Neurobiological mechanisms of spontaneous behavior and operant feedback in Drosophila

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1. Goal

How does activation of dopaminergic neurons affect operant behavior in the fruit fly?

2. Experimental setups

A. Joystick

B. T-maze

C. Y-mazes

3. Screen

4. Biplots

5. Interesting lines

6. Conclusion

We used optogenetics to screen subpopulations of dopaminergic neurons in three different operant paradigms for their reinforcing properties. The experiments reveal a multiplicity of functions for dopaminergic neurons in the fruit fly brain. Dopaminergic neurons have a different function in classical and operant paradigms. To avoiding confounding effects from visual input, we trained the flies to choose between a dark choice arm and an arm where the optogenetically stimulating light is presented. Choice time is 60 s.

Conclusion

- Dopaminergic neurons have a different function in classical and operant paradigms.

- TH-D' is a candidate for punishment and TH-D1 for positive reinforcement, probably through PPM3.