Ántonia Pavek and Yousuf Suleman Research Plan

The Effects of *Ganoderma lingzhi* and *Lentinula edodes* on the Regeneration Rates and Longevity of *Lumbriculus variegatus*

Project Question

Do *Ganoderma lingzhi* and *Lentinula edodes* have effects on regenerative properties and longevity in *Lumbriculus variegatus*?

A. Rationale

The effectiveness of Eastern medicine in the evolving world and modern disease has been widely asked by many doctors in the Western world. Many Western doctors refute the use of traditional Chinese medicine and the use of natural remedies in order to fight various illnesses. *Ganoderma lingzhi* and *Lentinula edodes* are two well-known mushrooms used for their health benefits and medicinal properties in China. These mushrooms are recognized for their anti-aging, anti-cancer, regulation, and for increasing regeneration in cellular activity. Cancer is a major issue in the world and a vast topic that the Science community must prioritize learning about. These medicinal mushrooms may be the solution and a less harmful way to fight cancer, along with aiding in regeneration in cellular repair and by enhancing and modulating the immune response. The *Ganoderma lingzhi* has been tested and displays anti-cancer properties where it triggers the apoptotic pathway in the cancer cell and leads to overall cancer cell death while still boosting the human immune system and repair of non-cancer cells. Other uses for *G. lingzhi* also include treatment for high blood pressure, high cholesterol, promotes cardiovascular and kidney health, and treats liver disease. *Lentinula edodes* enhances the immune system, which may indirectly slow tumor growth in the body, contains antibacterial, antiviral, and anti-inflammatory properties. Anti-aging properties are prevalent in this mushroom since it goes against oxidative stress that can lead to signs of aging in the skin. The purpose of this study is to find the effects of *Ganoderma lingzhi,* Reishi, and *Lentinula edodes,* Shiitake, have on the *Lumbriculus variegatus* (California Blackworms). The hypothesis is that these mushrooms will extend the lifespan of the worms along with speed up the regeneration rate of the segments in the worm.

B. Hypothesis

If *Lumbriculus variegatus* are exposed to *Ganoderma lingzhi* and *Lentinula edodes* in their diets, then they will have a prolonged life and increased regeneration rate, because the *Ganoderma lingzhi* and *Lentinula edodes* are said to have regenerative and longevity properties.

C. Procedure

1. 35 *Lumbriculus variegatus* will be separated into 7 petri dishes. (5 per dish)
2. Petri dish 1 will contain the control group with the 5 *Lumbriculus variegatus* under normal conditions (fish food flakes) and placed in water.
3. Petri dish 2 will contain 5 *Lumbriculus variegatus* with a 1:100 ratio solution of *Lentinula edodes*
4. Petri dish 3 will contain 5 *Lumbriculus variegatus* with a 1:1,000 ratio solution of *Lentinula edodes*
5. Petri dish 4 will contain 5 *Lumbriculus variegatus* with a 1:10,000 ratio solution of *Lentinula edodes*
6. Petri dish 5 will contain 5 *Lumbriculus variegatus* with a 1:100 ratio solution of *Ganoderma lingzhi*
7. Petri dish 6 will contain 5 *Lumbriculus variegatus* with a 1:1,000 ratio solution of *Ganoderma lingzhi*
8. Petri dish 7 will contain 5 *Lumbriculus variegatus* with a 1:10,000 ratio solution of *Ganoderma lingzhi*
9. Results and data will be tracked and recorded for segments regrowth, survival rates, and life span

Materials

- A troop of *Lentinula edodes* mushrooms
- A troop of *Ganoderma lingzhi* mushrooms
- 7 Petri dishes
- 35 *Lumbriculus variegatus* in purified water
- One bottle (27 grams) of Betta fish food flakes
- Purified water
- Dissection microscope or Stereoscope

D. Bibliography

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