

# New ways methamphetamine use can alter the brain

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Crystal methamphetamine. Credit: public domain

(Medical Xpress)—Dr Peter Bosch focused his research on how the brain's natural reward pathways are strongly stimulated following exposure to methamphetamine.

"The [brain reward](#) system is a group of cells that send signals when we do anything rewarding, such as exercising, eating food or [drinking water](#)," he says. "Drugs of addiction—like amphetamines or cocaine—target the reward system, activating that particular part of the brain."

Although New Zealanders are among the highest users of [methamphetamine](#) worldwide, Dr Bosch says the genetic and cellular modifications induced by the drug are not completely understood.

"When it came to putting together my PhD project, I really wanted it to have a New Zealand angle. There's not a huge amount of research on methamphetamine compared to other drugs of abuse, like cocaine."

During his research, Dr Bosch studied many thousands of genes and proteins within the [reward system](#) to identify what was altered following exposure to the highly addictive drug.

"We tried to study as many genes and proteins as we could, and then see what changed the most significantly following methamphetamine. We saw a number of genes and proteins which had previously been associated with the drug, but also ones which hadn't been associated with it before."

Dr Bosch says identifying these previously undescribed genetic and protein changes represents an exciting target for future drug-based therapies in the treatment of addiction, including relapses, which are a major challenge.

"The biggest trouble for researchers is trying to prevent someone from

relapsing, which occurs in 80-90 percent of cases for psycho-stimulant addictions.

"There's something going on in terms of how the brain has responded to the drug, that sets the brain up to relapse at another stage in life. By identifying the genes that have been altered, we can explore possible reasons for why some people are more vulnerable to drug relapses."

Over the past couple of months, Dr Bosch has been putting together projects that Victoria honours and master's students will be able to carry out, furthering the discoveries he has made.

Having completed undergraduate and honours studies at Victoria, Dr Bosch says he had an idea of what was possible in his three and a half year doctorate.

"I collaborated with the School of Psychology, because of the work they've done on addiction, and was also able to use the fantastic equipment we have in the School of Biological Sciences.

"That was the reason I first got started—because I knew I could do everything that I wanted, and that the University had all the expertise within quite a small distance."

Provided by Victoria University

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