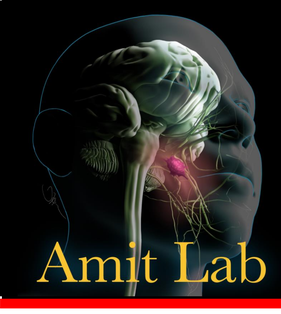

Psilocybin's Effects on Neuritogenesis in Cancer Associated Neurons

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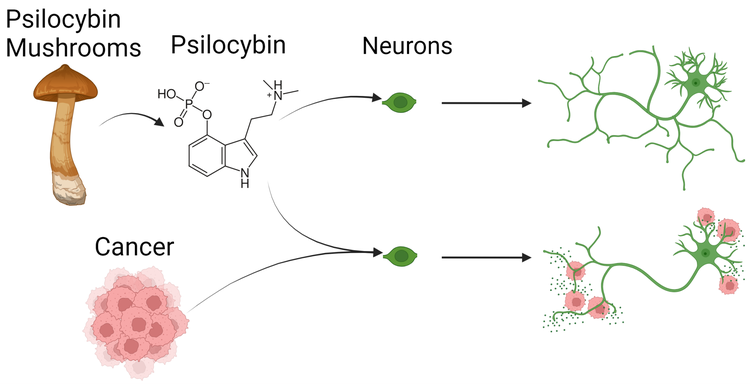
Making Cancer History®

Introduction

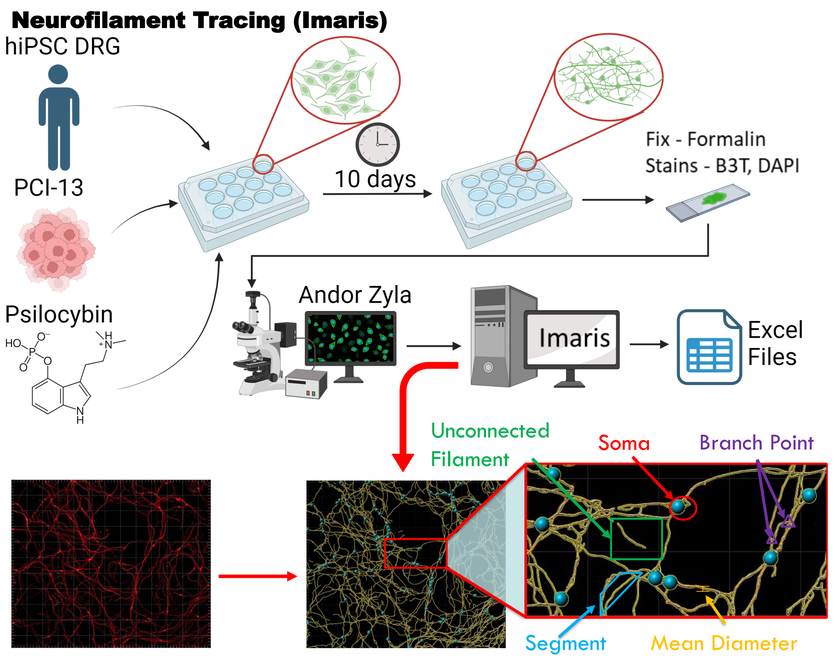
- Psilocybin is a psychoactive component in psychedelic mushrooms.
- Used medically for PTSD and Depression[1]
- Why are we interested?
  - Experiments showed ability to increase neuronal filament generation (**neuritogenesis**)[2]
  - **Cancer cells** have been suggested to interact with neurons and **damage the neuronal filaments**
- Our investigation focuses mainly on hiPSC DRG neurons and PCI-13 cancer cells

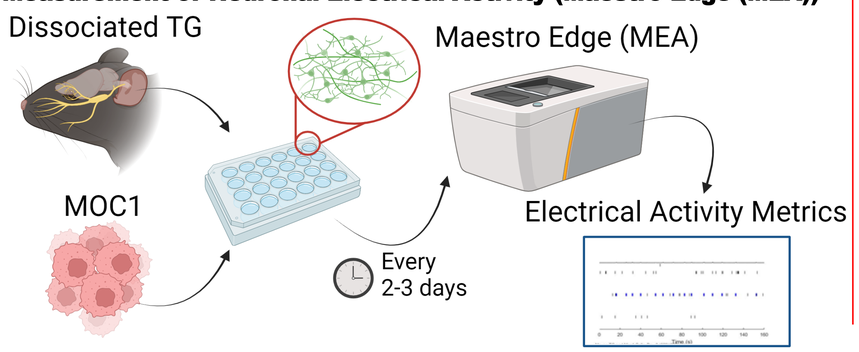
Hypothesis

- **Overall Goal**: Determine if Psilocybin is a potential drug therapy to reduce effects of cancer on neurons in patients.
- **Hypothesis**: Psilocybin will cause change in neuronal structure in presence and absence of cancer.



Methods

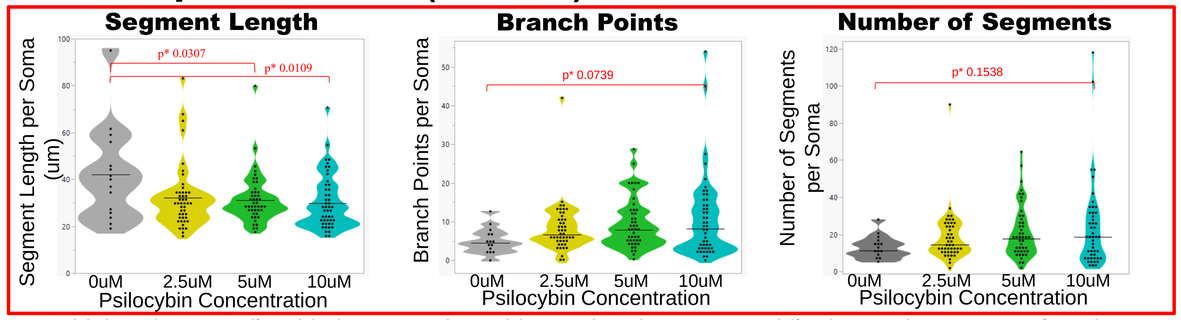




Results

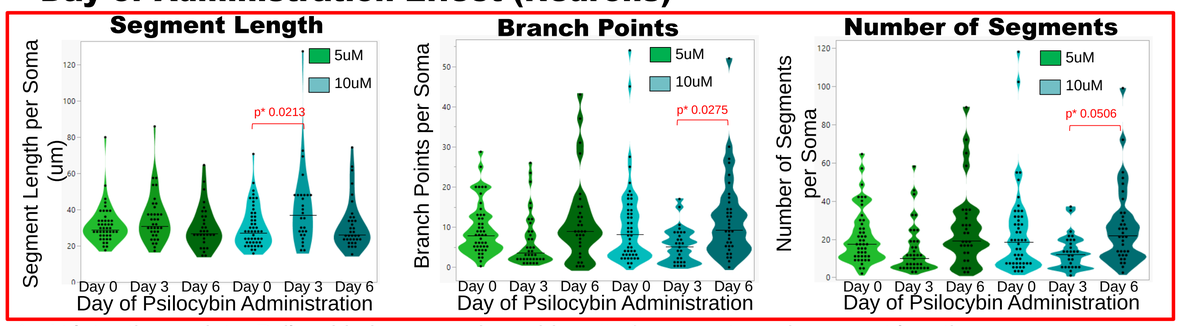
Morphology

Dose Dependent Effect (Neurons)



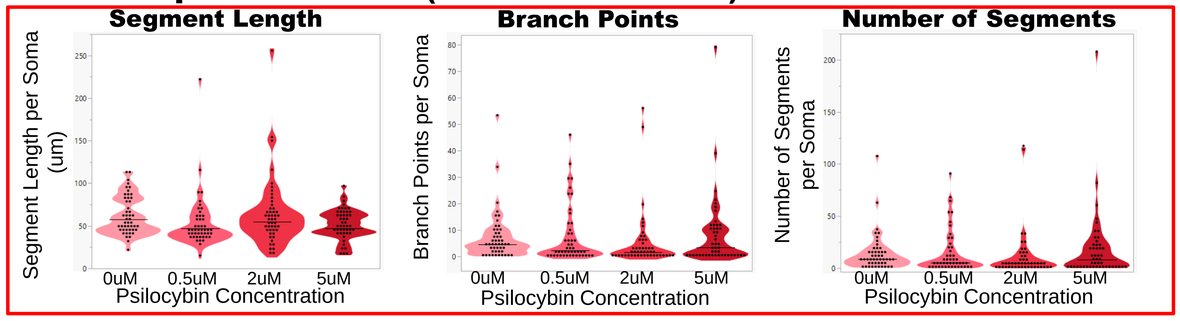
❖ At higher doses, Psilocybin increases branching and # of segments while decreasing segment length

Day of Administration Effect (Neurons)



❖ At later time points, Psilocybin increases branching, # of segments and segment length

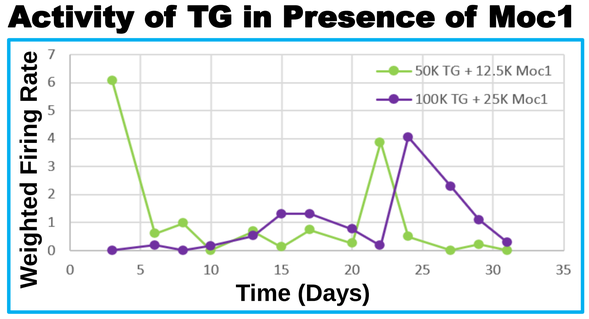
Dose Dependent Effect (Cancer + Neurons)



❖ In Cancer Associated Neurons, a trend differing from neurons alone appeared with increasing doses of Psilocybin.

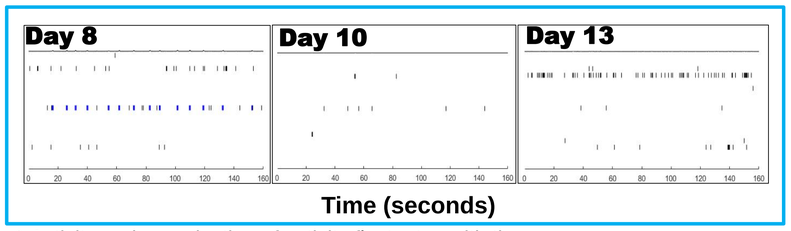
Electrical Activity

Activity of TG in Presence of Moc1



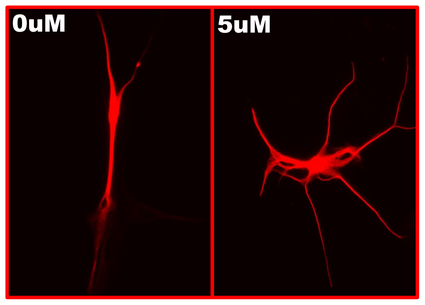
❖ Activity only present in coculture and 50K-100K neurons

Real Time Activity Plots (Raster Plot)

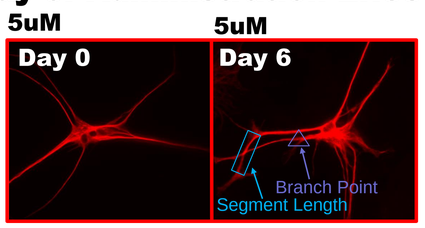


❖ Activity and organization of activity fluctuates with time

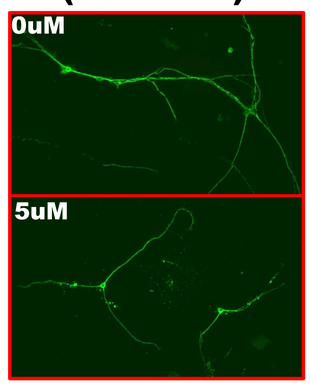
Dose Dependent Effect (Monoculture)



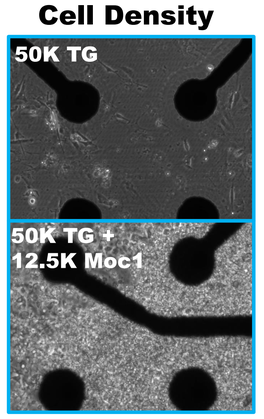
Day of Administration Effect



Dose Dependent Effect (Coculture)



Cell Density



❖ Proliferation Rate of Moc1 was excessive

Conclusions

- ❖ Psilocybin leads to increase in filament growth, branching, and number of segments at higher doses and a later administration of the drug.
- ❖ In Neuron + Cancer Coculture, Psilocybin trends toward a decrease in filament length, branching and number of segments but needs further investigation.
- ❖ Neurons give electrical activity in the presence of cancer.

Future Experiments

- ❖ Investigate Cancer Associated Neuronal structure and electrical activity in vitro and in vivo by using neurofilament tracing, RNA sequencing, Antibody Staining, Electron Microscopy and a microelectrode array.

Acknowledgments

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- ❖ Lab Members: Hinduja Sathishkumar, Kala Debnath

References

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