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Impulsive flies shed light on new players for dysfunctional inhibitory control

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Inhibitory control is a core cognitive function and its dysfunction causes impulsivity that underlies addiction. Inhibitory capacity is not uniform in all individuals nor constant all the times but is affected by genetic and environmental interplay. We found that social context interacts with dopamine activity to impact inhibitory control in *Drosophila*. In the go/no-go test that measures action restraint, wild-type flies sustain movement suppression whereas the flies with enhanced dopamine neurotransmission loose inhibition and exhibit impulsive movements in the presence, but not the absence, of peers. This dysfunctional inhibitory control requires D1 dopamine receptor and cAMP signaling in the mushroom bodies. Consistently, mushroom body activation is sufficient to provoke impulsivity without dopamine input nor social context. We conducted an unbiased genetic screen using X chromosome deficiency lines to uncover novel molecules important for social context-sensitive impulsivity and found 28 positive lines. Two lines have overlapping deficiencies that contain *scully*. The *scully* encodes the mitochondria HSD17B10 (hydroxysteroid 17-beta dehydrogenase 10) that binds to beta amyloid peptides. In human subjects, missense mutations in HSD17B10 are associated with mental retardation. We found that the double heterozygous mutations in *scully* and *fumin* (dopamine transporter mutant), but not single heterozygous mutation, lead to dysfunctional inhibitory control. Overall, genetic association studies of inhibitory control often reveal inconsistent findings. Our study underscores the impact of social context in task performance that is largely overlooked and provides a unique opportunity for mechanistic study of social and genetic influence on inhibitory control.