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A brief summary of the articles appearing in this issue of *Biological Psychiatry*.

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### Drug-Induced Plasticity in the Nucleus Accumbens

Opioid addiction is characterized by vulnerability to drug cues, leading to relapse. Drug cues cause transient changes in reward regions of the brain, but most prior work has focused on changes in neurons. Here, using a rodent model, **Kruyer et al.** (pages 811–819) show that self-administered heroin and cued heroin seeking change the structure of astroglia, such that astroglial synaptic proximity in the nucleus accumbens is reduced during heroin withdrawal but transiently reversed (i.e., proximity is increased) during cued relapse. Blocking this cue-induced change potentiated cued heroin seeking, suggesting that the reversal is compensatory.

Methamphetamine activates dopamine receptor signaling in the nucleus accumbens, but the mechanisms of drug-induced behavioral and structural plasticity remain unclear. Using mice with a conditional D<sub>1</sub> or D<sub>2</sub> receptor deletion in the nucleus accumbens and Rac1 and Cdc42 mutant viruses, **Tu et al.** (pages 820–835) found that D<sub>1</sub> and D<sub>2</sub> receptors differentially regulate downstream Rac1 and Cdc42 signaling to modulate methamphetamine-induced behavioral and structural plasticity. These findings suggest that the transmission of dopamine receptor signals to downstream molecules may serve as a therapeutic target in the treatment of drug addiction.

### Fast-Spiking Interneurons Inhibit Impulsivity

The ability to control impulsive actions involves the nucleus accumbens and is impaired in neuropsychiatric disorders. Using calcium imaging in the mouse nucleus accumbens, **Pisansky et al.** (pages 836–847) report that successful impulse control correlates with sustained activity of fast-spiking interneurons. Chemogenetic or optogenetic inhibition of these specific interneurons increased impulsive behavior, pinpointing a potential mechanism for impulse control that may be targeted therapeutically.

### Social Interaction Decreases Drug Craving

A rat model of voluntary abstinence and relapse from methamphetamine self-administration was recently developed based on behavioral treatments in humans with substance use

problems. Here, **Veniro et al.** (pages 848–856) extend this work to heroin self-administration, demonstrating that when rats are given the opportunity to lever press for access to a social partner, they will abstain from lever pressing for infusions of heroin. The authors also show that social choice-induced voluntary abstinence decreased the time-dependent increases in heroin seeking after cessation of drug self-administration (incubation of heroin craving). Lastly, the authors introduce a novel fully automated social self-administration and choice procedure.

### Neural Patterns Predict Relapse and Drinking Behavior

Alcohol dependence is a chronic relapsing disorder of the brain, yet the mechanisms underlying its development and persistence remain largely unknown. Using functional magnetic resonance imaging, **Sekutowicz et al.** (pages 857–863) show that brain activation patterns in prefrontal cortex reflecting instrumental conditioning are predictive not only of future relapse in a sample of recently detoxified alcohol-dependent patients, but also of future drinking characteristics in a second sample of young social drinkers. Together, these findings provide a potential general neurobiological marker of alcohol abuse and a potential target region and mechanism for treatment.

### Kappa Opioid Receptor and Naltrexone

Naltrexone is a nonselective opioid receptor antagonist used for the treatment of alcohol use disorder, but the mechanisms underlying its efficacy are not clear. **de Laat et al.** (pages 864–871) assessed drinking behavior in non-treatment seeking participants with alcohol dependence before and after 1 week of naltrexone. Positron emission tomography at baseline revealed that lower kappa opioid receptor availability in frontal and limbic brain regions is associated with lower alcohol craving and reduced drinking after naltrexone. These data provide insight into the effects of naltrexone and may help improve identification of patient groups who would most benefit from naltrexone.