

2018

Recording neuronal activity using miniscopes

BrainsCAN, Western University

Marco Prado

Sylvian Williams

Vania Prado

Salah El Mestikawy

Follow this and additional works at: <https://ir.lib.uwo.ca/brainscanprojectsummaries>

Part of the [Neurosciences Commons](#)



Recording neuronal activity using miniscopes

Background

Our behaviours are often the result of complex combinations of genetic and environmental factors. Sometimes they can be characterized as action-outcome learning or a goal-directed behavior, where an action results in a reward reinforcing that action. Persistence and repetition of a behavior, particularly when a pattern of rewards becomes more intermittent, encourages more habitual behavior governed by stimulus-response learning, where a trigger prompts the behaviour as a response.

The dorsal striatum, a principle component of the basal ganglia, regulates complex cognitive functions, including selecting the neuronal resources required for goal-directed or habitual control of behavior. Cholinergic interneurons (CINs) influence striatal function by a variety of mechanisms and secrete two distinct neurotransmitters, acetylcholine (ACh) and glutamate (Glu), suggesting the use of co-transmission for neuronal regulation. However, we do not yet fully understand how cognitive outputs can be controlled by regulation of the co-transmission of these neurotransmitters.

The Problem

We would like to understand more about how CINs-dependent co-transmission can regulate the transition from goal-directed behavior to habit formation and how CINs regulate information processing. This work could have wide implications for many compulsion states.

The Project

Our overarching goal is to understand how the striatum can select between competing options to favor goal-directed behaviors or the establishment of habitual control. This will provide fundamental and transformational insights into the regulation of cognitive functions by co-transmission.

We will be optically recording striatal neurons with miniscopes to understand their involvement in cognitive functions, a high-risk and technically demanding critical foundational milestone to this work. Miniscopes enable us to observe neuronal activity while the brain is active. Combining miniscopes with touchscreen technology and behavioural activities has not been reported by any other research group.

Western Researchers

Marco Prado
Sylvian Williams
Vania Prado
Salah El Mestikawy

Funding Program

[BrainsCAN Accelerator Grant: Stimulus](#)

Awarded: \$109,998

Additional BrainsCAN Support

[Rodent Cognition Core](#)
[Imaging Core](#)

Western Faculty, Group or Institution

Robarts Research Institute

Keywords

[Compulsion, miniscopes](#)

Related

None

Share this page

