Dissecting the Dopaminergic Circuitry Underlying Feeding Behavior in Drosophila

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INTRODUCTION

Dopamine (DA) is a key neuromodulator that regulates a variety of behaviors in the Drosophila melanogaster including feeding. Previous studies have found that DA increases the probability of the proboscis extension response (PER), a behavior implicated in the initiation of feeding and modulated by peripheral sensory cues as well as starvation1,2. Meanwhile, feeding is a more complex behavior and can involve post-ingestion feedback mechanisms, enabling flies to quantify the caloric value of foods. Here, we investigate the specific DA circuits involved in acutely modulating feeding after a mild starvation. This was done by activating distinct populations of DA neurons in the fly and quantifying the volume of food ingested.

METHODOLOGY

Start dry starvation between ZT 0 and 1

Fed on wet food with 3% FD&C Blue no. 1 dye for 20 minutes

RESULTS

Figure 4: Activating TH and C'-4 neurons promotes an increase in sucrose feeding after starvation. Neurons in D’7 and C’6 are not involved in this phenotype.

CONCLUSIONS

1. C’4 neurons increase sucrose and mannose intake after a mild starvation.
2. Starvation is necessary for this phenotype and the phenotype is reversed once flies have been satiated.
3. D’7 and C’6 neurons do not increase feeding, suggesting this phenotype may be mediated by neurons in the PPM1/2 cluster.

REFERENCES