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Assignment

Discuss the long term regulation of mean arterial pressure

In cardiovascular system, blood flow is controlled by arterial blood pressure, and in this way the long term mean blood pressure is stabilized to nregulate oxygen and carbondioxide levels. Thereafter, the barorefles would stabilize the instantaneous pressure value to the prevailing carotid pressure(MAP). Long term regulation takes minutes to days to go into effect. It involves the kidneys, then the kidneys could regulate your blood volume, by regulating the blood volume you can regulate the mean arterial pressure. The kidney regulates the arterial pressure by two ways

- Regulation of extracellular fluid volume: When blood pressure increases, kidneys excrete large amounts of water ans salt particularly sodium, by means of pressure diuresis: excretion of large quantity of water in urine. And pressure natriuresis: excretion of large quantity of sodium in urine.
- Through renin-angittensin system: When blood pressure and ECF volume decreases, renin secretion from kidney is increased. It converts angittensin into angittensin 1. This is converted into angittensin 2 by angittensin-converting enzyme.

Write short notes on the following

Pulmonary Circulation: This 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. The term plumonary circulation is readily paired and contrasted with the systemic circulation. The vessels of the plumonary circulation are the plumonary arteries and the plumonary veins.

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: This describes 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 abdominalaorta, the coeliac artery, superior mesenteric artery(SMA), and inferior mesenteric artery(IMA). The heptic 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 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 tisssue and has relatively small energy requirements, so its blood supply is different tto that of the other tissues.

Discuss the cardiovascular adjustment that occurs during exercise

The cardiovascular system provides the link between pulmonary ventilation and oxygen usage at the cellular level. 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 over 35-fold increases in oxygen uptake that occur during submaximal exercise. Cardiac output during exercise increases greatly owing to the relatively high heart rates that are achieved 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 during exercise after training are recognized, but at maximal exercise, hypoxemia may reduce arterial oxygen content. More effective redistribution of cardiac output to muscles by increased capillarization and more efficient oxygen diffusion to cells may also be an important means of increasing oxygen uptake after training.