TENDER HEART HIGH SCHOOL, SEC-33B, CHD

CLASS 9 DATE 16.12.2024

SUBJECT BIOLOGY TEACHER Nidhi Rana

CHAPTER - 8 CIRCULATORY SYSTEM

Good morning Students,

This lesson is of Class 9 for the subject of Biology Topic Hepatic Portal System and Lymphatic system which is covered in chapter 8 titled Circulatory System starting on Page No 90 of your text book titled Concise biology - Selina Publications and is being submitted to you on 16.12.2024

This voice is of Nidhi Rana.

Students today we are going to learn about -

HEPATIC PORTAL SYSTEM

The veins starting from the gut (stomach and intestine) do not open directly into the inferior vena cava. Instead they unite and enter the liver as a Hepatic Portal Vein There (in liver) hepatic portal vein breaks up into numerous capillaries

A portal vein is so called because it carries blood from one capillary network to another. Thus the Hepatic portal vein arises from capillaries in the gut wall at one end and gives rise to capillaries in the liver at the other end

Thus in contrast to the general characteristic of a vein, the capillaries of hepatic portal vein in the liver reunites to form hepatic vein.

Hepatic vein finally joins the inferior vena cava

Thus by definition - A portal vein is one which

CLASS- 9 [BIOLOGY]
CHAPTER- 8
Teacher - Nidhi Rana

starts with capillaries and also ends in capillaries.

SIGNIFICANCE OF HEPATIC PORTAL SYSTEM

1. Excess amount of digested food (glucose) is converted and stored as glycogen in the liver. Thus it regulates the quantity of nutrients flowing into general blood circulation.
2. It helps in neutralising the toxic substances ie. if certain poisons/toxic substances are absorbed through food, then these toxins are detoxified or rendered harmless in the liver.

Children please look at Fig 8.15 of your text book showing the diagrammatic view of hepatic portal system

THE PULSE

The arteries on account of their elastic muscular walls distend every time the heart pumps the blood into them during its contraction or systolic phase. This rhythmic contraction of the heart is felt in certain areas like the wrist in form of pulsations and this is called pulse. The pulse rate is same as same as heart beat. Normal heart beat in human being is 72 times per minute. Thus pulse is defined as-

Pulse is the alternate expansion and elastic recoil of the wall of the artery during ventricular systole.

Before we go further, children its the question time. Please write the answers to the following questions in your notebooks.

Class - 9 [Biology]
Chapter - 8
Teacher - Nidhi Rana

Q1 Name the blood vessel that starts in capillaries and ends in capillaries.

Q2 What is the normal pulse rate of a normal adult person?

Q3 Name the blood vessel that leaves the liver?

You may now pause the audio for 3 min to write the answers.

Break is over children Break is over children Listen to the correct answers first.

A1 Portal vein starts and ends in capillaries.

A2 Normal pulse rate of an adult person is 72 times / minutes

A3 Hepatic vein leaves the liver.

Now let us resume the topic with discussion of - Blood Pressure is the pressure which the blood flowing through the arteries exerts on the walls of the arteries, due to pumping of blood from the heart. The blood pressure varies according to the age of the individual There are two limits of this pressure - (i) Systolic pressure (i.e. the upper limit) is the pressure of the blood when fresh blood is pushing through the artery as a result of ventricular systole of the heart (ii) Diastolic Pressure (i.e. the lower limit is the pressure recorded when the heart relaxes. As a result blood is received by various chambers of the heart.

In a adult person the systolic pressure is about

Class- 9 [BIOLOGY]
Chapter - 8
Teacher - Nidhi Rana

100-140 mm whereas the diastolic pressure is about 60-80 mm of Hg. Thus the blood pressure under normal conditions is thus expressed as 120/80 mm of Hg
A rise in blood pressure above 140/90 mm of Hg is called hypertension or high blood pressure
Blood pressure is measured by means of an instrument called Sphygmomanometer
Now before going further let us take up an activity.
Place two fingers between the bone and the tendon over your radial artery - which is located on the thumb side of your wrist. When you feel the pulse count the number of beats in 15 seconds. Multiply this number by four to calculate your pulse rate
You may pause the audio for 3 min to perform the activity.
Break is over children. Hope you have calculated your pulse rate Now let us resume the discussion with -

TISSUE FLUID AND LYMPH

TISSUE FLUID or Intercellular Fluid
When the blood is flowing through capillaries it sometimes leaks out of the capillaries The blood which leaks out includes the plasma and Leucocytes This fluid which has leaked out bathes the body cells and is thus called the tissue fluid or intercelluler or extra cellular fluid. From this tissue fluid cells absorb O_2

and other required substances like nutrients etc. and give out CO_2 and wastes back into the tissue fluid.

LYMPH AND LYMPHATIC SYSTEM

Some times the tissue fluid is returned and reabsorbed into the capillaries but some of it is unable to reenter the capillaries and thus enter another set of minute channels named lymph vessels where it is called lymph. Lymph is light yellow fluid that flows only in one direction from tissues to heart. The lymph flows in these lymph vessels due to contraction of the surrounding muscles. Physical exercise which involves muscular movements keeps lymphatic system healthy. At various points along the lymph vessels are lymph nodes. In these nodes antibodies and new white blood cells are produced. White blood cells in the nodes ingest the bacteria/germs. Lymph vessels ultimately pour the lymph into the major anterior veins close to their entry into the right auricle and is again in circulation.

Composition of lymph

1) Lymph cantains Leucocytes i.e. White blood cells. (majorly lymphocytes) No RBC and blood platelets are present in lymph
2) Lymph contains 94% water alongwith solids in form of proteins, fats, carbohydrates enzymes, antibodies etc. which form 6% of the total non cellular part of lymph

Class - 9 [BIOLOGY]
Chapter - 8
Teacher - Nidhi Rana

FUNCTIONS OF LYMPH.

1. Lymph provides oxygen and nutrients to cells. and to those parts where blood cannot reach.
2. It helps in removal of excess tissue fluid and other substances and returns proteins to the blood from tissue spaces
3. Lacteals present in intestine i.e. in villi of intestine helps to absorb fats Thus lymph also carries digested fat
4. Lymph contains Leucocytes which kill the germs Thus they defend the body against disease causing germs Lymph node tend to localise the infection and prevent it from spreading to the whole body Tonsils present on the sides of the neck are lymph glands

SPLEEN is an important lymphatic organ It is about the size of a clenched fist and is reddish brown in colour. Spleen is situated in the abdomen, behind the stomach above the left kidney

Functions of Spleen

1. Spleen produces Lymphocytes (WBCs)
2. It releases the stored blood into the blood stream during emergency so it acts like a blood reservoir
3. In a foetus (embryo) it produces erythrocytes
4. With liver it destroys worn out RBCs

Children please see Fig 8.16 of your text book showing the lymph vessels in the human body

Class 9 [BIOLOGY]
Chapter - 8
Teacher - Nidhi Rana

Dear students with this I am ending todays discussion. Kindly go through the given explanation and with reference to the detailed explanation you are required to answer the following Home assignment questions in the note books.

Home assignment questions are as follows-

Q-1 Answer the following 'Review questions' given at the end of the chapter 8 in your note books

E. Structured / Application Type
Q No 2 and 7

Q2 State the benefits of Hepatic Portal System

Q3 Define - a) Portal vein b) Pulse.