A Fun Time With A Fungi: Simulating Neuronal Galvanotropism on Ustilago maydis Mycelium to Manipulate Growth Rate, Direction, and Cell Development and Its Applications to Nerve Regeneration

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It is important to find ways to study neuronal diseases or methods of treatment that are ethical, relevant, and effective. It is intriguing to see that the structure of fungal mycelium and neurons are similar in that they are both very long and polar cells that rely on those two features to function and communicate. This means that an experiment that would affect fungal mycelium relying on its polarity could be applied to neurons. The result would attempt to treat peripheral nervous restrictions as well as regeneration of superficial nerve endings for renewed feeling. The hypothesis of this experiment was “An electric field and current that is applied to fungal mycelium will influence the growth direction toward the cathode and increase the growth rate by giving the fungus a direction to head towards, rather than growing radially” The experiment put the fungus Ustilago maydis in a large agar plate (about 14x9 inches) with an 8.21 volt current going through the plate and having an anode (+) and cathode (-). The fungus was expected to grow toward the cathode and have an increased growth rate. The growth rate of the untreated>treated due to the fact that the electrical current was too high and the treated group was observed as dead after week 1 (experiment ran for 4 weeks). It is expected that further experimentation would be beneficial and the topic of research is promising.

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