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Q1.write a note on ABO blood group system?

ABO blood group system

A system used to group human blood into different types, based on the presence or absence of certain markers on the surface of red blood cells. The four main blood types are A, B, O, and AB. For a blood transfusion, the ABO blood group system is used to match the blood type of the donor and the person receiving the transfusion. People with blood type O can donate blood to anyone and are called universal donors. People with blood type AB can accept blood from all donors and are called universal recipients. People with type A or B can receive matching blood or type O blood.

ABO blood group system, the classification of human blood based on the inherited properties of red blood cells (erythrocytes) as determined by the presence or absence of the antigens A and B, which are carried on the surface of the red cells. Persons may thus have type A, type B, type O, or type AB blood. The A, B, and O blood groups were first identified by Austrian immunologist Karl Landsteiner in 1901.

Blood group

Type A blood

Type AB blood

Type B blood

Type O blood

Blood containing red cells with type A antigen on their surface has in its serum (fluid) antibodies against type B red cells. If, in transfusion, type B blood is injected into persons with type A blood, the red cells in the injected blood will be destroyed by the antibodies in the recipient's blood. In the same way, type A red cells will be destroyed by anti-A antibodies in type B blood. Type O blood can be injected into persons with type A, B, or O blood unless there is incompatibility with respect to some other blood group system also present. Persons with type AB blood can receive type A, B, or O blood.

The ABO and Rh groups in transfusion system recipient type donor red cell type donor plasma type

Note if the patient's serum contains anti-A1 (antibody to common type A red cell in subgroup A patients).

Note if the patient is a female less than 45 years old (childbearing possible), unless life-threatening hemorrhage is present and transfusion of Rh-positive blood is lifesaving.

Note if the patient's serum contains anti-D (antibody to positive red cells), except under unusual medical circumstances.

Blood group O is the most common blood type throughout the world, particularly among peoples of South and Central America. Type B is prevalent in Asia, especially in northern India. Type A also is common all over the world; the highest frequency is among Australian Aboriginal peoples, the Blackfoot Indians of Montana, and the Sami people of northern Scandinavia.

The ABO antigens are developed well before birth and remain throughout life. Children acquire ABO antibodies passively from their mother before birth, but by three months of age infants are making their own; it is believed that the stimulus for such antibody formation is from contact with ABO-like antigenic substances in nature. ABO incompatibility, in which the antigens of a mother and her fetus are different enough to cause an immune reaction, occurs in a small number of pregnancies. Rarely, ABO incompatibility may give rise to erythroblastosis fetalis (haemolytic disease of the new-borns), a type of anemia in which the red blood cells of the fetus are destroyed by the maternal immune system. This situation occurs most often when a mother is type O and her fetus is either type A or type B.

Q2. A patient is AB +, he need blood ,which blood group people can give blood to him?

ANS:

AB+ blood has both A and B antigens at the surface of the red blood cells, while other blood groups (A and B) only have one, or lack them altogether (group O). Because of this unique combination, AB+ donors' blood can only be given to others with AB+ blood. However, AB+ is the universal recipient blood type, meaning that patients with AB+ blood can receive blood from donors of any blood type if they require a transfusion.

Q3.write a detail note on CVS with diagram?

Functions of the cardiovascular system

Blood circulates through a network of vessels throughout the body to provide individual cells with oxygen and nutrients and helps dispose of metabolic wastes. The heart pumps the blood around the blood vessels.

Functions of blood and circulation:

- Circulates OXYGEN and removes Carbon Dioxide.
- Provides cells with NUTRIENTS.
- Removes the waste products of metabolism to the excretory organs for disposal.
- Protects the body against disease and infection.
- Clotting stops bleeding after injury.
- Transports HORMONES to target cells and organs.
- Helps regulate body temperature.

Blood

Blood is made up of about 45% solids (cells) and 55% fluids (plasma). The plasma is largely water, containing proteins, nutrients, hormones, antibodies, and dissolved waste products.

General types of blood cells: (each has many different sub-types)

ERYTHROCYTES

(red cells) are small red disk shaped cells. They contain HAEMOGLOBIN, which combines with oxygen in the lungs and is then transported to the body's cells. The haemoglobin then returns carbon dioxide waste to the lungs. Erythrocytes are formed in the bone marrow in the knobby ends of bones.

LEUKOCYTES

(white cells) help the body fight bacteria and infection. When a tissue is damaged or has an infection the number of leukocytes increases. Leukocytes are formed in the small ends of bones. Leukocytes can be classed as granular or non granular. There are three types of granular leukocytes (eosinophils, neutrophils, and basophils), and three types of non-granular (monocytes, T-cell lymphocytes, and B-cell lymphocytes). See also the lymphatic system.

THROMBOCYTES

(platelets) aid the formation of blood CLOTS by releasing various protein substances. When the body is injured thrombocytes disintegrate and cause a chemical reaction with the proteins found in plasma, which eventually create a thread like substance called FIBRIN. The fibrin then "catches" other blood cells which form the clot, preventing further loss of blood and forms the basis of healing.

Blood vessels

ARTERIES

carry oxygenated blood away from the heart. They are thick hollow tubes which are highly ELASTIC which allows them to DILATE (widen) and constrict (narrow) as blood is forced down them by the heart. Arteries branch and re-branch, becoming smaller until they become small ARTERIOLES which are even more elastic. Arterioles feed oxygenated blood to the capillaries. The AORTA is the largest artery in the body, taking blood from the heart, branching into other arteries that send oxygenated blood to the rest of the body.

CAPILLARIES

distribute the nutrients and oxygen to the body's tissues and remove deoxygenated blood and waste. They are extremely thin, the walls are only one cell thick and connect the arterioles with the venules (very small veins).

VENULES

(very small veins) merge into **VEINS** which carry blood back to the heart. The vein walls are similar to arteries but thinner and less elastic. Veins carry deoxygenated blood towards the lungs where oxygen is received via the pulmonary capillaries. The PULMONARY Veins then carries this oxygenated blood back to the heart.

The heart

The heart is a hollow muscular organ which beats over 100,000 times a day to pump blood around the body's 60,000 miles of blood vessels. The right side of the heart receives blood and sends it to the lungs to be oxygenated, while the left side receives oxygenated blood from the lungs and sends it out to the tissues of the body. The Heart has three layers; the ENDOCARDIUM (inner layer), the EPICARDIUM (middle layer), and MYOCARDIUM (outer layer). The heart is protected by the PERICARDIUM which is the protective membrane surrounding it.

The heart has FOUR CHAMBERS, in the lower heart the right and left Ventricles, and in the upper heart the right and left Atria. In a normal heart beat the atria contract while the ventricles relax, then the ventricles contract while the atria relax. There are VALVES through which blood passes between ventricle and atrium, these close in such a way that blood does not backwash during the pauses between ventricular contractions. The right and left ventricles are divided by a thick wall (the VENTRICULAR SEPTUM), babies born with "hole in the heart" have a small gap here, which is a problem since oxygenated and deoxygenated can blood mix. The walls of the left ventricle are thicker as it has to pump blood to all the tissues, compared to the right ventricle which only pumps blood as far as the lungs.

component	*meaning*	*example*
CARDIO-	heart	echocardiogram = sound wave image of the heart.
CYTE-	cell	thrombocyte = clot forming cell.

HAEM-	blood	haematoma - a tumour or swelling filled with blood.
THROMB-	clot, lump	thrombocytopenia = deficiency of thrombocytes in the blood
ETHRO-	red	ehtrocyte = red blood cell
LEUKO-	white	leukocyte = white blood cell
SEP, SEPTIV-	toxicity due to micro-organisms	septicaemia
VAS-	vessel / duct	cerebrovascular = blood vessels of the cerebrum of the brain
HYPER-	excessive	hyperglycaemia = excessive levels of glucose in blood.
HYPO-	deficient / below	hypoglycaemia = abnormally low glucose blood levels.
-PENIA	deficiency	neutropenia = low levels of neutrophilic leukocytes.
-EMIA	condition of blood	anaemia = abnormally low levels of red blood cells.

Q4.what is the difference between active and passive immunity?

ANS:

Immunity is the body's ability to destroy foreign materials and pathogens in order to prevent further infection. The first line of defence in a human body against pathogens is through barriers such as the skin, mucus layers, and saliva. This is known as innate immunity. The second line of defence is through phagocytes; this is again produced by innate immunity. The third line of defence is through adaptive immunity.

Active immunity and passive immunity are two types of adaptive immunity. A prominent difference between active and passive immunity is that active immunity is developed due to the production of antibodies in one's own body, while passive immunity is developed by antibodies that are produced outside and then introduced into the body. In this article,

let us look at more differences between active and passive immunity.

Active Immunity	Passive Immunity
Active immunity is usually permanent – it is produced by	Passive immunity lasts only for a few weeks or months. It is

the antibodies of the host in response to direct contact of an antigen	produced by the introduction of antibodies from outside to the host
It produces an immunological memory	It does not produce immunological memory
When the antigens enter the body, antibodies and other specialised lymphocytes are produced	Antibodies are introduced from an external source. For instance, a mother introduces antibodies to a fetus through the placenta and to an infant via mother's milk.
There are no side-effects	It may cause reactions
Immunity does not occur immediately	Immunity develops immediately

Q5.write a note on lymphatic system in detail?

ANS: Definition

Lymph nodes, or "glands" may swell as the body responds to a threat.
The lymphatic system has **three main** functions:
It maintains the balance of fluid between the blood and tissues, known as fluid homeostasis.
It forms part of the body's immune system and helps defend against bacteria and other intruders.
It facilitates absorption of fats and fat-soluble nutrients in the digestive system.
The system has special small vessels called lacteals. These enable it to absorb fats and fat-soluble nutrients from the gut.
They work with the blood capillaries in the folded surface membrane of the small intestine. The blood capillaries absorb other nutrients directly into the bloodstream.

The lymphatic system is part of the immune system. It also maintains fluid balance and plays a role in absorbing fats and fat-soluble nutrients.

The lymphatic or lymph system involves an extensive network of vessels that passes through almost all our tissues to allow for the movement of a fluid called lymph. Lymph circulates through the body in a similar way to blood.
There are about 600 lymph nodes in the body. These nodes swell in response to infection, due to a build-up of lymph fluid, bacteria, or other organisms and immune system cells.
A person with a throat infection, for example, may feel that their “glands” are swollen. Swollen glands can be felt especially under the jaw, in the armpits, or in the groin area. These are, in fact, not glands but lymph nodes.
They should see a doctor if swelling does not go away, if nodes are hard or rubbery and difficult to move, if there is a fever, unexplained weight-loss, or difficulty breathing or swallowing.

The lymphatic system plays a key role in the immune system, fluid balance, and absorption of fats and fat-soluble nutrients.
As lymph vessels drain fluid from body tissues, this enables foreign material to be delivered to the lymph nodes for assessment by immune system cells.
The lymph nodes swell in response to infection, due to a build-up of lymph fluid, bacteria, or other organisms and immune system cells.
Lymph nodes can also become infected, in a condition known as lymphadenitis.
If lymph nodes remain swollen, if they are hard and rubbery, and if there are other symptoms, you should see a doctor.