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**MATRIC NO: 18/MHS01/350**

**DEPARTMENT: MBBS**

**LEVEL: 200**

**COLLEGE: MHS**

**COURSE: PHYSIOLOGY**

**ASSIGNMENT**

* **DISCUSS THE LONG TERM REGULATION OF MEAN ARTERIAL BLOOD PRESSURE**

Mean arterial blood pressure is defined as the average pressure in a patient's arteries during one cardiac cycle. It is said that any factor that decreases cardiac output, by decreasing heart rate or stroke volume or both, will decrease arterial blood pressure.

Mean arterial blood pressure is regulated long term by the feedback of chemo and cardiopulmonary receptors. And also through mechanisms such as baroreceptor reflex, anti diuretic hormone (ADH) and renin angiotensin aldosterone system (RASS).

* **Baroreceptor reflex:** In response to acute changes in blood pressure, the body responds through the baroreceptors located within blood vessels. Baroreceptors are a form of mechanoreceptor that become activated by the stretching of the vessel. This sensory information is conveyed to the central nervous system and used to influence peripheral vascular resistance and cardiac output.
* **Anti diuretic hormone:** The antidiuretic hormone produced in the hypothalamus makes its way down the pituitary stalk to the posterior pituitary where it is kept in reserve for release in response to the above-listed triggers. ADH mainly functions to increase free water reabsorption in the collecting duct of the nephrons within the kidney, causing an increase in plasma volume and arterial pressure. ADH in high concentrations has also been shown to cause moderate vasoconstriction, increasing peripheral resistance, and arterial pressure.
* **Renin angiotensin aldosterone system:**The renin-angiotensin-aldosterone system is an essential regulator of arterial blood pressure. The system relies on several hormones that act to increase blood volume and peripheral resistance. It begins with the production and release of renin from juxtaglomerular cells of the kidney. In response to these triggers, renin is released from the juxtaglomerular cells and enters the blood where it comes in contact with angiotensinogen which is produced continuously by the liver. The angiotensinogen is converted into angiotensin I by renin. Angiotensin I is then converted to angiotensin II by ACE. Angiotensin II has many functions to increase arterial pressure which includes the Potent vasoconstriction of arterioles throughout 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. Deoxygenated blood leaves the heart, goes to the lungs, and then re-enters the heart; Deoxygenated blood leaves through the right ventricle through the pulmonary artery. From the right atrium, the blood is pumped through the tricuspid valve into the right ventricle. Blood is then pumped from the right ventricle through the pulmonary valve and into the main pulmonary artery.

* **CIRCLE OF WILLIS**

The Circle of Willis is the joining area of several arteries at the bottom inferior side of the brain. At the Circle of Willis, the internal carotid arteries branch into smaller arteries that supply oxygenated blood to over 80% of the cerebrum. The circle of Willis also allows blood to flow across the midline of the brain if an artery on one side is occluded. The circle of Willis thereby serves a safety valve function for the brain, allowing flow of blood through an alternate route to take place if the flow is reduced to one area.

* **SPHLANCHIC CIRCULATION**

This circulation involves the blood supply to the gastrointestinal tract which includes the spleen, pancreas, small intestine, large intestine and liver. It consists of two large capillary beds partially in series. The small splanchnic arterial branches supply the beds of capillaries, and the efferent venous blood flows into the PV.

* **CORONARY CIRCULATION**

Coronary circulation is the circulation of blood in the blood vessels that supply the heart muscle (myocardium). Coronary arteries supply oxygenated blood to the heart muscle, and cardiac veins drain away the blood once it has been deoxygenated. The cardiac muscle is supplied by two coronary arteries which is the right and left coronary arteries.

* **CUTANEOUS CIRCULATION**

The cutaneous circulation is the circulation and blood supply of the skin.Some of the circulating blood volume in the skin flows through arteries instead of capillaries.

* **THE CARDIOVASCULAR ADJUSTMENT THAT OCCURS DURING EXERCISE**

During exercise, cardiac output increases to provide the flow needed to serve the contracting skeletal muscles, There’s dilation of blood vessels in the muscles which increases local blood flow and there’s decreased blood flow to the kidney and liver which results to the redirection of the blood flow to the muscles in use.

Vasodilatation is regulated to make blood pressure stable or to increase during exercise. Essentially, The central nervous system and neural feedback from contracting muscles, are important for the blood pressure response to exercise. When one is exercising, there is an increase in physical activity and muscle cells respire more than they do when the body is at rest. The heart rate increases during exercise. The rate and depth of breathing increases which ensures that more oxygen is absorbed into the blood, and more carbon dioxide is removed from it.