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1. DISCUSS 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 .

2. A SHORT NOTE ON THE FOLLOWING
   A. 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

B. 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.

C. 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.
D. 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.
E. 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 it's blood supply is different to that of other tissues.

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 muscle blood flow .
   2. Greater rate of utilization.