✦ Multiple Choice Type Questions

1. Cells involves immunity are absent in ....

(a) Bone marrow (b) Liver,

(c) Stomach (d) Lymphs.

2. Plasma cells are transformed form of which of the following cells?

(a) B-lymphocyte cell

(b) T-lymphocyte cells

(c) Neutrophil

(d) a and c.

3. In which of the following antigenic determinants are found?

(a) Antigen (b) IgG antibody
(c) IgM (d) Plasma cells.

4. **Primary antibody is :**
(a) IgG (b) IgM
(c) IgD (d) IgA

5. **Which of these antibody is found mother's milk?**
(a) IgG (b) IgM
(c) IgD (d) IgA

6. **Which of the following cells are not found in blood?**
(a) Red blood corpuscles
(b) white blood corpuscles
(c) B-lymphocytes
(d) Plasma cells.

7. **Who classified the blood groups?**
(a) Lueis Pasture (b) Karl Landsteiner
(c) Robert Koch (d) Edward Jenner

8. **Universal donor blood group is :**
(a) A (b) AB (c) O (d) B

9. **Main reason for Erythroblastosis fetalis :**
(a) Blood transfusion in child
(b) Rh incompatibility
(c) ABO incompatibility
(d) a and c.

10. **In Self transfusion which is used?**
(a) Stored blood of the person
(b) Stored blood of another person
(c) Stored blood of sheep
(d) a and b

11. **Which disease is not caused due carelessness during blood transfusion?**
(a) Hepatitis-B, (b) Malaria
(c) Haemolysis (d) Creutzfeldt Jacob

12. **Which of the following blood group result of recessive homozygous allele condition?**
(a) A-blood group. (b) B-blood group
(c) O-blood group (d) AB-blood group

13. **Which is not on application of blood group inheritance?**
(a) Treatment of hemophilia
(b) Treatment of malaria
(c) Treatment of dengue
(d) both b and c.

14. **When is organ donation day celebrated in India?**
(a) 13 Sept. (b) 13 August.
(c) 13 May (d) 13 June

15. In India the number of organ donors per ten lakh is?
(a) 0.1 (b) 2.0
(c) 0.8 (d) 1.8

Answers

1. (c). 2. (a), 3. (a), 4. (b), 5. (d).
6. (d), 7. (b), 8. (c), 9. (b), 10. (a).
11. (b). 12. (c), 13. (d), 14. (b), 15. (c).

✦ Very Short Answer Type Questions

Q.16. How many types of defence mechanism are found in human?

Ans. Two types : 1. Innate difence mechanism
2. Acquired defence mechanism.

Q.17. How many types of antibodies are there?

Ans. Antibodies are of types :
(i) IgG, (ii) IgM, (iii) IgA, (iv) IgE, (v) IgD

Q.18. What is the atomic mass of antigen?

Ans. 6000 Dalton or above.

Q.19. Antibodies are which type of proteins?

Ans. Antibodies are specific γ-globulin type of proteins which combine with antigens. These are synthesised by plasma cells.

Q.20. Which antibody passes through placenta and reaches to embryo?

Ans. IgG passes through placenta and reaches the embryo.

Q.21. Name the antibody found/present on the surface of mast cell.

Ans. IgE antibody.

Q.22. Which blood corpuscles are involved in diffusion of gases?

Ans. RBCs.

Q.23. Which scientist classified blood groups?

Ans. Karl Landsteiner.

Q.24. Which is the universal donor blood group?

Ans. 'O' blood group.

Q.25. Which blood group has both A and B antigens?

Ans. AB blood group.

Q.26. What is the percentage of Rh + individuals of human population in world?

Ans. About 85%

Q.27. Which Rh factor is very significant?

Ans. Rh.D

Q.28. Who was first to conduct/perform blood transfusion?

Ans. French physician Dr. Jean Bapstist.

Q.29. What is homo-specific transfusion?

Ans. The blood transfusion done by stored blood of other people.

Q.30. Mention the alleles that regulate the blood group.

Ans. I^A, I^B, I^O and *i*.

Q.31. When is organ donation day celebrated in India?

Ans. 13th August

Q.32. Mention the persons who have recently pledged body donation.

Ans. Sadhvi Ritambhara and cricketer Gautam Gambhir.

✦ Short Answer Type Questions

Q.33. Define antibody.

Ans. Antibody is a gama globulin protein synthesised by plasma cells present in blood and other body fluids. It is also called immunoglobulin (Ig).

Q.34. What is antigenic determinator epitope?

Ans. Whole antigen molecule does not interact with antibody. Only a specific portion bind with is and interacts with it is termed as an antigenic determinator epitope.

OR

The specific antigen portion that binds with antibody is termed as antigenic determinator epitope.

Q.35. What is the meaning of hinge in antibody?

Ans. Hinge in antibody helps in providing flexibility to it so that it can adjust to react with antibody of different sizes.

Q.36. Define blood.

Ans. Blood is thick/viscous, sticky, and bright red colour living tissue that flows in blood vessels.

Q.37. Explain the ABO blood grouping.

Ans. On the surface of RBCs two types of antigen A and B are present. On the presence/absence of the antigens there are four type of blood groups A, B, AB and O. This blood grouping is called ABO blood grouping.

Q.38. What is Rh factor? Explain its significance.

Ans. Rh factor a protein with 4/7 amino acids discovered in **Macaca Rhesus** monkey. It is also found on the surface of human RBCs.

Significance of Rh Factor

1. 85% of the human population are having Rh factor and are called Rh^+ while the remaining 15% of population is Rh^-. Therefore before blood transfusion along with blood group Rh factor compatibility is also assumed.

2. During pregnancy also it is borne in mind.

Q.39. What is blood donation. Explain.

Ans. It is a process of transfusion of blood or its products such as-plasma, platelets from one person to another.

Q.40. Mention the precautions taken during blood transfusion.

Ans. Precaution taken during/under blood transfusion

1. Comparison of ABO antigen of donor and patient.

2. Comparison of Rh factor of donor patient specially Rh D.

3. Verification of harmful and disease causing substances are absent.

4. Safe storage of blood from infection.

5. Blood storage and transfusion should be done in presence of qualified doctor(s).

Q.41. Explain the importance of organ donation.

Ans. By organ donation we can transplant organ to the recipient. This not only saves the life of the recipient but also gives happiness to the patient.

Q.42. Explain the genotype of ABO grouping.

Ans.

Sr. No.	Blood group	Genotype
1.	A	$I^A I^A, I^A$
2.	B	$I^B I^B, I^B$
3.	AB	$I^A I^B$
4.	O	ii

✦ Essay Type Question :

Q.43. Explain the structure of antibody.

Ans. Antibody is '*Y*' shaped molecule made up of four structural units. These are big and heavy each made of 440 amino acids and two are small and light each made of 220 amino acids. One heavy (*H*) and one light (*L*) combine to form an *HL* dimer. Two *HL* dimers combine to form an antibody. Carbohydrate chain is attached to heavy chain. Both dimers are bonded with $S-S$ disulphide bond to form antibody molecule.

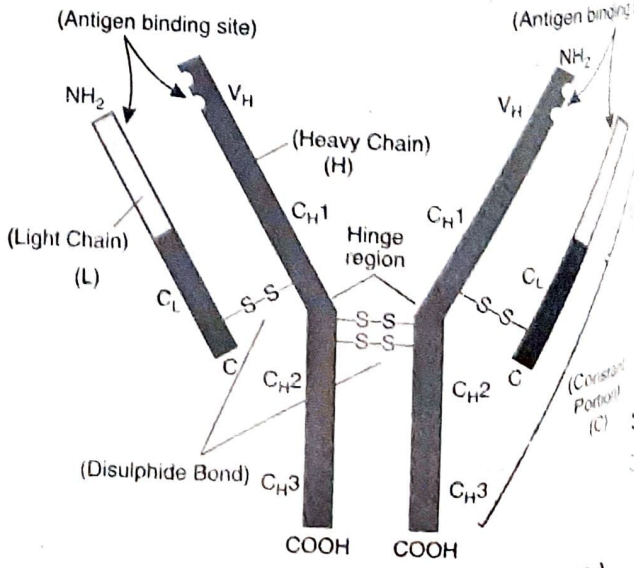

Fig. 4.3 : Structure of Antibody(*Ig*)

Each heavy and light chain is divided into :

(a) Variable portion : This portion binds with the antigen and it is also termed as F_{ab}. It is towards NH_2.

(b) Constant portion : This portions towards COOH side of the chain and it is also termed as F_{ac}.

The origin of the arms are flexible and is called hinge. Due to this the big or small molecules of antigens adjust and it helps in ths reaction.

Q.44. Explain the erythroblastosis fetalis during pregnancy.

Ans.

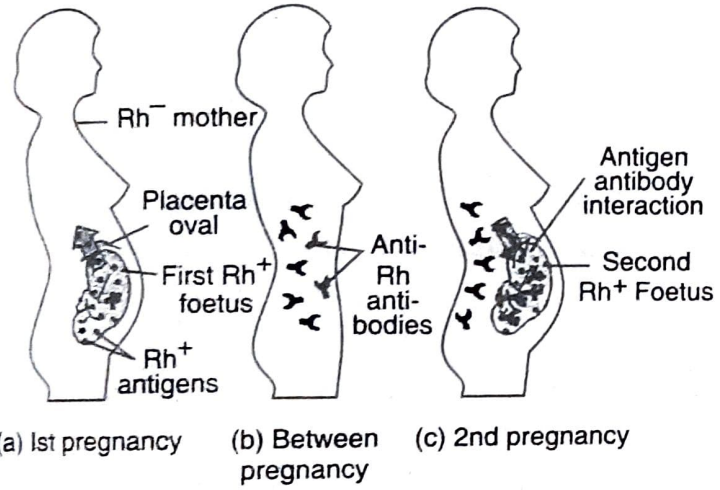

Fig. 4.3 : Erythroblastosis fetalis

Erythroblastosis fetalis during pregnancy is caused due to Rh factor in compatibility.

I st Delivery : If the mother is Rh^- and the embryo/foetus is Rh^+ then during delivery special care must be taken. During delivery the blood of both gets mixed. Due to which Rh antibodies is synthesised in mother. The I st delivery of the child is normal.

II nd Delivery : If the mother is pregnant for 2 nd time then the Rh antibodies formed in the mother's body react with embryo/foetus blood. Due to blood group these antibodies destroy RBCs of foetus and cause haemolysis. Resulting in death of foetus. In case the foetus remains alive, this is very weak and has hepatitis. This condition is called erythroblastosis fetalis.

Treatment of this condition can be done by : Vaccination If RhD is given mother within 24 hrs. or the IgG antibodies anti delivery. This is called **Rhogam** antibody. This destroys Rh^+ blood cells of foetus mixed in mother's blood and inhibits the formation of antibodies in mother. At times the blood of child is changed by blood transfusion.

Q.45. How is blood transfusion process done?

Ans. Blood transfusion is a scientific process. It is done as follows :

(A) Blood collection and safe storage

1. Before blood collection the donor's health status is checked.

2. Blood is collected in a sterilized pouch containing anticoagulant by inserting a suitable cannula to the vein in an arm.

3. Collected blood is cold stored or in refrigerated warehouse; due to this the growth of living organisms is checked and cellular degradation is slowed down.

4. Collected blood is tested for

Blood group, Rh factor, hepatitis B, hepatitis C, HIV etc.

5. After collection of blood the donor is allowed to wait for some time in order to observe and reaction of donation. If needed treatment should be done.

B. Blood Transfusion

1. Blood transfusion need comparison of ABO and Rh of the patient is done.

2. Only before 30 min. of blood transfusion the blood is taken from the blood bank.

3. It is a 4 hrs. transfusion process. Blood is given through cannula.

4. Possible reactions in patient is observed and controlled by medicines. Such as fever, feeling cold, pain, cyanosis, irregular heart beats etc.

Q.46. What is organ donation? Mention the importance of organ donation.

Ans. The donation of tissue or an organ by alive person or from a dead body is called organ donation. It can be done by any person upto 90 yrs. old. Organ is transplanted to a patient. It gives life and happiness to the recipient. The importance of

organ donation can be realised that about 50 needy patients can be helped. Normally most of the organ donation is done after death of the donor.

Heart, Eyes, Liver and Kidneys can be donated. There is need of 2 lakh kidneys but maximum only 7000-8000 are available. 50,000 people need liver, its availability is very few. 50,000 people need heart transplant, its availability is 10 to 15. According to an estimate due to damage of organs and non availability about 5 lakh people lose their life.

In India due to cultural tradition only 0.8 people per 10 lakh come for organ donation. In developed countries the figure is 10-30. It is important to realise its importance.

Q.47. Describe the importance of blood group inheritance.

Ans. The blood group in human depends on three alleles of ABO blood group. These alleles are part of the same gene. The blood group is because of interaction of I^A, I^B, I^O and i alleles. The antigens present on RBCs is due to I^A and I^B and I and *i* are recessive and are not involved in formation of antigen. Blood group of a person is result of interaction of any two alleles. There are six types of alleles. Blood group-O is the result of homozygous recessive gene interaction. These genes follow Mendal's laws of inheritance. It is useful in resolving issues related to :

(a) Inheritance

(b) Successful blood transfusion

(c) Hemolysis of blood in children

(d) Heredity diseases such as treatment of Hemophilia