

A 15-year old student feels dizzy during light exercise and her heart rate increases. At exercise, the muscles need more energy for contraction and for that muscles need oxygen and glucose. The circulatory and pulmonary system are essential for sustaining life, acting as the body's primary transport and gas exchange network, and in this paper I will discuss the possible pathological problems the student has.

At inhalation, the oxygen first goes through the nose and mouth to the trachea, bronchi, bronchioles, alveoli and then to the other parts of the body. Other parts of the body need oxygen to primarily produce energy (ATP) required for survival, growth, repair, and movement through a process known as cellular respiration. In the alveoli there are capillaries, they are small blood vessels where gas and the oxygen can diffuse through the wall of the alveolus to the capillary. In the alveoli the oxygen diffuses because the concentration gradient of oxygen is high in alveoli and low in capillaries and this means that the oxygen diffuses down its gradient, but in the case of carbon dioxide the concentration gradient is high in capillaries and low in alveoli so CO₂ also diffuses down its gradient, and this is how diffusion occurs of carbon dioxide. The systemic circulatory system is the body's main blood circuit, delivering oxygenated blood from the left ventricle, through the aorta, to all bodily tissues, and returning deoxygenated blood to the right atrium. In the systemic circulatory system the oxygenated blood first goes to the left ventricle then to aortic valve, aorta, systemic arteries, arterioles, capillaries, venules, systemic veins, vena cava, right atrium, but the pathway of deoxygenated blood is systemic capillaries, venules, systemic veins, vena cava, and right atrium.

If the student gets tired and increased heart rate very fast then this could mean the student has an oxygenation problem. An oxygenation problem means that when oxygenated blood doesn't go into the body properly and this happens if the student has circulatory and haematological problems. For example, anaemia is the deficiency of oxygenated haemoglobin in the body. Haemoglobin is a specialized protein in red blood cells that reversibly binds to oxygen to transport it from the lungs to tissues throughout the body, forming oxyhaemoglobin.

Asthma is another possible reason for her breathing condition, which is a common chronic respiratory condition characterized by inflammation of the lungs and narrowing of the airways in the lungs, making breathing difficult.

Also, if the student has a damaged lung it means her or his one lung doesn't work properly and this causes decrease in ventilation.

In the case of pacemaker cells which help in contraction if it doesn't work properly then the heart's electrical system becomes disrupted, leading to sinus node dysfunction. The coronary sinus is a large vein located in the upper part of the left atrium of the heart.

Cells need oxygen primarily to generate energy (ATP) efficiently through a process called aerobic cellular respiration. The problems like asthma and anaemia are the reasons why the student's breathing becomes shallow and fast. Normally when we do exercise, it keeps our body strong and keeps our heart healthy by maintaining our heart rate, but we have problems like anaemia and asthma which make our lungs and heart weak and our body doesn't respond properly to the exercises.

The cardiovascular and pulmonary systems are connected, interdependent, and work together as a single cardiopulmonary system to maintain life, with failure in one system frequently causing failure in the other. The heart and lungs are deeply interdependent organs working as a single cardiopulmonary unit to oxygenate blood and distribute it throughout the body.