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200L MBBS.

PHYSIOLOGY ASSIGNMENT

1. DISCUSS THE LONG-TERM REGULATION OF MEAN ARTERIAL BLOOD PRESSURE: The long term relation of arterial blood pressure relies on the relationship between arterial pressure and the urinary output of salt and water, which is affected by some factors including renal sympathetic nerve activity (RSNA); The paraventricular nucleus (PVN) in the hypothalamus has major direct and indirect connections with the sympathetic outflow and there is now considerable evidence that tonic activation of the PVN sympathetic pathway contributes to the sustained level of RSNA that occurs in conditions such as heart failure and neurogenic hypertension. The tonic activity of PVN sympathetic neurons, in turn, depends upon the balance of excitatory and inhibitory inputs.A number of neurotransmitters and neuromodulators are involved in these tonic excitatory and inhibitory effects, including glutamate, GABA, angiotensin ii and nitric oxide. The dorsomedial hypothalamic nucleus also exerts a powerful influence over sympathetic activity, including RSNA, through synapses with sympathetic nuclei in the medulla and, possibly, also other brain stem regions. The DMH sympathetic pathway is an important component of the phasic sympathoexcitatory responses associated with acute stress, but there is no evidence that it is an important component of the central pathways that produce long-term changes in arterial pressure .
2. a) Pulmonary circulation: pulmonary circulation is the system that conveys deoxygenated blood from the heart to the lungs and returns oxygenated blood from the heart back to the lungs. The vessels of pulmonary circulation are pulmonary arteries and pulmonary veins. It carries the deoxygenated blood from the right ventricle where carbon dioxide is let out and oxygen is picked up then this goes to the left atrium.

b) Circle of Willis: The Circle of Willis is the joining area of several arteries at the inferior side of the brain. It is an arterial ring at the base of the brain that allows blood flow exchange between the anterior and posterior circulation and the left and right hemispheres.

c) Splachnic circulation: this consists of the blood supply to the gastrointestinal tract and the organs in that region.

d) Coronary circulation: coronary circulation is the circulation that supplies oxygenated blood to the cardiac muscles and drain out the used deoxygenated blood from the heart.

e) Cutaneous circulation: cutaneous circulaton is the blood supply and circulation of the skin.

3. Discuss the cardiovascular adjustment that occurs

During exercise

There are three major adjustments made by the Cardiovascular

system and they include

1. Increased cardiac output

Increased pumping capacity of the heart enhancing delivery of

oxygen and fuel to working muscles.

2. Increased muscle blood flow

Blood vessels in muscles dilate, increasing local blood flow

3. Decreased blood flow to kidney , liver and gut

Redirects/shuns blood flow to working muscles

Cardiac output is the amount of blood pumped from the heart in

a minute .

Cardiac output (Q)= HR x stroke volume.

To increase the cardiac output you can increase either heart rate

or stroke volume but in this case of exercises we can increase

the both

Basic ways to increase heart rate during exercises

1. Reduction of parasympathetic nervous system activity

2. Increase in sympathetic Nervous system activity

3. Increase of circulating adrenaline / Epinephrine

4. Increase in stroke volume

Cardiovascular factors responsible include

Vo2 = cardiac output x (a-v)o2 difference

Where Vo2 = oxygen consumption

Where a = arterial oxygen con.

Where v = venous oxygen con.

Where(a-v) =arteriovenous oxygen difference

NB: (a-v) gives the amount of oxygen taken up and utilized by

muscles for ATP production in mitochondria

The greater the exercise intensity, the greater the extraction

of oxygen from the blood by muscle mitochondria

Two major factors responsible for the increase in

arteriovenous oxygen difference are :

1. Greater rate of oxygen delivery accomplished by increase

in local