**IQRA NATIONAL UNIVERSITY**

**DEPARTMENT OF ALLIED HEALTH SCIENCES**

**Final-Term Examination**

**HND 2nd Semester**

**Course Title: Human Physiology I Instructor: Dr Sara Naeem**

**Time: 6 Hours Max Marks:50**

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**Q1. Establish a differentiation criteria between arteries, veins and capillaries.**

## Answer:

# Arteries:

Any of the muscular-walled tubes forming part of the circulation system by which blood is conveyed from the heart to all parts of the body.

# Veins:

Any of the tubes forming part of the blood circulation system of the body, carrying in most cases oxygen-depleted blood towards the heart.

# Capillaries:

Any of the fine branching blood vessels that form a network between the arterioles and venules

|  |  |  |  |
| --- | --- | --- | --- |
|  | Arteries | Veins | Capillaries |
| Function | Send blood from heart. | End blood to heart | Material exchange with tissues |
| Pressure | High | Low | Low |
| Lumen diameter | Narrow | Wide | Extremely narrow |
| Wall thickness | Thick | thin | Extremely thin |
| Wall layers | It has three wall layers:   * Tunica adventitia * Tunica media * Tunica intima | It also has three walls:   * Tunica adventitia * Tunica media * Tunica intima | It has one wall:   * Tunica intima |
| Muscle and elastic fibers | Large amounts | Small amounts | None |
| Valves | No | Yes | no |
|  | Situated deep into the skin | Situated superficially on the skin | Situated in terminals of arteries or veins |

**Q2. Name classes of antibodies. What are the characteristics of antibodies?**

## Answer:

# Antibodies:

A blood protein produced in response to and counteracting a specific antigen. Antibodies combine chemically with substances which the body recognizes as alien, such as bacteria, viruses, and foreign substances in the blood.Antibodies, also known as immunoglobulins, are Y-shaped proteins that are produced by the immune system to help stop intruders from harming the body. When an intruder enters the body, the immune system springs into action. These invaders, which are called antigens, can be viruses, bacteria, or other chemicals. When an antigen is found in the body, the immune system will create antibodies to mark the antigen for the body to destroy.

# Classes of antibodies:

* IgM
* IgG
* IgA
* IgD
* IgE

# Characteristics of antibodies:

## Specificity:

Actions specifically directed against antigens that initiated response.

## Diversity of antibodies:

Antibodies against a variety of antigens persist in the body

## Immunological memory:

Response many years after initial exposure due to memory T and B cells.

### Other points;

* Gamma globulin called immunoglobulins
* Constitutes 20% of all plasma proteins
* Combinations of lights and heavy polypeptide chain
* Variable portion attaches to particular type of antigen
* Constant portion determines other properties of the antibody

**Q3. Explain the significance of lymphatic ducts.**

# Answer:

## Lymphatic ducts:

Lymphatic ducts is a great lymphatic vessel that empty the lymph into one of the subclavian veins. Lymphatic vessels are thin-walled, endothelial-lined channels that originate near the capillary beds and serve as a drainage system for returning interstitial tissue fluid and inflammatory cells to the blood.

## Types of lymph ducts:

There are two types of lymph ducts:

1. Right lymphatic duct
2. Thoracic duct

## Significance of lymphatic ducts:

The right lymphatic duct about 1.25 cm. in length, courses along the medial border of the anterior scalene at the root of the neck. The right lymphatic duct forms various combinations with the right subclavian vein and right internal jugular vein. A right lymphatic duct that enters directly into the junction of the internal jugular and subclavian veins is uncommon.

The right duct drains lymph fluid from:

* The upper right section of the trunk, (right thoracic cavity, via the right Broncho mediastinal trunk),
* The right arm (via the right subclavian trunk),
* And right side of the head and neck (via the right jugular trunk),
* Also, in some individuals, the lower lobe of the left lung

In human anatomy, the thoracic duct is the larger of the two lymph ducts of the lymphatic system. It is also known as the left lymphatic duct, alimentary duct, cheliferous duct, and Van Horne’s canal .in adults, the thoracic duct is typically 38–45 cm in length and has an average diameter of about 5 mm. The vessel usually starts from the level of the twelfth thoracic vertebrae and extends to the root of the neck. It drains into the systemic (blood) circulation at the angle of the left subclavian and internal jugular veins as a single trunk, at the commencement of the brachiocephalic vein.

**Q4**. **What are the clinical manifestations of a patient having kidney disease? Also write functions of kidney.**

# Answer:

## Kidney:

The kidneys are two bean-shaped organs in the renpressureal system. They help the body pass waste as urine. They also help filter blood before sending it back to the heart creating hormones that help produce red blood cells, promote bone health, and regulate blood.

**Location**: Thorax vertebra T12 to third lumber vertebra L3.

**Colour**: Reddish brown

**Length**: about 11 cm long.

**Width**: 5 cm broad.

**Thickness**: 3 cm thick.

**Weight**: **Male**: 150 gm, **Female: 135** gm.

**Nephron**: it is the structural and functional of the kidneys.

## Clinical manifestations of patients with kidney disease:

Chronic kidney disease, also called chronic kidney failure, describes the gradual loss of kidney function. Your kidneys filter wastes and excess fluids from your blood, which are then excreted in your urine. When chronic kidney disease reaches an advanced stage, dangerous levels of fluid, electrolytes and wastes can build up in your body.

In the early stages of chronic kidney disease, you may have few signs or symptoms. Chronic kidney disease may not become apparent until your kidney function is significantly impaired.

Treatment for chronic kidney disease focuses on slowing the progression of the kidney damage, usually by controlling the underlying cause. Chronic kidney disease can progress to end-stage kidney failure, which is fatal without artificial filtering (dialysis) or a kidney transplant.

Following are the symptoms of kidney disease:

* **You're more tired,** A severe decrease in kidney function can lead to a buildup of toxins and impurities in the blood. This can cause people to feel tired, weak and can make it hard to concentrate.
* **You're having trouble sleeping**. When the kidneys aren't filtering properly, toxins stay in the blood rather than leaving the body through the urine. This can make it difficult to sleep
* **You have dry and itchy skin**. Dry and itchy skin can be a sign of the mineral and bone disease that often accompanies advanced kidney disease, when the kidneys are no longer able to keep the right balance of minerals and nutrients in your blood.
* **You feel the need to urinate more often.** If you feel the need to urinate more often, especially at night, this can be a sign of kidney disease.
* **You see blood in your urine.** Healthy kidneys typically keep the blood cells in the body when filtering wastes from the blood to create urine, but when the kidney's filters have been damaged, these blood cells can start to "leak
* **Your urine is foamy.**  Excessive bubbles in the urine – especially those that require you to flush several times before they go away—indicate protein in the urine.
* **You're experiencing persistent puffiness around your eyes.**  This puffiness around your eyes can be due to the fact that your kidneys are leaking a large amount of protein in the urine, rather than keeping it in the body.
* **Your ankles and feet are swollen.** Decreased kidney function can lead to sodium retention, causing swelling in your feet and ankles.
* **You have a poor appetite.** This is a very general symptom, but a buildup of toxins resulting from reduced kidney function can be one of the causes.
* **Your muscles are cramping.**  Electrolyte imbalances can result from impaired kidney function. For example, low calcium levels and poorly controlled phosphorus may contribute to muscle cramping.

## Functions of the kidney:

### Excretory functions:

This includes formation and excretion of urine.

* Mains steps are:

Glomerular filtration

Tubular reabsorption

Tubular secretion

### Homeostatic functions;

* Regulate blood volume and blood pressure.
* Regulate plasma ion concentration
* Help stabilize blood pH
* Conserve valuable nutrients
* Assist water to detoxify poisons

### Endocrine functions:

* They have primary endocrine function since they produce hormones
* They are a site of degradation for hormones
* Such as insulin and aldosterone
* they’re primary endocrine function is to produce erythropoietin

### Metabolic functions:

Kidneys perform gluconeogenesis during periods of starvation.

**Q5. What is the difference between systemic circulation and pulmonary circulation? Give signs and symptoms of Myocardial Infarction.**

# Answer:

## Systematic circulation:

The systemic circulation provides the functional blood supply to all body tissue. It carries oxygen and nutrients to the cells and picks up carbon dioxide and waste products. Systemic circulation carries oxygenated blood from the left ventricle, through the arteries, to the capillaries in the tissues of the body.

### High pressure;

Systematic circulation has high pressure because it needs to send blood to the brain even when a human is standing and to the tip of an elevated finger.

### High resistance:

It has high resistance because of increased smooth muscle in the arterioles and metarterioles

### Low compliance:

It has low compliance because of resistance offered by the arterioles and metarterioles.

* Helps provide nutrients and oxygen to the metabolizing cells in the body.

## Pulmonary circulation:

The pulmonary circulation is the portion of the circulatory system which carries deoxygenated blood away from the right ventricle, to the lungs, and returns oxygenated blood to the left atrium and ventricle of the heart.

### Low pressure;

It has low pressure because it only needs to pump blood to the top of the lungs. If the pressure is high then following startling forces the fluid would the lungs.

### Low resistance:

Arterioles have less smooth muscle veins and are wider and shorter and pulmonary vessel veins are thinner.

### High compliance:

It accommodates 5 liters of blood it accommodates shifts of blood more quickly e.g when a person shifts from a standing to a lying position.

* Helps release carbon dioxide from the blood while dissolving oxygen.