

# Example of cardiovascular and pulmonary reflexes report

[Science](#), [Chemistry](#)



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## **Introduction**

The amount of carbon dioxide that is in the blood is regulated within a very optimum range in order to keep the functioning of the body cell in the right order. Reducing the level of carbon dioxide in the cells may result into the reduced pH in the blood which eventually results in the reduction of the blood vessels. The reduced blood vessels are known to cause reduction in the amount of blood that is being taken to vital organs such as the brain. The reduced carbon dioxide may also result in reduced heart rate as well as breathing rate (Medical Health Tests, 2012).

On the other hand, when the amount of carbon dioxide is high in the blood there is an increase in the pH level of blood. This results in the dilation of blood vessels as well as raise in the heart rate as well as raise in the breathing rhythm. Cardiac muscle in the heart has an intrinsic depolarization rate that is involved in setting the basic rhythm of the cardiac cycle. This rate can be modified in order to meet demands that are placed on it by the environment. The part of the brain called the medulla is involved in

monitoring sensory input and provide directs for the adjustments in the rate by sending signals out through the sympathetic as well as the parasympathetic nerves (Medical Health Tests, 2012).

Factors that may trigger these demands include changes in the oxygen level, carbon dioxide, pH as well as pressure through sensors that are in the carotid and aortic bodies. In addition the right atrium has sensors that monitor the conditions of the blood returning to the heart. In the case of a drop in oxygen levels, pH level or the amount of pressure in the arteries, or even a rise in carbon dioxide venous return to the heart there would be a signal transmitted to the medulla for the need to raise the heart rate. These changes also raise the breathing rate as well as the depth of inspiration.

When there is a drop in oxygen or pH, a rise in carbon dioxide sensed by the carotid and aortic bodies will provide input that will cause the respiratory rate to increase. Respiratory rate is also under conscious control

In this exercise, the average heart rate, breathing rate and the depth of inspiration were determined both under resting conditions as well as under experimental conditions. Hypothesis to be tested was that breathing in a bag would raise the blood carbon dioxide and hence increase in heart rate as well as breathing rate. Experimental variable was change in the amount of carbon dioxide in the blood while the dependent variables were the heart rate, breathing rate and the depth of inspiration.

## **Method**

The increase in blood carbon dioxide was increased by allowing the subject to breath in a bag for 30 seconds. The effect of the increased level of carbon

dioxide was monitored by measuring the heart rate, breathing rate and the depth of inspiration before and compared with after the experiment.

The Vernier LabPro data collection system was used to record both heart rate and breathing rate. The heart rate was measured using a POLAR heart rate monitor, where the monitor was placed under the subject's shirt in contact with the lower rib cage. This was to detect the electrical activity associated with contraction of the heart and send a radio signal to the receiver unit that is connected to the LabPro interface. The breathing rate was measured using a breathing belt and a gas pressure sensor. First, the baseline data was obtained and the subject allowed to breath in a plastic bag for duration of 30 seconds. The experimental data was then collected the same way as the baseline data.

## **Results**

The baseline data as well as the experimental data collected were recorded in Table 1 below. The experimental data was higher than the baseline data in all the cases tested. The rate of heart beat was 84. 86 beats per minute at base line and 98. 5 beats per minute after the experiment. The rate of breathing at baseline was 17. 76 and after the experiment the rate was 24. 7 breathings per minute. The baseline depth of inspiration was 0. 52 while after the experiment the depth was 2. 13.

## **Summary and conclusion**

The experiment successfully determined the effect of increased level of carbon dioxide to the rate of heart beat, breathing rate as well as the depth of inspiration. While the rate of heart beat at baseline was 84. 86 beats per

minute, the rate of the heart beat increased to 98.5 beats per minute. The condition of high carbon dioxide level in the blood is referred to as hypercapnia. The condition experienced in the experiment is similar to the condition that is experienced when an individual is undergoing hypoventilation. The increased rate of the heart beat results to increased blood pressure and other factors such as muscle twitches.

The rate of breathing was also increase in the experimental condition when compared to the baseline data. This is usually due to the reduced amount of oxygen in the blood causing the breathing system to be increased to enable the body inhale more oxygen (Medical Health Tests, 2012). The reduced oxygen in the system also causes the depth of inspiration to increase where at baseline this had an average of 0.52 and increased to 2.13 after the exercise.

In conclusion, this experiment was aimed at determining the effect of breathing in a bag to the rate of heart beat, breathing and the depth of inspiration. The experimental design that was used can thus be said to have been successful in test the set hypothesis.

## **Work Cited**

MedicalHealthTests. (2012). Symptoms & Treatment of High Carbon Dioxide Level in Blood. Retrieved April 4, 2013, from <http://www.medicalhealthtests.com/blood-tests/blood-carbon-dioxide-level.html>