

Research Profile:

Paul Cocker

Research Project:

Investigating the potential efficacy of Dopamine D4 receptors in alleviating compulsive gambling in Parkinson's disease.

Project Grant: \$30,000 over two years



Project Description:

Grappling with Gambling: The receptor that could hold the key

"We want to develop a model of problem gambling, and then see if we can tailor treatments so we can stop these pathological forms of gambling."

For a small percentage of people with Parkinson's disease, taking dopamine-replacement drugs to treat their stiffness, tremors or rigidity can cause side effects such as impulse control problems resulting in compulsive shopping, gambling or hyper-sexuality. So far, those behaviours have been tough to treat without taking people off medication to control their other symptoms.

At the University of British Columbia, graduate student Paul Cocker investigates the possibility that blocking a particular set of receptors – the portion of a cell that receives signals from chemicals like dopamine – in brain cells might alleviate these troubling behaviours. Cocker, a student in Dr. Catharine Winstanley's lab, uses a rodent slot machine to investigate compulsive gambling. Initially, Cocker and his colleagues administered a medication that mimics the effects of the dopamine-replacement drugs that people with Parkinson's take. When rats are under the influence of that medication, they can't distinguish between winning and losing outcomes. Cocker now plans to give the rats a different kind of compound that blocks dopamine D4 receptors, the receptors that may cause these impulse control problems. If they can alleviate the rats' compulsive gambling behaviour, their data could help other researchers redesign dopamine-replacement drugs to make sure they don't activate the D4 receptors. Alternatively,

pharmacologists who design drugs could develop an additional drug to block those receptors and prevent the problem behaviour. “If we were able to show that problem gambling in this animal model was contingent on this one receptor, that might present a relatively easy fix,” says Cocker.

Receptors, which sit on the surface of cells, are like the locks that brain chemicals like dopamine fit into. Once the receptors receive a signal from dopamine, they initiate activity, which is the reason blocking the D4 receptor might halt the gambling, shopping or hyper-sexuality. Cocker, who has devoted most of his research to decision-making and impulsivity, is fascinated by the role dopamine plays in this behaviour. “If this works, I would want to see dopamine D4 receptor drugs explored as a treatment option,” he says.

Biography:

Paul Cocker completed his undergraduate degree at the University of Sussex in the UK and following a brief stint with a ‘real job’, returned to academia. He began a Master’s in Neuroscience in Dr. Catharine Winstanley’s lab at the University of British Columbia in 2012, before transferring into the PhD program in 2013.

Cocker’s primary research interests lie in the neurobiological basis of pathological gambling. Specifically, he is interested in the iatrogenic gambling that occurs in a small but significant sub-population of individuals with Parkinson’s disease. Using animal models of gambling he aims to mimic this particularly compulsive form of gambling and thereby potentially inform novel treatment options.