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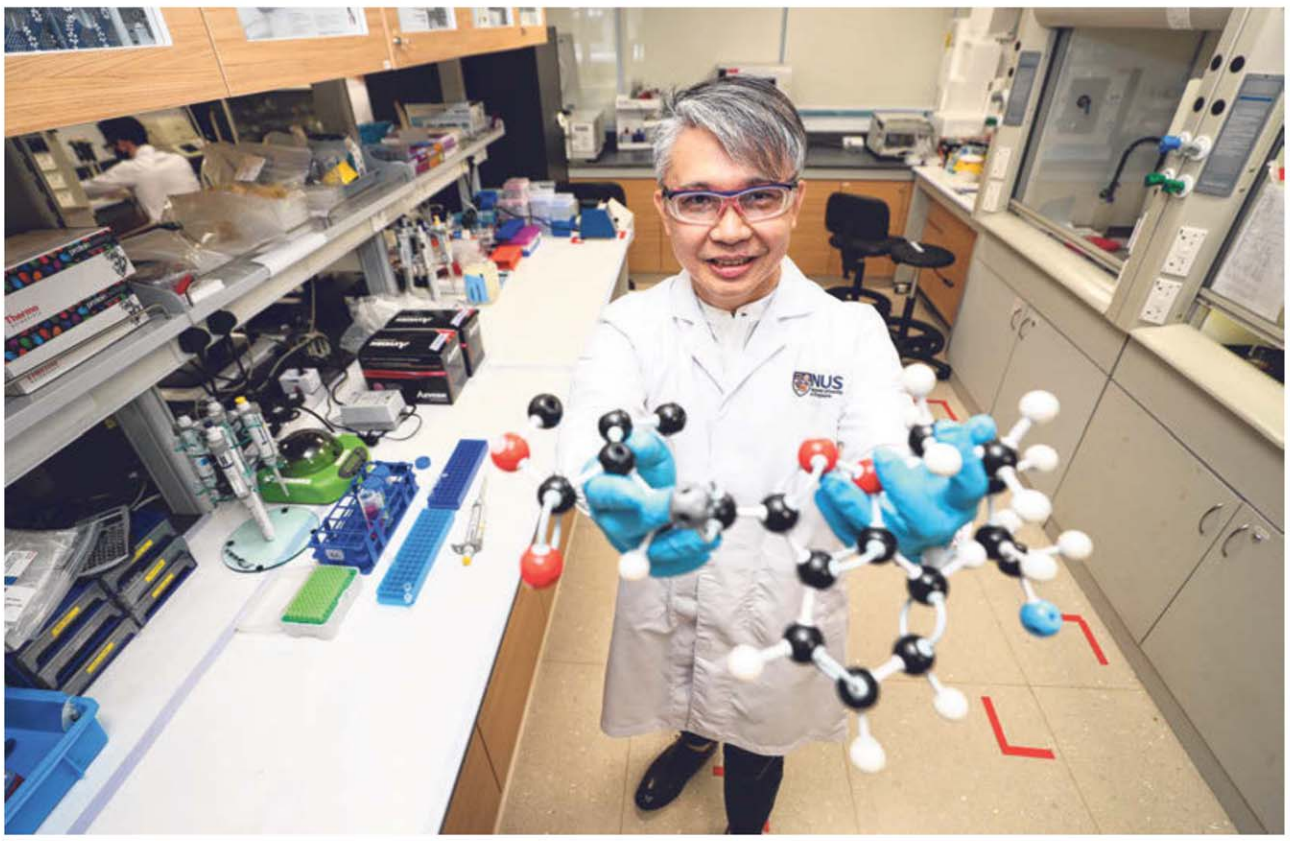
# A new way to detect consumers of illicit drugs

## Knowing how the body reacts to drugs helps identify substances to look for in urine samples



Professor Eric Chan, a pharmaceutical scientist at the National University of Singapore, and his collaborators from the Health Sciences Authority have been able to identify two trending synthetic cannabinoids by using their metabolites as biomarkers when analysing urine samples. ST PHOTO: TIMOTHY DAVID

**The metabolites of 5F-MDMB-PINACA and 4F-MDMB-BINACA have a half-life of 17.5 hours and nine hours respectively, and can still remain in one's body for up to four and two days respectively. As such, when analysing urine samples, the metabolites of both synthetic cannibinoids are taken as biomarkers to detect drug consumption.**

Cheryl Tan

Forensic scientists have long been on the alert to keep pace with new psychoactive substances entering the market, and tracking those who regularly consume them.

Known as NPS, these are designed to mimic the effects of controlled drugs such as cocaine, cannabis, ecstasy and methamphetamine.

Often, the NPS are made from a chemical compound resembling tetrahydrocannabinol, which is an active stimulant in cannabis that gives drug users feelings of euphoria.

One such class of drugs common in the NPS market would be synthetic cannabinoids, which are designed to replicate the effects of cannabis.

Sold under common names such as K2 and Spice, these are often sprayed onto dry plant materials, and are smoked or vaped by the end user.

While tracking down illicit drug manufacturers has long been challenging for the authorities, pinning down those who consume these drugs has proven to be an even greater difficulty.

Professor Eric Chan, a pharmaceutical scientist at the National University of Singapore's Department of Pharmacy, said that illicit chemists are often synthesising variations of NPS, by making minor modifications to each drug to evade detection by the authorities.

"As such, it is important to find out how the body reacts to the consumption of these newly modified drugs, so that when we collect urine samples from people, we know exactly the kind of substances we are looking out for," he said.

Prof Chan and his collaborators from the Health Sciences Authority (HSA) have been investigating the effects of two trending synthetic cannabinoids in the market – known as 5F-MDMB-PINACA and 4F-MDMB-BINACA.

The study findings were published in the Archives of Toxicology journal last November.

When both types of drugs are consumed, they are immediately broken down by an enzyme in the liver known as esterase, which alters the chemical structure of the drug, forming a metabolite.

"What is then excreted in the urine samples are thus metabolites of the original drug. Without this knowledge, scientists may end up looking for traces of the original drug – which may be difficult to find especially after the drug test is taken days after consumption," said Prof Chan.

The metabolites of 5F-MDMB-PINACA drug and 4F-MDMB-BINACA have a half-life of 17.5 hours and nine hours respectively, and can still remain in one's body for up to four and two days respectively.

As such, when analysing urine samples, the metabolites of both synthetic cannibinoids are taken as biomarkers to detect drug consumption.

They are currently being used by the HSA in their test panel to screen for consumption of both types of NPS in urine samples.

Moving forward, Prof Chan and his team are investigating the interactions between three common types of NPS when they are consumed together with alcohol.

He noted that many drug users tend to consume NPS together with alcohol, often in club settings, making it useful to understand the interactions between these drugs and alcohol in the human body.

"Interestingly, in the presence of alcohol, the interaction among ethanol, NPS and the esterase enzyme in one's body may yield a unique metabolite," said Prof Chan, though it is currently unknown if the metabolite has toxic effects on the body.

He hopes that the findings of the study can help to shed insights on the possible ill effects of consuming these substances with alcohol.

tansuwen@sph.com.sg