

Physiology II Summer Theory

Final term paper (50 marks)

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Batch# Bs Dental

Q1. write a note on ABO blood group system?

Ans: 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 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.

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 (hemolytic disease of the newborn), 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 typing 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: All blood group has the ability to transfuse to AB+ blood group. Following blood groups can transfuse to AB+. AB+ is called universal receptionist because it has both type A and B antigen.

A+, B+, O+, O-, B+, B- are groups which can transfuse blood to AB+.

Q3. write a detail note on CVS with diagram?

Ans:What does the cardiovascular system do?

The cardiovascular system (CVS) moves vital nutrients, gases and hormones around the body. The CVS is made up of the heart, lungs and blood vessels, all working together.

- The heart functions as a pump.
- The blood vessels act as pipes, carrying blood through the body.
- The lungs supply the blood with oxygen and remove its carbon dioxide.

A number of complex nerve and hormone systems keep the CVS in balance with the body's changing needs for oxygen and nutrients.

The heart

The heart is a pear-shaped organ in the centre of the chest. It is divided into a right side and left side, and each side is made up of two chambers: the atrium (top) and the ventricle (bottom).

The movement of blood through the heart is controlled by the contraction of the heart muscle, and special valves inside the heart that open and close at the right moments.

The two sides of the heart work in partnership.

- The right side of the heart receives de-oxygenated blood (blood that has been depleted of its oxygen) from the major veins of the body, and pumps this blood into the lungs.
- The left side of the heart then receives this oxygenated blood (blood rich in oxygen) from the lungs, and pumps it into the body through the aorta.

The heart muscle needs its own blood supply to carry out its work, which it receives via the left and right coronary arteries.

How the heart beats

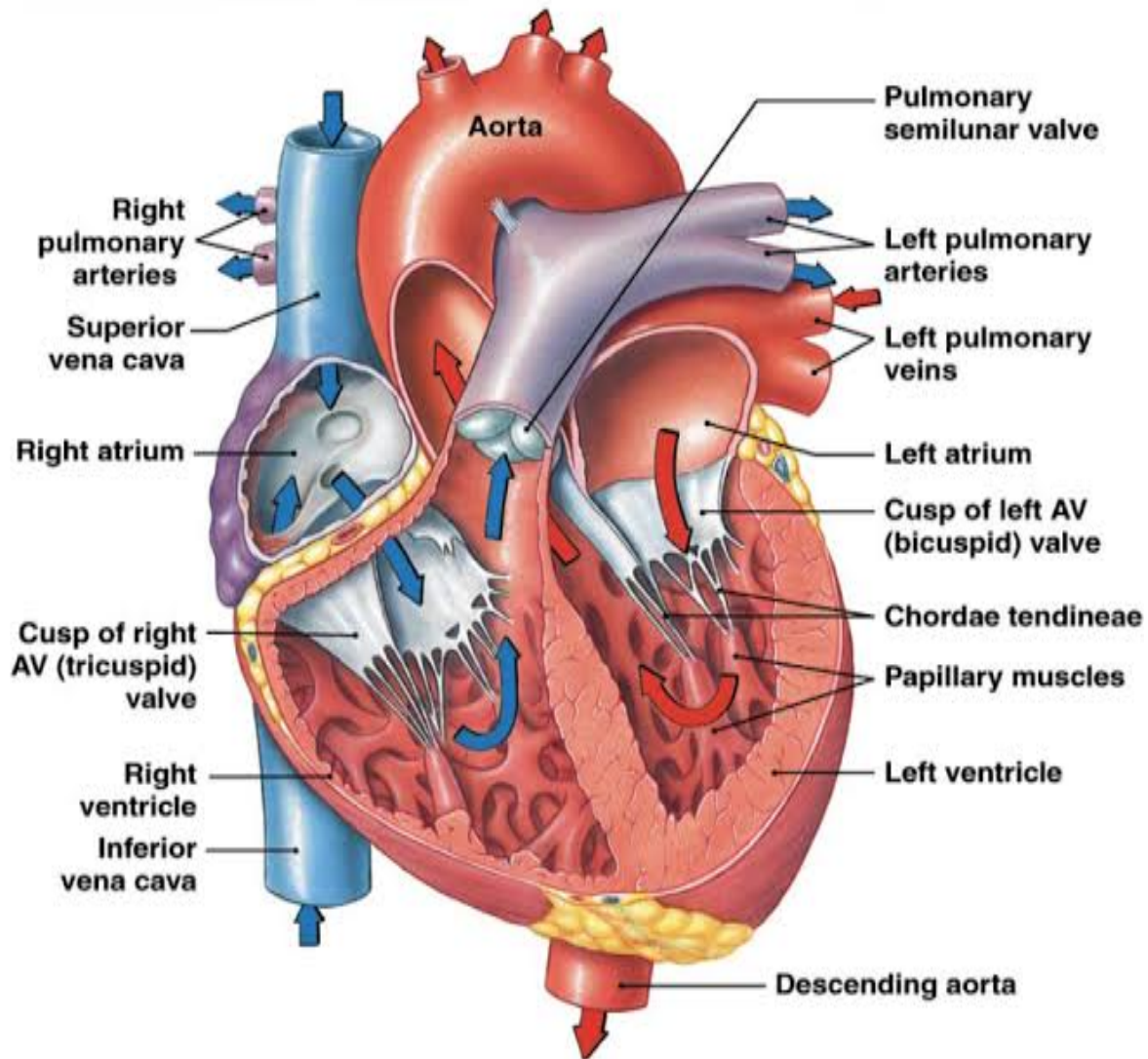
Each heartbeat starts with an electrical signal generated from the part of the heart called the pacemaker (the sinoatrial or SA node). This signal travels through nerves in the heart and stimulates the heart muscle to contract, which forces blood to move. The movement of blood through the arteries can be felt as a 'pulse' in the wrist and the neck.

A healthy person usually has a resting heart rate of between 60 and 100 beats per minute.

Problems with the cardiovascular system

There are several reasons why the CVS may not work properly.

- The body may not have enough of a blood supply because of dehydration, bleeding or swelling.
- The heart muscle may not have a good enough blood supply to do its work.
- The lungs may not be working properly, or may not be getting a proper blood flow, which places a strain on the heart muscle.
- There may be too many or too few electrolytes (essential chemicals such as potassium and magnesium), which can lead to an irregular heartbeat.
- The blood vessel walls may be weakened.
- The heart muscle may be too weak to work properly.



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	difference	Passive Immunity
1. Definition	The protective immunity in which the individual's own immune system is stimulated to produce antibodies and lymphocytes.		The immunity in which a person receives antibodies or lymphocytes that have been produced by another individual's immune system.
2. Exposure to Antigen	Requires exposure to a pathogen or to the antigen of a pathogen.		Does not require exposure to an infectious agent or its antigen.
3. Immune system involvement	The immune system of the individual is actively involved in the process.		The immune system of the individual is not actively involved but rather passive.
4. Natural acquirement	Arise naturally when an individual is exposed to an antigen or pathogen (clinical infection).		Arise naturally when a fetus receives antibodies from the mother across the placenta or when a breast-feeding infant ingests antibodies in the mother's milk.
5. Artificial acquirement	Conferred artificially by means of vaccines.		Conferred artificially by administration of preformed antibodies.
6. Immunity type	Involves both humoral and cell mediated immunity.		The immunity is conferred only by readymade antibodies.
7. Components	T cells (cytotoxic T cells, helper T cells, memory T cells, and suppressor T cells), B cells (memory B cells and plasma cells), and antigen-presenting cells (B		No immune cells are involved as antibody is preformed.

		cells, dendritic cells, and macrophages).	
8.	Antibody production	Involves antibody production which is induced by infection or immunogen.	No antibody is produced, but directly transferred.
9.	Memory cell formation	Active immunity results in the formation of long-lasting memory cells.	Memory immune cells are not formed.
10.	Secondary response	The first exposure leads to primary response and in case of a subsequent exposure to same pathogen later, a much faster and stronger secondary response is established.	Absence of a secondary response.
11.	Durability	The protection offered is long-lived.	The protection is only transient.
12.	Response time	The protective response takes time to establish as a lag period is present.	No lag period hence the protection is instant.
13.	Reactivation	Reactivated by recurrence of infection or by revaccination.	Frequent re-administration needed for renewed protection.
14.	Booster effect	Subsequent doses with antigens cause booster effect.	Subsequent doses are less effective due to immune elimination.
15.	Suitability	Active immunity is not suitable for protection of immuno-compromised or immuno-deficient individuals.	Passive immunity is useful in cases of immuno-compromised, immuno-deficient or severe combined immunodeficiency.
16.	Use	Very effective for prophylaxis of diseases.	Artificial passive immunity is effective as a post-exposure remedy.
17.	Effectiveness of Protection	Provides effective protection.	Protection rendered is less effective and may not be complete.
18.	Adverse effect	It can be implicated in autoimmune diseases and allergies, but generally does not have side effects.	A condition called serum sickness can result from exposure to antisera.

19. Examples

Natural – Producing antibodies in response to exposure to a pathogenic infection such as measles or cold.

Natural – Receiving antibodies from another organism (e.g. to the foetus via the colostrum or a newborn via breast milk).

Artificial – Producing antibodies in response to the controlled exposure to an attenuated pathogen (i.e. vaccination).

Artificial – Receiving manufactured antibodies via external delivery (e.g. blood transfusions of monoclonal antibodies).

Q5. write a note on lymphatic system in detail?

Ans

The lymphatic system is a network of tissues and organs that help rid the body of toxins, waste and other unwanted materials. The primary function of the lymphatic system is to transport lymph, a fluid containing infection-fighting white blood cells, throughout the body.

The lymphatic system primarily consists of lymphatic vessels, which are similar to the veins and capillaries of the circulatory system. The vessels are connected to lymph nodes, where the lymph is filtered. The tonsils, adenoids, spleen and thymus are all part of the lymphatic system.

Description of the lymphatic system

There are hundreds of lymph nodes in the human body. They are located deep inside the body, such as around the lungs and heart, or closer to the surface, such as under the arm or groin, according to the American Cancer Society. The lymph nodes are found from the head to around the knee area.

The spleen, which is located on the left side of the body just above the kidney, is the largest lymphatic organ, according to the U.S. National Library of Medicine (NLM). "The spleen . . . acts as a blood filter; it controls the amount of red blood cells and blood storage in the body, and helps to fight infection," said Jordan Knowlton, an

advanced registered nurse practitioner at the University of Florida Health Shand's Hospital.

If the spleen detects potentially dangerous bacteria, viruses, or other microorganisms in the blood, it – along with the lymph nodes – creates white blood cells called lymphocytes, which act as defenders against invaders. The lymphocytes produce antibodies to kill the foreign microorganisms and stop infections from spreading. Humans can live without a spleen, although people who have lost their spleen to disease or injury are more prone to infections.

The thymus is located in the chest just above the heart, according to Merck Manual. This small organ stores immature lymphocytes (specialized white blood cells) and prepares them to become active T cells, which help destroy infected or cancerous cells.

Tonsils are large clusters of lymphatic cells found in the pharynx. According to the American Academy of Otolaryngology, they are the body's "first line of defence as part of the immune system. They sample bacteria and viruses that enter the body through the mouth or nose." They sometimes become infected, and although tonsillectomies occur much less frequently today than they did in the 1950s, it is still among the most common operations performed and typically follows frequent throat infections.

Lymph is a clear and colourless fluid; the word "lymph" comes from the Latin word *lympa*, which means "connected to water," according to the National Lymphedema Network.

Plasma leaves the body's cells once it has delivered its nutrients and removed debris. Most of this fluid returns to the venous circulation through tiny blood vessels called venules and continues as venous blood. The remainder becomes lymph, according to the Mayo Clinic.

Unlike blood, which flows throughout the body in a continue loop, lymph flows in only one direction – upward toward the neck. Lymphatic vessels connect to two subclavian veins, which are located on either side of the neck near the collarbones, and the fluid re-enters the circulatory system, according to the Mayo Clinic.