

# HART SOPRINYE AKIE

18/MHS01/168

## 1. LONG TERM REGULATION OF MEAN ARTERIAL BLOOD PRESSURE:

Mean arterial blood pressure is the average pressure existing in the arteries. It is also called renal mechanism. Activation of the renin-angiotensin-aldosterone system – A decrease in blood pressure causes the release of renin from the juxtaglomerular apparatus which converts the plasma-borne precursor angiotensinogen into angiotensin I. Angiotensin-converting enzyme (ACE) then converts angiotensin I into the active molecule, angiotensin II (AgII), which is a potent vasoconstrictor. AgII increases TPR and decreases glomerular filtration rate. It also stimulates adrenal cortex to secrete aldosterone which causes re-absorption of water and salt from the renal tubules.

## 2. PULMONARY CIRCULATION: This is the circulation between the heart and lungs. In this circulation, the right ventricle carries deoxygenated blood to the lungs and returns oxygenated blood to the left atrium and ventricle of the heart.

**CIRCLE OF WILLIS:** The circle of Willis is the joining area of several arteries at the inferior side of the brain. At the circle of Willis, the internal carotid arteries branch into the smaller arteries that supply oxygenated blood to over 80% of the cerebrum.

**SPLANCHIC CIRCULATION:** This is also known as visceral circulation. It has three portions;

a) Mesenteric Circulation- it supplies blood to the gastrointestinal tract (stomach, pancreas and intestine).

b) Splenic Circulation- it supplies blood to the spleen. 2 structures are involved in storage of blood in the spleen (splenic venous sinuses and splenic pulp) and they are lined with reticuloendothelial cells. Sympathetic nerve fibres regulate blood flow to the spleen.

c) Hepatic Circulation- it supplies blood to liver. Blood is supplied by hepatic artery and portal vein. Liver receives the maximum amount of blood among the organs in the body because most metabolic activities are carried out there.

**CORONARY CIRCULATION:** This is the circulation of blood within the heart. Heart muscle is supplied by 2 coronary arteries and they are the first branches of the aorta. Right coronary artery supplies the whole of the right ventricles and posterior part of left ventricle. Left coronary artery supplies the anterior and lateral parts of the left ventricle.

**CUTANEOUS CIRCULATION:** This is the blood supply to the skin. It supplies nutrition to skin and regulates body temperature by heat loss. Cutaneous blood flow increases with increase in body temperature.

### **3. CARDIOVASCULAR ADJUSTMENTS DURING EXERCISE:**

a) On Blood- mild hypoxia developed during exercise stimulates the juxtaglomerular apparatus to secrete erythropoietin. It stimulates the bone marrow and causes release of red blood cells. Increased carbon dioxide content in the blood decreases the pH of blood. More heat is produced during exercise and the thermoregulatory system is activated. This causes secretion of large amount of sweat leading to fluid loss, hemoconcentration, reduced blood volume and dehydration.

b) On Heart Rate- heart rate is increased during exercise because of vagal withdrawal. Even the thought of exercise increases the heart rate.

c) On Cardiac Output- during exercise, oxygen increases due to increase heart rate and stroke volume. Increase in cardiac output is directly proportional to the increase in the amount of oxygen consumed during exercise.

d) On Venous Return- venous return increases during exercise because of muscle pump, respiratory pump and splanchnic vasoconstriction.

e) On Blood Flow to Skeletal Muscles- during muscular activity, because of compression of blood vessels during contraction, stoppage of blood flow occurs. In between the contractions, blood flow to the skeletal muscles increases greatly.

