

The effects of environmental temperature on human respiration - lab report example...



The effects of environmental temperature on human respiration

The surrounding environment constantly influences the biological processes of human body. When the surrounding temperature falls, the blood vessels in human beings and mammals constrict in order to generate heat and maintain the body temperature at warm level. In the process, the flow of blood faces an obstruction and this increases the blood pressure (force exerted by the flow of blood against the walls of artery). This also raises the risk of heart attack.

According to Sun, a professor at Florida University, " Everyone should bear in mind that cold temperature is a risk factor (for heart attack and stroke)" (University Of Florida Health Science Center, 2005). Hypertensive patients should be extremely careful in cold weather and people should take care such that the amount or degree of exposure to cold is reduced and also adopt measures to keep the body warm. It is important to expose the body to the cold stress. However the instant impact is quite drastic. After the initial brief seconds, the rate of metabolism seems to fall as the body now adjusts itself gradually to the stimuli. Adaptation is important for human being and degree of adaptation depends upon the habituation.

The term acclimatization refers to the physiological adaptation of the body to a fall in temperature. In order to make the patient adaptable to the surrounding cold, it is important first for the person to come in contact with the stimuli. Escaping or protecting oneself from the cold by wearing heavy warm clothes is not the permanent solution. The study carried out by Young, Muza, Sawka, Gonzalez, and Pandolf (1985) shows the impact of repeated

immersion in cold water, a program designed for adaptation. However it was observed that only under light stressful a condition a person is able to show adaptation but not under strict conditions. It has also been observed that cold pressor test (CPT) revealed that with the increase in cardiac sympathetic activity, the heart rate increases too during the first 30 seconds of the test. In this case results also reveal “ Arterial pressure, heart rate, and MSNA all increased significantly during the CPT” (Victor, Leimbach, Jr., Seals, Walljn, and Mark, 2008, 431)

According to Fleisher and Krieger (2007) cardiac arrest brings about halt in respiratory activities or apnea. Therefore, we can infer that an increase in cardiac activity will bring about an increase in respiration rate. It may be hypothesized that the environmental temperature will affect human respiration. At colder temperature, the respiration rate is likely to increase. The experiment also gives us an elaborate idea regarding the process of respiration. We may also form an idea about the amount of carbon dioxide released with every exhalation. Again, the experiment exposes the composition and solubility of different elements of air and hence the experiment helps us understand the difference between the activities of a water breather and an air breather. This is what the experiment is designed to prove - “ CPR involves a group of procedures that may include artificial respiration and intubation to support or restore breathing, and chest compression or the use of electric stimulation or medication to support or restore heart function” (National Hospice and Palliative Care Organization, 2005, 21)

Thinking about this logically, we may draw a conclusion from a known fact that air pressure and temperature are inversely related. When the air
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pressure is high in the surrounding, the inhalation rate is high since the mass of air entering the body is much more compared to a reduced air pressure. (Long, 1996) Thus when the temperature is low or when the environment is cold, it is implied that the air pressure will be low and this will lead to high rate of respiration among the individuals. Habituation to cold brings about adaptation and therefore it is a repetitive process rather than a one-time process.

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