

## **Cardiovascular system**

**This system is responsible for conveying the blood inside the blood vessels from the heart toward the body tissues and from the tissues to the heart.**

**The components of this system are :-**

**1-Heart**

**2-Arteries**

**3-Veins**

**The heart ;-** is pumping muscular organ formed by four chambers concerned with the receiving the blood from the lung and tissues of the whole body and then pumping the blood from the heart to the lung and body tissues.

**The heart is consist of the following structures:-**

**1-Endocardium**

**2-Myocardium**

**3-Epicardium**

**The endocardium is formed by simple squamous epithelium resting on the basement membrane and these cells are called endothelium , beneath there is sub endocardial layer which is formed by the delicate connective tissue and purkinje fibers .**

**The myocardium is formed by cardiac muscle fibers which form the bulk of the heart wall, these fibers are invested by delicate connective tissue carrying the blood vessels and act for supporting the muscle fibers to each other.**

**The epicardium is formed by delicate connective tissue with small blood vessels which are the venules and arterioles called vasa vasorum responsible to supply the wall of the heart with blood. Also could be recognize the presence of the fat cells and sympathetic with parasympathetic plexus from the ANS .**

**The heart is containing the following :-**

**1-Thickening of the connective tissue mainly the collagen fibers at the opening of the atrio ventricular sites of both sides and at the base of the aorta and pulmonary artery to sustain these areas and called annulus fibrosus**

**2-Sino atrial and atrio ventricular nodes , which are responsible for induction of the electrical impulses and spreading these through the purkinje and his bundles .**

**3-Valves , are prolapse from endocardium and sub endocardium in between the left and right atria with ventricles which responsible for allowing the blood to pass for one way from the atria to the ventricles and from the ventricles to the aorta and pulmonary artery.**

**The arteries are classified into large, medium sized, small and arterioles**

**The whole arteries are formed by three tunics**

**1-Tunica intima**

**2-Tunica media**

**3-Tunica adventitia**

**The large artery such as aorta is formed by these tunics , the tunica intima is formed by simple squamous epithelium resting on the basement membrane and below to it is presence of sub endothelial layer formed by delicate connective tissue and smooth muscle fibers ,**

**The tunica media is formed by elastic lamellae many layers and in between is there smooth muscle fibers and collagen fibers**

**The tunica adventitia is formed mainly by delicate connective tissue and presence of vasa vasorum .**

The medium sized artery is like large that consist of the three tunics except that the tunica media is formed mainly by smooth muscle fibers instead of the elastic lamellae, which called muscular artery and example to that is the renal, splenic, gastric and hepatic aa.

The small artery is like to that of the medium sized but its layers are thinner and example to that in the arteries of the skin, endocrine aa.

The arterioles are the smallest units of the arterial vessels formed by endothelial cells 3-4 resting on basement membrane invested by 2-3 layers of smooth muscle fibers and outermost layer a thin collagen and elastic fibers.

The arterioles are communicate with the capillaries which are thin vessels formed by endothelial cells and surrounded by loose connective tissue , these capillaries are present in many types

1-Continuous capillary which have endothelial cells connected together tightly by tight junctions and this type is present in the CNS.

2-Porous capillary , these are present in the kidney, assist for filtration in the glomeruli.

3-fenestrated capillaries present in the spleen , red pulp of spleen

4-sinusoidal capillaries located mainly in the endocrine system to allow for the hormones to be pass toward the target organ from the endocrine organs .

The venules are the smallest vessels of the venous system, larger than the arterioles and less thicker wall, but it have same structure to it.

The small vein is formed by three tunics like to that of small artery, but here the tunica media is composed mainly of connective tissue and the smooth muscle fibers are located in the tunica adventitia

The medium sized vein, is like the small vein but the layers are thicker and the lumen is wider.

The large sized vein such as vena cava is formed by three tunics like aorta but here the tunica media is thinner and there is no elastic lamellae , but there is collagen, elastic and smooth muscle fibers and the tunica adventitia is mainly composed by the smooth muscle bundles associated with the connective tissue and vasa vasorum



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