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Mechanisms of cocaine aversion in *Drosophila*

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Millions of Americans abuse illicit drugs, including the stimulant cocaine. The annual economic burden this creates is in the hundreds of billions of dollars. There is a substantial genetic contribution to the development of substance abuse disorders (SUD), but many molecular pathways remain to be elucidated. The vinegar fly, *Drosophila melanogaster*, has been a genetic model organism for more than a hundred years. Major strides have been made in the last 10 years studying the behavioral responses to alcohol in flies, both in characterizing novel conserved genes and pathways, but also in the development of new assays that resemble addiction more closely. To date, few experiments have successfully been carried out showing that flies will voluntarily self-administer cocaine in a 2-choice paradigm. Here we show that there are multiple systems that contribute to flies' dislike of cocaine, including bitter tasting neurons and higher processing centers, such as the fan-shaped body. We'll also discuss our efforts to reverse engineer flies' to more readily self-administer this abused stimulant.