The role of central amygdala neuronal types in drug-related and appetitive behaviors

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CHAPTER 8. ENGLISH SUMMARY

Drug abuse and obesity are two major health problems the world faces today. To tackle these health problems, we need a better understanding of the underlying mechanisms causing these diseases. Both drug abuse and obesity are heavily dependent on disordered rewarding and appetitive brain circuitry. The central amygdala (CeA) is a brain area that is involved in both rewarding and appetitive behaviors. This thesis tries to elucidate the mechanisms underlying these behaviors, while mainly focusing on the role of the CeA, and some of its major neuronal types. Using *in-vivo* single cell calcium imaging and electrophysiological recordings, we have demonstrated that a single dose of methamphetamine can affect SST- and Prkcd-expressing CeA neurons. In addition, we show that this methamphetamine-induced CeA activity is not responsible for the rewarding, hyperactive and anxiogenic properties of methamphetamine. In addition to the role of CeA neurons in drug-related behaviors, we show a sex-specific role for VIPR2-expressing CeA neurons in feeding and homeostatic behaviors. Lastly, we examine AMPA-receptor plasticity as a potential mechanism through which psychostimulants could affect CeA synapses. We show that increased intracellular cyclic adenosine monophosphate (cAMP) can induce synaptic potentiation at CeA neurons, and this potentiation might be independent of AMPA-receptor subunit composition. This thesis has provided novel insight into the role of different neuronal CeA cell types in reward-based and appetitive behaviors. Further research along these avenues is of great importance for understanding the origin of health problems as a consequence of drug abuse of eating disorders.