

ABSTRACT

The Nucleus Accumbens Core Dopamine D1 and Glutamate AMPA/NMDA Receptors Play a Transient Role in the Performance of Pavlovian Approach Behavior

by

Veronica Dobrovitsky

Advisor: Jon C. Horvitz

The role of the nucleus accumbens core (NAc core) continues to be redefined with newly acquired data on neurochemical mechanisms mediating the learning and performance of behavior. Previous empirical data showed that dopamine (DA) transmission at D1 receptors plays a transient role in the expression of learned Pavlovian approach behavior. Here we show that, prior to overtraining, DA activity at D1Rs specifically within the NAc core is critical for the performance of approach behavior elicited by the recently-acquired reward-paired cue. Blockade of D1Rs in the NAc core, but not the DMS or NAc shell, disrupted approach responses during early training; however, the dependence of Pavlovian approach on D1R transmission declined throughout training. Upon blockade of NAc core D1Rs during extended training, the expression of Pavlovian approach responses remained intact. Given these findings we next explored whether a) neuronal activity within the core of accumbens still mediates cued approach during the late training stages in the absence of D1R transmission by relying on glutamatergic transmission, or b) whether mediation of the cued approach becomes independent of the NAc core itself, i.e., shifts to another substrate. We blocked AMPA/NMDA receptors in the NAc core during early versus extended training and showed that loss of neuronal activation in the NAc core only disrupted expression of CS-elicited responses during early training. Our results indicate that NAc core activity is not necessary for the expression of well-acquired approach.