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Assignment

Discuss the long term regulation of mean arterial pressure

It can also be called Renal mechanism. Kidney is the organ responsible for this action. The nervous system adapt to altered pressure which may be on for days, months or even years. Kidney regulate blood pressure via 2 ways:

- Regulation of extracellular fluid volume: This is done via pressure diuresis and pressure natriuresis. Diuresis is the excretion of large quantity of water through urine while Natriuresis is the excretion of large quantity of sodium in urine.
- Through renin-angiotensin system: When blood pressure and extracellular fluid volume decrease, renin secretion from kidney is increased. It converts angiotensin to angiotensin 1 which is converted to angiotensin2 by Angiotensin-converting enzyme. Angiotensin stimulates afferent arteries in the kidney and stimulates adrenal cortex to secrete aldosterone. Both help to restore blood pressure.

Write short notes on the following

Pulmonary Circulation: Pulmonary arteries supply deoxygenated blood from right ventricle to alveoli of lungs. Oxygenated blood from alveoli is carried to left atrium by a pulmonary vein.

Circle of Willis: Also called willis circle, loop of willis, cerebral arterial circle, and willis polygon is a circulatory anastomosis that supplies blood to the brain and surrounding structures. It is named after Thomas Willis(1621-1675), an english physician. In the systematic representation, arteries of the brain and brain stem. Blood flows up to the brain through the vertebral arteries

and through the internal carotid arteries.

Splanchnic Circulation: The blood flow to the abdominal gastrointestinal organs including the stomach, liver, spleen, pancreas, small intestine, and large intestine. It comprises three major branches of the abdominal aorta, the coeliac artery, superior mesenteric artery, and inferior mesenteric artery. The hepatic portal circulation delivers the majority of the blood flow to the liver.

Coronary Circulation: This is the circulation of blood in the blood vessels that supply the myocardium. From the capillaries, deoxygenated blood return through the veins to the right atrium of the heart. Coronary artery supply oxygenated blood to the myocardium, 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 blood vessels of skin is different from that of other tissues in that it is not a metabollically active tissue and has small energy requirements.

Discuss the cardiovascular adjustment that occurs during exercise

During exercise, efficient delivery of oxygen to working skeletal and cardiac muscles is vital for maintenance of ATP production by aerobic mechanisms. The equine cardiovascular response to increased demand for oxygen delivery during exercise contributes largely to the increase in oxygen uptake that occur during submaximal exercise. Cardiac output during exercise increases greatly owing to the relatively high heart rates during exercise. Heart rate increases proportionately with workload until heart rates close to maximal are attained. It is remarkable that exercise heart rates six to seven times resting values are not associated with a fall in stroke volume, which is maintained by splenic contraction, increased venous return, and increased myocardial contractibility. Despite the great changes in cardiac output, increases in blood pressure during exercise are maintained within relatively smaller limits, as both pulmonary and systemic vascular resistance to blood flow is reduced. Redistribution of blood flow to the working muscles during exercise also contributes greatly to the efficient delivery of oxygen to sites of greatest need. Higher work rates and oxygen uptake at submaximal heart rates after training imply an adaptation due to training that enables more efficient oxygen delivery to working muscle. Such an adaptation could be in either blood flow or arteriovenous oxygen content difference. Cardiac output during submaximal exercise does not increase after training, but studies using high-speed treadmills and measurement of cardiac output at maximal heart rates may reveal improvements in maximal oxygen uptake due to increased stroke volumes, as occurs in humans. Improvements in hemoglobin concentrations in blood

are recognized, but at maximal exercise, hypoxemia may reduce arterial oxygen content. More effective redistribution of cardiac output to muscles may also be an important means of increasing oxygen uptake after training. This process also helps in the distribution of oxygen where needed.