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PHYSIOLOGY ASSIGNMENT

THE LONG -TERM REGULATION OF MEAN ARTERIAL BLOOD PRESSURE

The long -term level of arterial pressure is dependent on the relationship between arterial pressure and the urinary output of salt and water, which, in turn, is affected by a number of 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 (DMH) 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 .

A SHORT NOTE ON THE FOLLOWING

PULMONARY CIRCULATION

This is the portion of the circulatory system that carries deoxygenated blood away from the the right ventricle , to the lungs and carries oxygenated blood to the left atrium and ventricle of the heart

CIRCLE OF WILLIS

This is the joining of several arteries at the bottom 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.

SPLANCHNIC CIRCULATION

This comprises the gastric, small intestinal, colonic, pancreatic, hepatic, and splenic circulations . They are arranged in parallel and

fed by the celiac artery and the superior and inferior mesenteric arteries.

CORONARY CIRCULATION

This 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.

CUTANEOUS CIRCULATION

This is the circulation and blood supply of the skin. The skin is not a very metabolically active tissue and has relatively small energy requirements, so its blood supply is different to that of other tissues.

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/shunts 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

