

The effect of nicotine
on the heart rate of
the lumbriculus
variegatus essay
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Background- This lab is being done to demonstrate the effects of stimulants on the circulatory system of blackworms. In this lab, the stimulant we have chosen to use is Nicotine. A stimulant is an agent that causes increased activity, especially in the nervous or cardiovascular systems. In this lab, we will put blackworms into the Nicotine to look at the differences in pulse rates when compared to a control. The proper name for blackworms is *Lumbriculus Variegatus*, they are freshwater worms most commonly found in North America and Europe. The blood in blackworms circulates from the dorsal blood vessel toward the head through a series of rhythmic contractions. A common pulse rate for the blackworm is 7 to 8 pulse/minute.

Hypothesis- If a stimulant increases heart rate, then when the *Lumbriculus Variegatus* is put into Nicotine its heart rate will increase. Materials and Methods: -First, fill a petri dish with water and insert 15 blackworms into the dish from the bucket containing all of the blackworms. Extract one worm into a pipette then insert into the capillary tube. Place the capillary tube under a microscope and adjust until the blood flow is seen. Pick one segment and count how many times it contracts during a minute's time. Use the pipette and push the worm out of the capillary tube and into another petri dish for "trash" (the petri dish which contains the worms that have already had their control pulse rate counted). Continue these steps doing one control and one nicotine test for each worm and make sure to count pulse rates from the same area of each worm that the data is as consistent as possible.

Next, get another petri dish and fill with 2.5 mL of unfiltered non-menthol Nicotine along with 1mL H₂O. Take one worm from the "trash" dish and insert into the Nicotine for one minute, make sure to measure how much

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water is getting into the Nicotine to know how much the solution is diluting. This was controlled so that we could make sure each worm was being put into the same strength nicotine solution. Take the worm and put it into a separate pipette and then another capillary tube and measure the pulse rate for one minute. Take the worm out and put it into the “rehab” petri dish, a place for the worms to get their heart rates back to normal before joining all of the worms. Continue these steps and record the pulse rate once in the nicotine for each of the worms. Make sure to calculate both the mean and median from both the control and stimulant trials. Results:

-The dependent variable is the pulse rate of the blackworms in pulse/min. The independent variable is the nicotine added which is 2.5 mL with 1 mL H₂O. The same 15 worms were used in both trials (each worm was tested once for each), the same Nicotine was used for all stimulant trials, worms were in the Nicotine for the same amount of time, the pulse rate was recorded at the same time for each worm, same capillary tubes were used, same pipette was used, and worms were put into the same petri dishes. Two trials were done with the Nicotine at 2.5 mL and nine trials were done with 2.5 mL Nicotine along with 1 mL H₂O. We had to dilute the solution because every worm in the 2.5 mL Nicotine solution died. Spring water served as the positive control since it serves as the worm's everyday habitat. All data will be compared to this control.

-Table 1 shows the heart rates of worms in the control, their average heart rate is at 10.7 pulse/min. Table 2 shows the worms in the 2.5 mL of Nicotine which proved to be too strong. Table 3 shows the heart rates of worms in the diluted solution of 2.5 mL Nicotine and 1 mL H₂O. Table 3 shows that the <https://assignbuster.com/the-effect-of-nicotine-on-the-heart-rate-of-the-lumbriculus-variegatus-essay-sample/>

heart rate of worms is faster in the nicotine with the average pulse rate at 15.5 pulse/min.

-This table shows the data for the 15 control worms in water and then the same 15 in Nicotine. There are not 15 worms in the nicotine solution because our first solution was too strong and 6 of the worms died. The solution being used in this graph is 2.5 mL of Nicotine and 1 mL H₂O. This graph shows that the pulse rates of worms in Nicotine tend to be higher than that of the worms in water. This data proves the idea that stimulants raise heart rate.

Conclusions:

-Nicotine does have an effect on heart rate. Nicotine has shown a raised heart rate (15.5 pulse/min) when compared to the control (10.7 pulse/min). Based on the background of a stimulant the heart rates were expected to raise. The one thing that intrigued me was how little nicotine it took to make the difference between death and a raised heart rate in the worms. I was intrigued by the fact that as humans we take in much more Nicotine than that at a time and are barely fazed. However, our bodies and organ systems are much bigger. For further study, I would test this lab with different concentrations of Nicotine to see where the dramatic changes in pulse come to play.

Works Cited:

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