

# Superworms

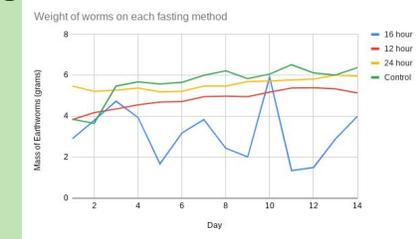
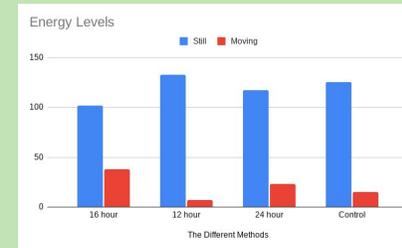
**Research Question:** Which kind of fasting improves the physical health of lumbricina (earthworms) the most?

**Hypothesis:** If lumbricina were to fast for different time intervals throughout the day **then** the group of lumbricina that fast for 16 hours and eat for 8 hours will have the biggest increase in energy and weight loss **because** it is the fasting method that is the most in tune with the body's natural circadian rhythm.

## Methodology:

- Set up the 20 habitats for the lumbricina, by placing a layer of paper towels on the bottom of each container and adding 30ml of water to the paper towels.
- Label the containers a letter and a number, 1-5, switching the letter with every 5 containers with a sharpie.
- Measure the weight of each lumbricina (grams) with a scale and log their weight in some sort of table. This will be done daily at 6am. As you weigh each worm place one individually in its own container, until you have put away all 20 worms.
- Place 30mL of food (soil mixture) on one side of 5 containers labeled with the same letter.
- Set a timer (1, 8, 12, or 24 hours) depending on the method you chose to set up first, to time how long the lumbricina will have access to food.
- Repeat steps 4-5 three more times for each method of fasting.
- Once the timers for each fasting method go off, remove the food from the lumbricina containers. Then remove the paper towels and clean the containers, making sure there is no soil residue. Then replace the paper towels and pour 30mL of water into each container evenly. For the fasting worms wait until the next day at the same time you gave them food, to place the 30mL of food back into the containers, and for the control group place the 30mL of food right back into the containers.
- You will also need to record the activity of the lumbricina every 12 hours (once before you feed them (6am) and again 12 hours later (6pm)), by logging whether they are still or actively moving around during the 2 weeks that you conduct the experiment.
- Once it is the next day at the same time you had initially fed them, check to see if the lumbricina are still or moving and write this down. Then place the food back into the containers and start the timers again.
- Repeat steps 7-9 every day for the next 14 days.

## Results and Data Analysis:



## Interpretation and Conclusions:

- At the end of our project we can conclude that our hypothesis was incorrect, as none of the methods of fasting caused the worms to lose weight in the end. The 16/8 fasting method was the most unstable as it had no gradual increase or decrease. The most stable method was the 24-hour approach, it was also the closest to making the lumbricina lose weight. We don't know exactly why we got the results that we did, however we believe it was due to the fact that lumbricina are very biologically different from humans. In theory the lumbricina should lose weight faster than human beings, because they have a much simpler digestive system, however that was not the case in our experiment, for all methods of fasting the lumbricina ended up gaining weight. There were a lot of limitations to our project, as it was originally supposed to be conducted with mice instead of the lumbricina. There were also a few instances where our scales would malfunction and one of the lumbricina died as well.

# Superworms

# Introduction:

Fasting has been around for hundreds of year, however recently interest in fasting has peaked due to it aiding with weight loss, however there are many other health benefits as well. To see which type of fasting increases energy, and weight loss in lumbricina, we will be testing multiple different types of fasting. First is the 16/8 method, which consists of fasting for 16 hours and having an 8 hour eating window. Second is the 24 hour approach, and as the name suggests you eat at the same time only once every 24 hours. The final method will be the 12 hour approach, which is fasting for 12 hours and having a 12 hour window to eat. Once people realize the many health benefits of fasting and start implementing it within their lives, not only their health will improve, but the world around them will as well. Fasting will decrease the amount of food waste and production around the world, which will then also lessen the load on the environment for growing so much food, which will then also improve the health of multiple ecosystems around the world.

## **Which kind of fasting improves the physical health of lumbricina (earthworms) the most?**

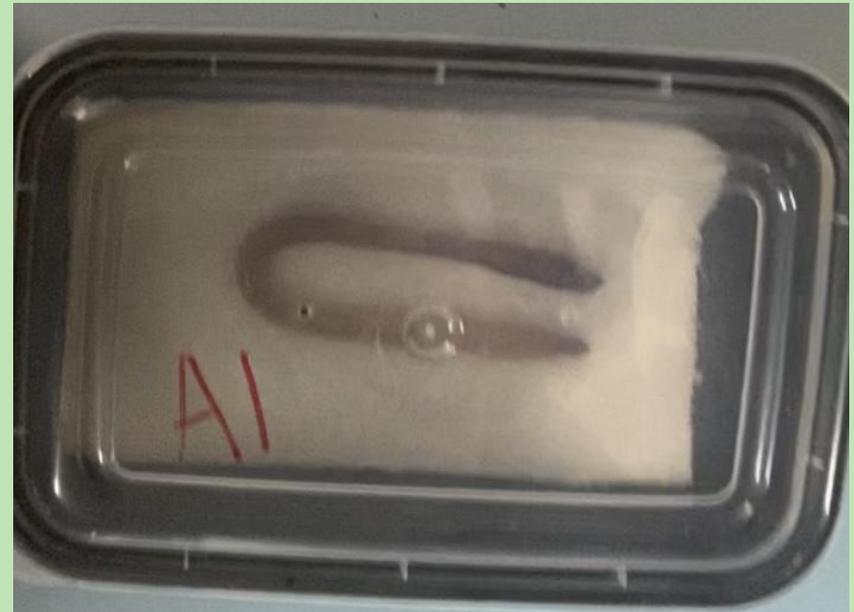
**Hypothesis:** If lumbricina were to fast for different time intervals throughout the day **then** the group of lumbricina that fast for 16 hours and eat for 8 hours will have the biggest increase in energy and weight loss **because** it is the fasting method that is the most in tune with the body's natural circadian rhythm.

**Variables:** Independent Variable(s): How long during the day that the lumbricina can eat. (8 hours, 12 hours, 1 hour, and 24 hours)

- Dependent Variable(s): The lumbricina's mass and energy
- Control: Having food available 24 hours a day
- Control Variables: Habitat, the amount of food the lumbricina get, the moisture, the species of lumbricina, the time of day they initially receive food

# Materials

1. 20 lumbricina (earthworms)
2. 20 plastic containers (6 Qt.)
3. Lumbricina food (9 cups of soil, 2 cups of berries, and 2 cups of shredded spinach)
4. Paper towels to lay on the bottom of the containers for substrate
5. A scale to weigh the mass (in grams) of the lumbricina
6. Permanent marker
7. Water
8. 30mL measuring cup
9. Timer

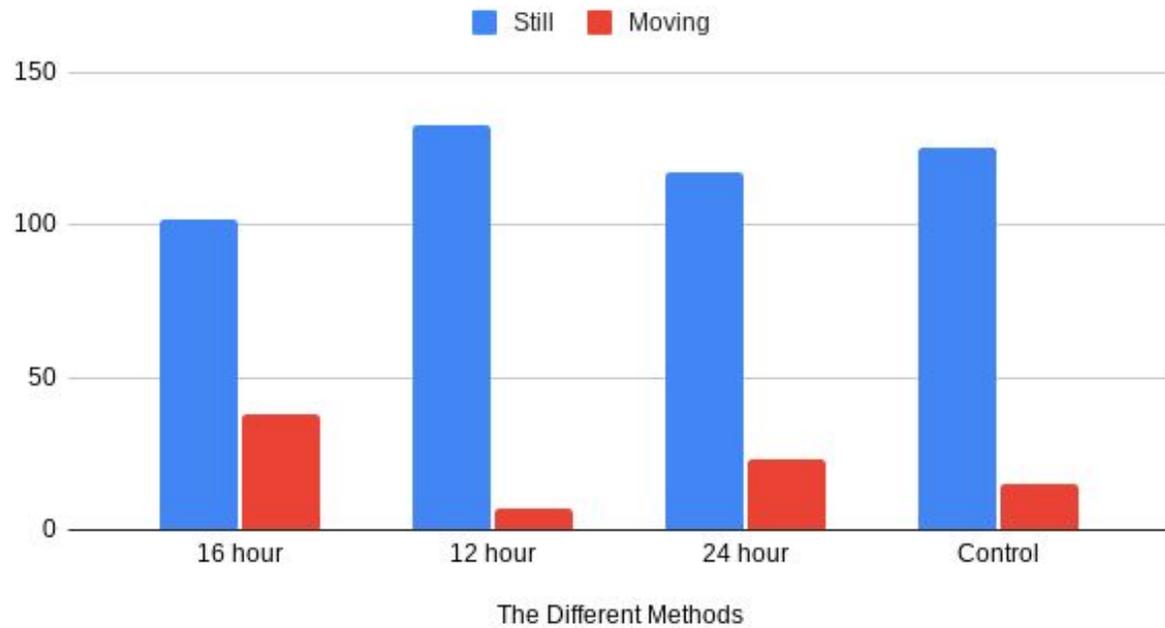


# Methods

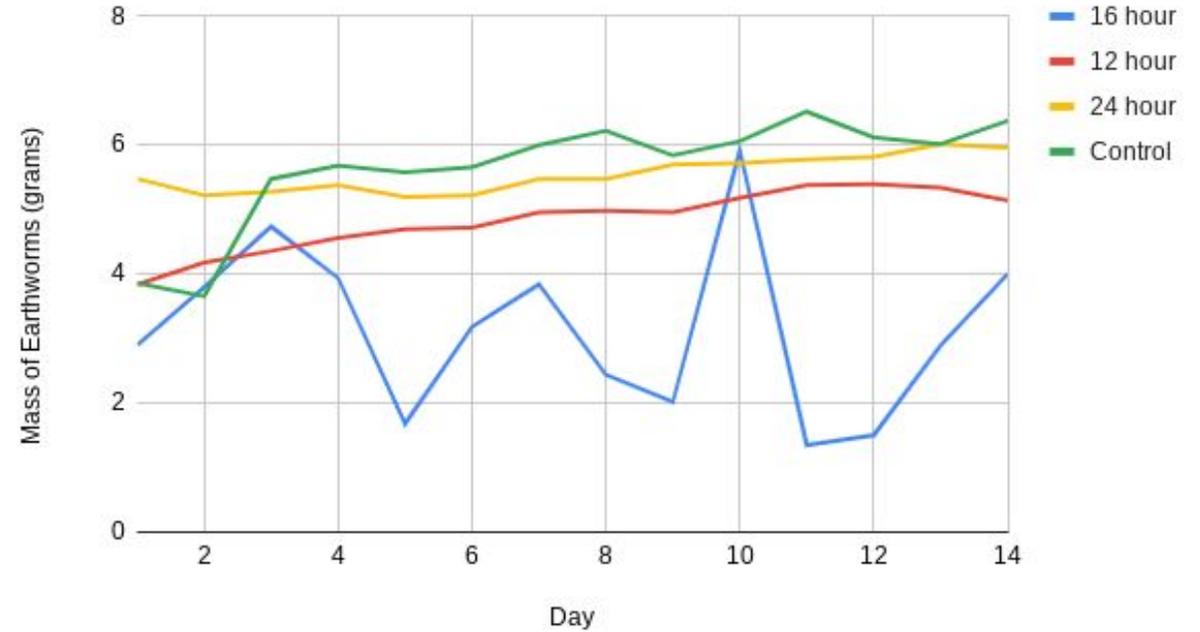
1. Set up the 20 habitats for the lumbricina, by placing a layer of paper towels on the bottom of each container and adding 30ml of water to the paper towels.
2. Label the containers a letter and a number, 1-5, switching the letter with every 5 containers with a sharpie.
3. Measure the weight of each lumbricina (grams) with a scale and log their weight in some sort of table. This will be done daily at 6am. As you weigh each worm place one individually in its own container, until you have put away all 20 worms.
4. Place 30mL of food (soil mixture) on one side of 5 containers labeled with the same letter.
5. Set a timer (1, 8, 12, or 24 hours) depending on the method you chose to set up first, to time how long the lumbricina will have access to food.
6. Repeat steps 4-5 three more times for each method of fasting.
7. Once the timers for each fasting method go off, remove the food from the lumbricina containers. Then remove the paper towels and clean the containers, making sure there is no soil residue. Then replace the paper towels and pour 30mL of water into each container evenly. For the fasting worms wait until the next day at the same time you gave them food, to place the 30mL of food back into the containers, and for the control group place the 30mL of food right back into the containers.
8. You will also need to record the activity of the lumbricina every 12 hours (once before you feed them (6am) and again 12 hours later (6pm) , by logging whether they are still or actively moving around during the 2 weeks that you conduct the experiment.
9. Once it is the next day at the same time you had initially fed them, check to see if the lumbricina are still or moving and write this down. Then place the food back into the containers and start the timers again.
10. Repeat steps 7-9 every day for the next 14 days.

# Results

## Energy Levels



## Weight of worms on each fasting method



# Conclusion

At the end of our project we can conclude that our hypothesis was incorrect, as none of the methods of fasting caused the worms to lose weight in the end. The 16/8 fasting method was the most unstable as it had no gradual increase or decrease. The most stable method was the 24-hour approach, it was also the closest to making the lumbricina lose weight. We don't know exactly why we got the results that we did, however we believe it was due to the fact that lumbricina are very biologically different from humans. In theory the lumbricina should lose weight faster than human beings, because they have a much simpler digestive system, however that was not the case in our experiment, for all methods of fasting the lumbricina ended up gaining weight. There were a lot of limitations to our project, as it was originally supposed to be conducted with mice instead of the lumbricina. There were also a few instances where our scales would malfunction and one of the lumbricina died as well.

# Resources

- Gunnars, Kris, and Aya Brackett. “6 Popular Ways to Do Intermittent Fasting.” Healthline, [https://www.healthline.com/nutrition/6-ways-to-do-intermittent-fasting#TOC\\_TITLE\\_HDR\\_4](https://www.healthline.com/nutrition/6-ways-to-do-intermittent-fasting#TOC_TITLE_HDR_4). Accessed 15 December 2021.
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