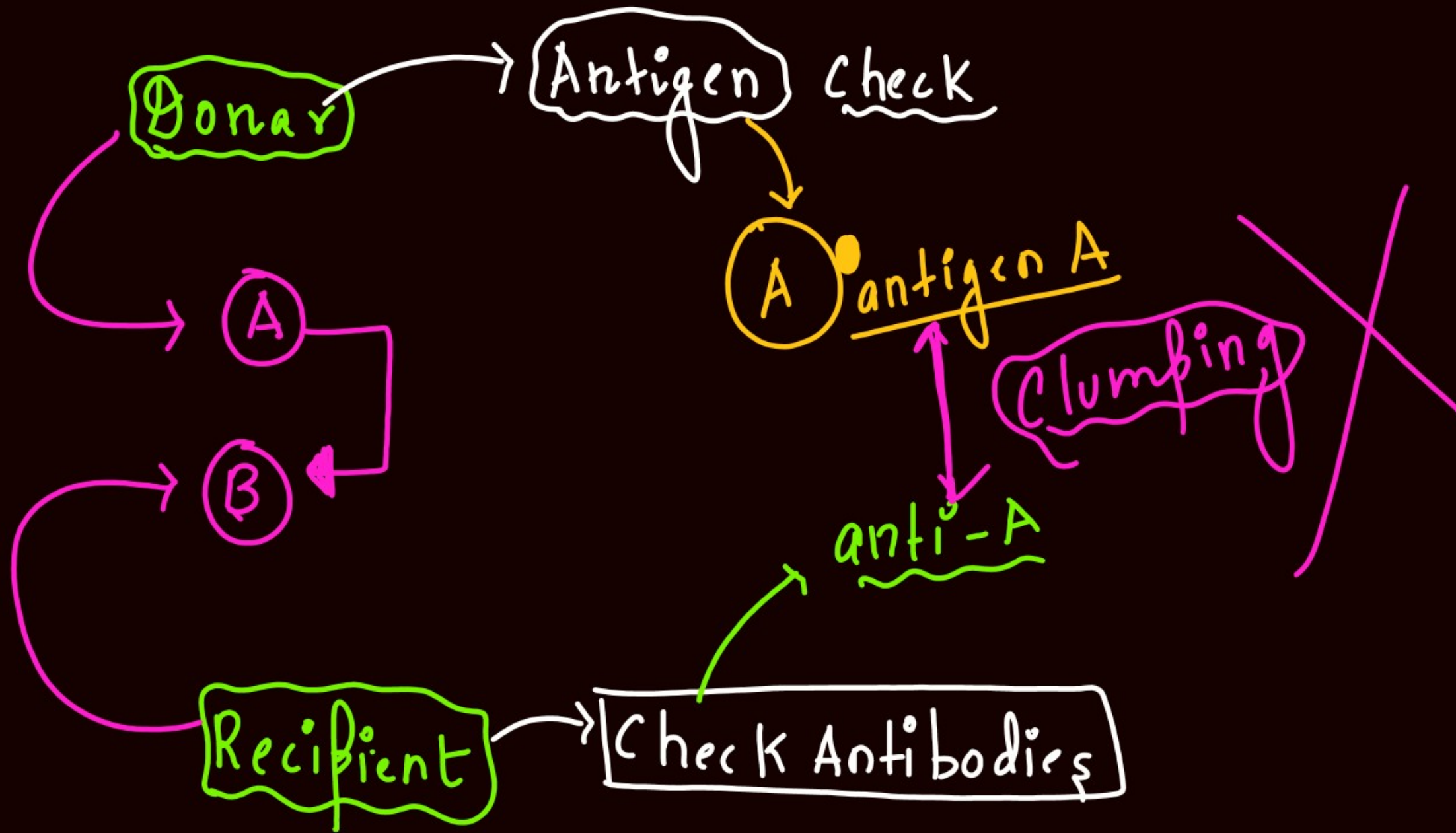
Antigen on RBC

↓  
GLYCOPROTEINS

Note Anti-β

↓  
Antibodies against β







Donar B → Antigen B  
Recipient A → Anti B

Clumping

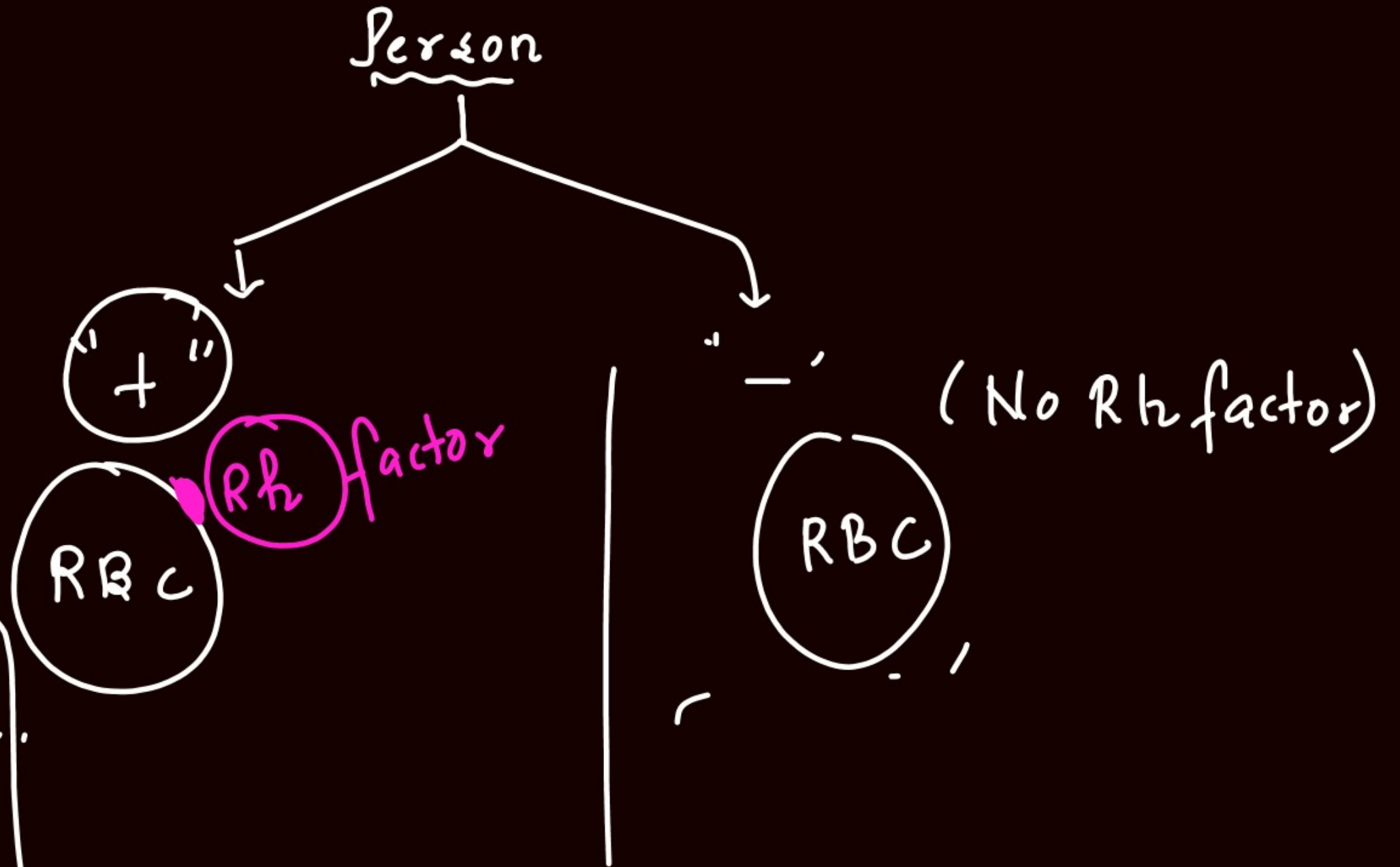
Donar O → ~~Antigen~~  
Recipient A → anti B

Donar (A) (B) (O)  
Antibodies NIL  
Receiver (AB)

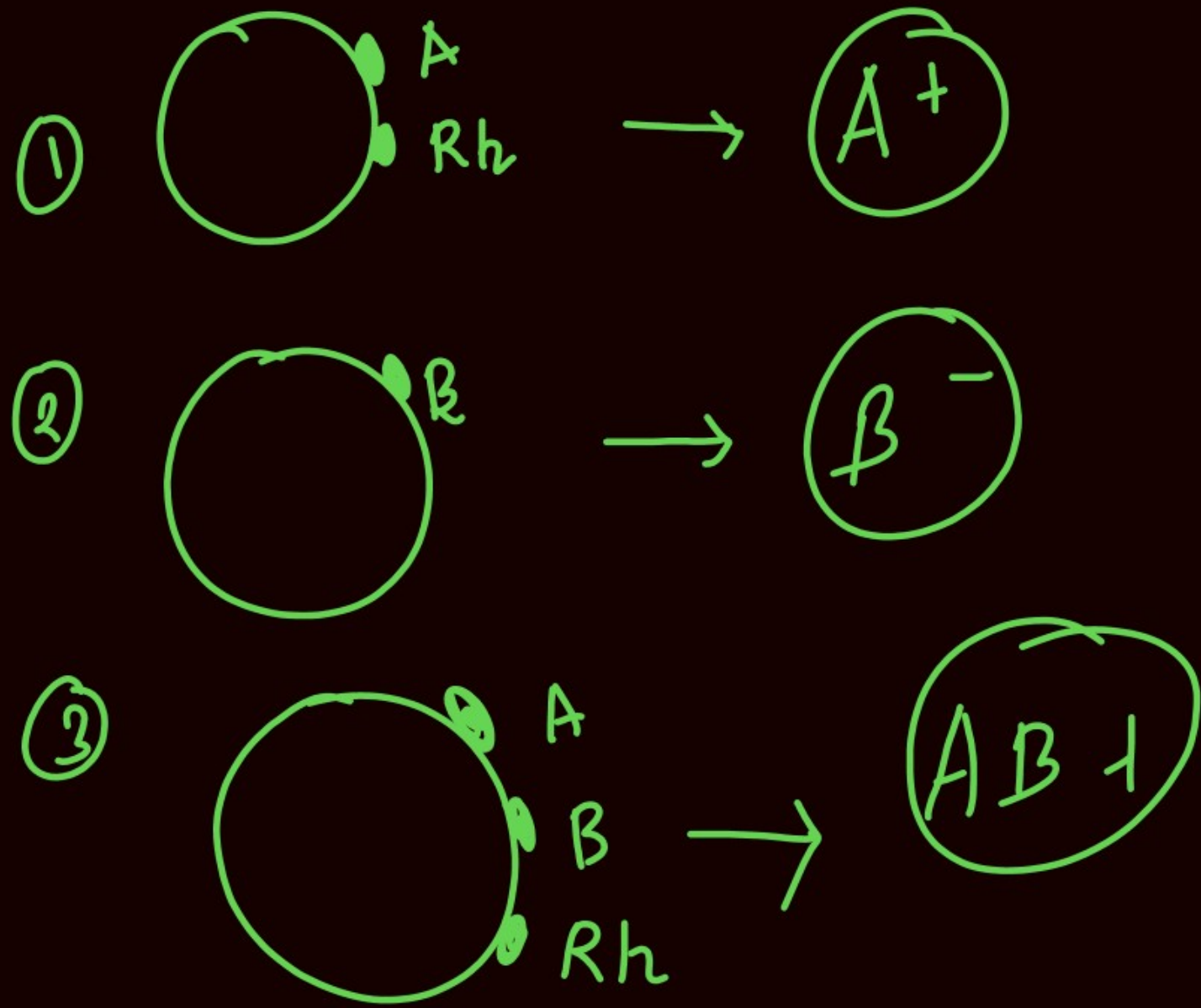
Rh grouping:

Rhesus Monkey  
↓  
first times

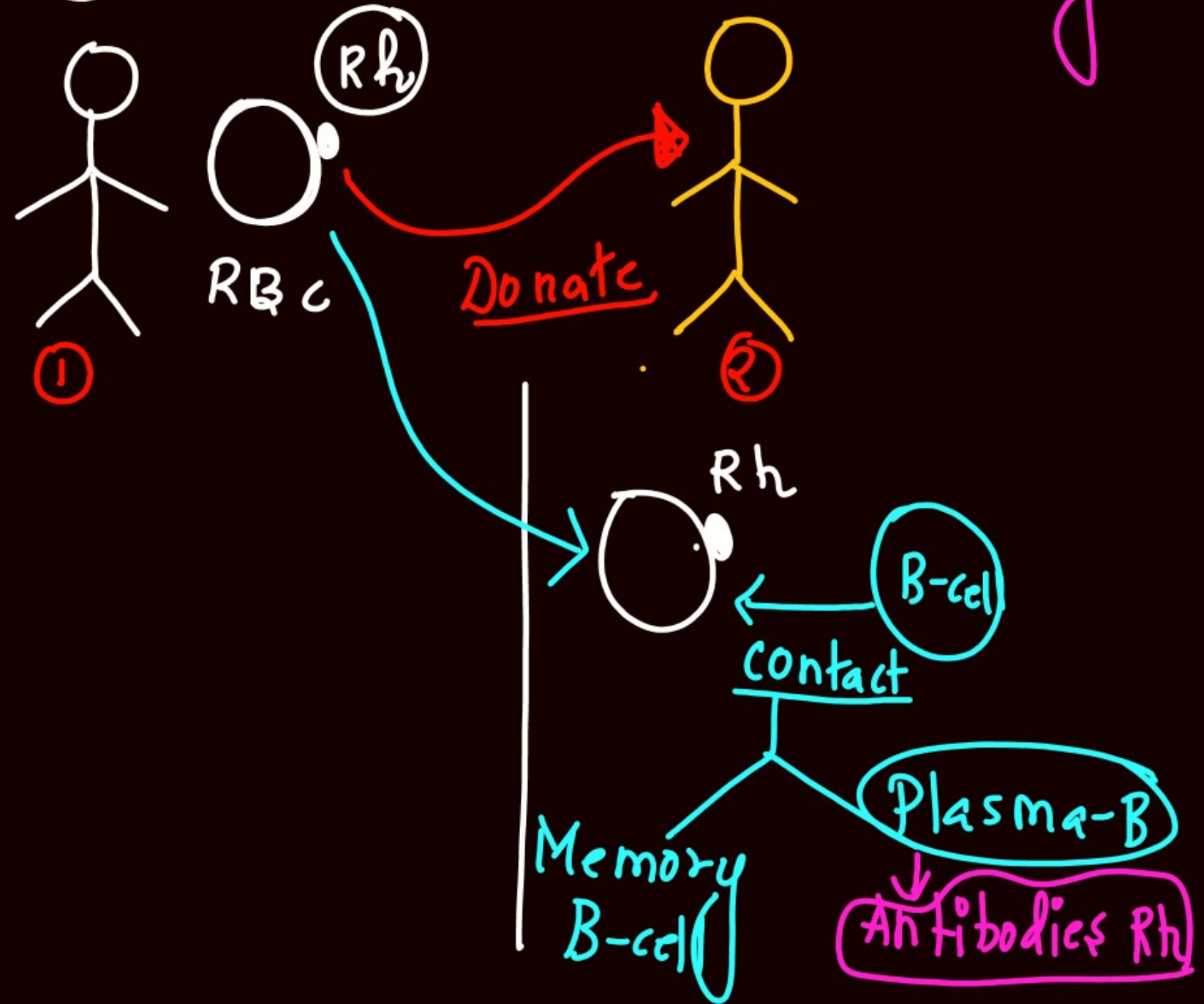
Person with A-Blood  
→ RBC with 'A' antigen.







**Note** Rh antibodies are developed only after exposure to Rh antigen.







### 18.1.3 Blood Groups

As you know, blood of human beings differ in certain aspects though it appears to be similar. Various types of grouping of blood has been done. Two such groupings – the ABO and Rh – are widely used all over the world.

#### 18.1.3.1 ABO grouping

ABO grouping is based on the presence or absence of two surface antigens (chemicals that can induce immune response) on the RBCs namely A and B. Similarly, the plasma of different individuals contain two natural antibodies (proteins produced in response to antigens). The distribution of antigens and antibodies in the four groups of blood, **A**, **B**, **AB** and **O** are given in Table 18.1. You probably know that during blood transfusion, any blood cannot be used; the blood of a donor has to be carefully matched with the blood of a recipient before any blood transfusion to avoid severe problems of clumping (destruction of RBC). The donor's compatibility is also shown in the Table 18.1.





### 18.1.3.2 Rh grouping

Another antigen, the Rh antigen similar to one present in Rhesus monkeys (hence Rh), is also observed on the surface of RBCs of majority (nearly 80 per cent) of humans. Such individuals are called **Rh positive** (Rh+ve) and those in whom this antigen is absent are called **Rh negative** (Rh-ve). An Rh-ve person, if exposed to Rh+ve blood, will form specific antibodies against the Rh antigens. Therefore, Rh group should also be matched before transfusions. A special case of Rh incompatibility (mismatching)



# ERYTHROBLASTOSIS FOETALIS ✓

Mother → Rh " - "

1st PREGNANCY

Foetus → Rh " + "

No complications as  
the Maternal Blood  
& foetal Blood is separate  
via PLACENTA

AFTER DELIVERY

Mother will come in contact with Rh + of foetus

Mother will develop antiRh





Mother (-)  
(anti Rh)

↳ SIZE very small

2nd pregnancy

Foetus (+)

COMPLICATIONS will be there

anti Rh antibodies due to its very small size  
will cross the PLACENTA barrier to reach to  
the foetus

clumping of foetal RBC will take place.

Mother

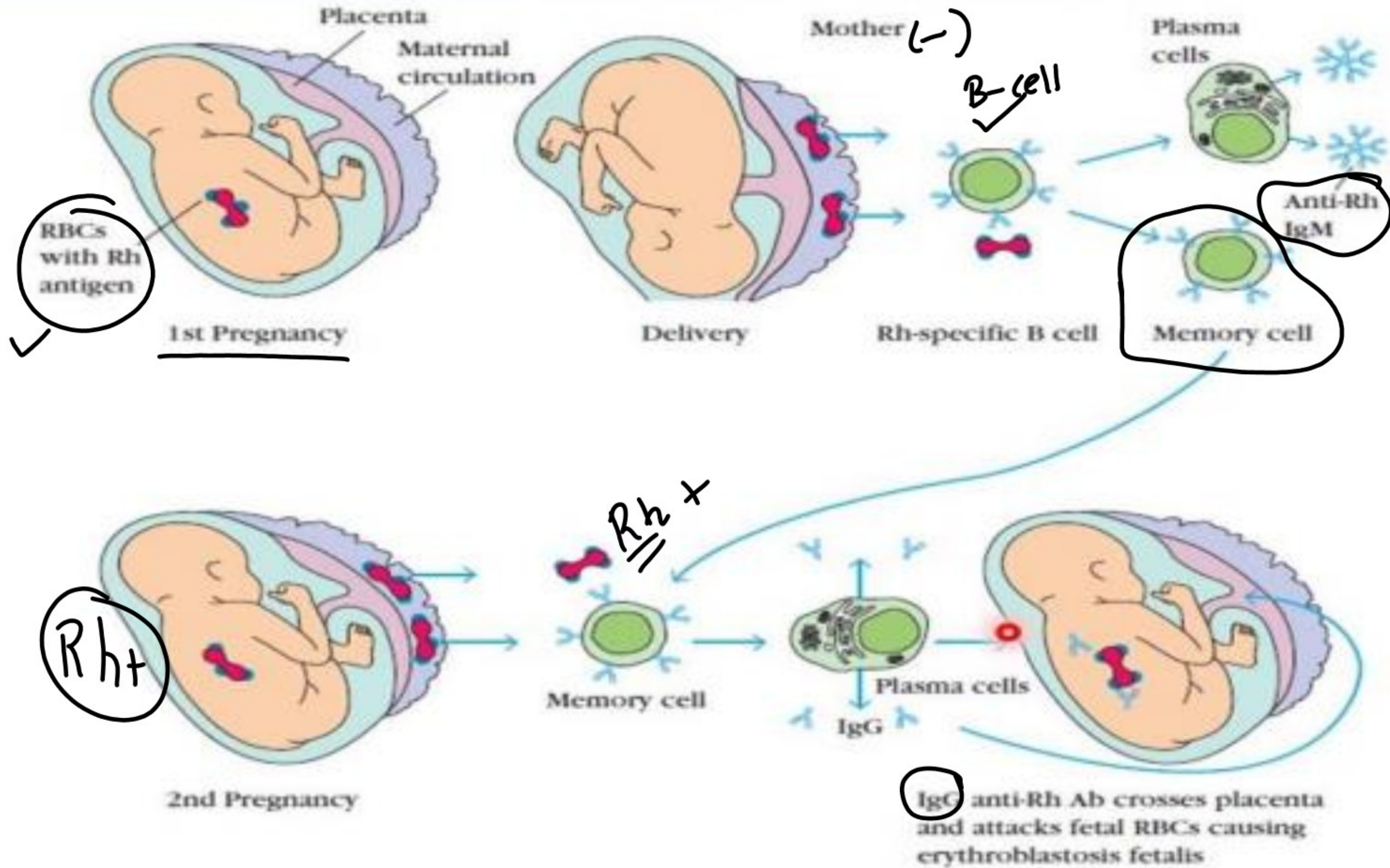
anti Rh

Placenta

Rh antigen  
RBC  
clumping  
Baby



# ERYTHROBLASTOSIS FOETALIS



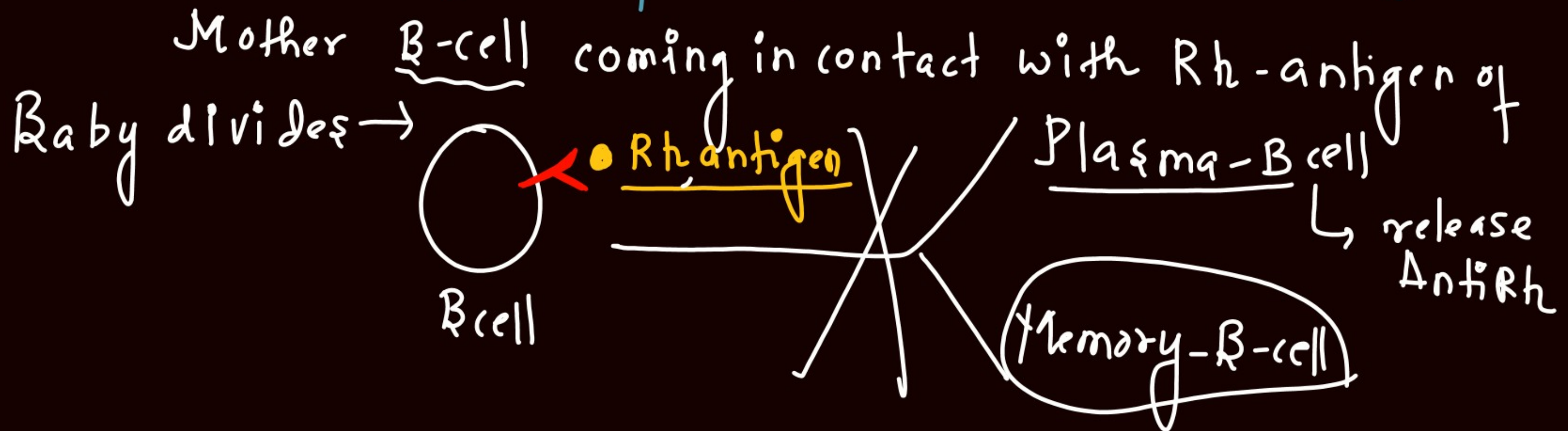


Q - How to prevent Erythroblastosis foetalis?



Ans: Provide mother with sufficient amount of anti Rh antibodies to react against Rh antigen of fetus.

After 1st Delivery





before transfusions. A special case of Rh incompatibility (mismatching) has been observed between the Rh-ve blood of a pregnant mother with Rh+ve blood of the foetus. Rh antigens of the foetus do not get exposed to the Rh-ve blood of the mother in the first pregnancy as the two bloods are well separated by the placenta. However, during the delivery of the first child, there is a possibility of exposure of the maternal blood to small amounts of the Rh+ve blood from the foetus. In such cases, the mother starts preparing antibodies against Rh antigen in her blood. In case of her subsequent pregnancies, the Rh antibodies from the mother (Rh-ve) can leak into the blood of the foetus (Rh+ve) and destroy the foetal RBCs. This could be fatal to the foetus or could cause severe anaemia and jaundice to the baby. This condition is called *erythroblastosis foetalis*. This can be avoided by administering anti-Rh antibodies to the mother immediately after the delivery of the first child.





## 18.2 LYMPH (TISSUE FLUID)

As the blood passes through the capillaries in tissues, some water along with many small water soluble substances move out into the spaces between the cells of tissues leaving the larger proteins and most of the formed elements in the blood vessels. This fluid released out is called the interstitial fluid or tissue fluid. It has the same mineral distribution as that in plasma. Exchange of nutrients, gases, etc., between the blood and the cells always occur through this fluid. An elaborate network of vessels called the lymphatic system collects this fluid and drains it back to the major veins. The fluid present in the lymphatic system is called the lymph. Lymph is a colourless fluid containing specialised lymphocytes which are responsible for the immune responses of the body. Lymph is also an important carrier for nutrients, hormones, etc. Fats are absorbed through lymph in the lacteals present in the intestinal villi.

