VANDERBILT SCHOOL OF MEDICINE | Basic Sciences

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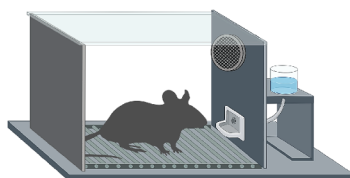*845-594-2846*
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"Neural basis of motivation and maladaptive decision making"

A major focus of the lab is to **understand the neural mechanisms of individual differences in decision making** - that is, why do behavioral responses vary even when given the same experience. For example, although a large portion of the population will be exposed to alcohol, only some will go on to develop an **alcohol use disorder**.
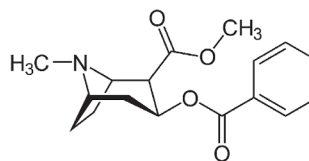
We develop behavioral procedures in rodents to model these phenomena, allowing us **to determine the pre-existing differences that may contribute to individual differences** as well as how they change with experience.

By combining these models with various techniques for observing and manipulating neuronal activity, **we dissect the circuitry of maladaptive decision making.**

Biosketch

Dr. Siciliano received his PhD from Wake Forest School of Medicine in 2015 where his work focused on elucidating the actions of abused drugs on dopamine signaling. He then completed his postdoctoral training at the Massachusetts Institute of Technology, where he used optical circuit dissection techniques to investigate individual differences in behavioral flexibility and vulnerability to compulsive behaviors. In 2019 he began his own lab as an Assistant Professor at Vanderbilt University where his work focuses on developing rodent models of substance use disorder, and using cutting-edge technologies to investigate the neurobiological underpinnings of these behaviors.

Key Publications

"A cortical-brainstem circuit predicts and governs compulsive alcohol drinking," *Science,* 366 (6468): 1008-1012, 2019

"Dopamine enhances signal-to-noise ratio in cortical-brainstem encoding of aversive stimuli," *Nature,* 563(731):397-401, 2018

"Amphetamine reverses escalated cocaine intake via restoration of dopamine transporter conformation," *Journal of Neuroscience*, 38(2):484-497, 2018

Behavior

Pharmacology

Optical Tools