Study allows for faster narcotics classification of novel internet drugs

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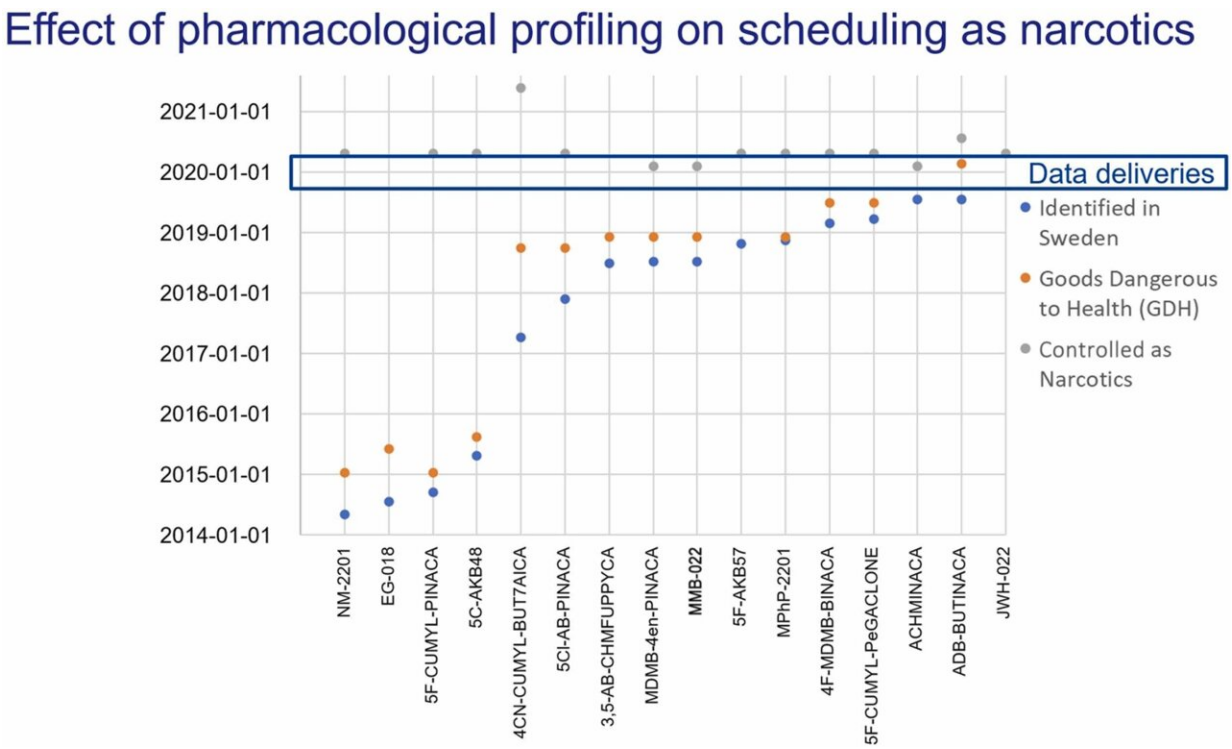

Effect on pharmacology profiling on scheduling in Sweden. Credit: *Forensic Science International* (2023). DOI: 10.1016/j.forsciint.2023.111691

New psychoactive substances (NPS), also known as "internet drugs," are substances developed to affect the brain in a similar way to illegal drugs. Researchers at Linköping University, Sweden, in collaboration with the Public Health Agency of Sweden and the National Board of Forensic

Medicine, have set up a rapid method for measuring the effect of new NPS and provide scientific basis for narcotics classification. This method made it possible to classify a majority of the substances tested as narcotic drugs.

The method and the result of analyses of 17 suspected psychoactive cannabinoid drugs are described in an article published in *Forensic Science International*.

"When new synthetic drugs come on the market, there is often no telling what effects they will have or how much to take," says Henrik Green, professor of Forensic Sciences at the Department of Biomedical and Clinical Sciences at Linköping University and researcher at the National Board of Forensic Medicine.

NPS, "designer drugs" or "legal highs" are new substances that have psychoactive properties affecting the brain. Some 50 such drugs enter Europe every year. Narcotics classification in Sweden is based on the exact chemical structure of each compound. It therefore takes time to classify new variants as illegal. In the meantime, they are easy to get hold of. As possession of these substances during that time is legal, many people erroneously think that they are safe or harmless.

One group of NPS is synthetic cannabinoids.

"Those who use cannabinoids are after euphoria. Sometimes you get the desired effect, but often you also get many unwanted effects, such as hallucinations, nausea, arrhythmia and anxiety," says Henrik Green.

Public agencies in several countries have warned against sweets containing synthetic cannabis, which look identical to normal sweets. Not only is there a risk that children may eat the cannabis sweets by mistake, the strength of synthetic cannabinoids may also vary quite

considerably. According to Swedish Customs, they may be up to 100 times stronger than ordinary cannabis.

"If you know that the sweets contain narcotic drugs, you'll take maybe one or two pieces to get the desired effect. But children rarely stop after a couple of pieces, especially not if they think the sweets are normal sweets, so there's a huge risk of overdosing when drugs are packaged in this way," says Henrik Green.

Narcotics classification by the Public Health Agency requires scientific basis describing the effects of new compounds. There was previously no system for rapid screening for the activity of new psychoactive substances.

As part of a collaboration between the Public Health Agency, the National Board of Forensic Medicine and Linköping University, researchers have set up a method for fast measurement of the effects of new substances. Their article, published in *Forensic Science International*, describes their method and the result of analyses of 17 suspected psychoactive cannabinoid drugs.

Cannabinoid substances are intended to affect the brain by binding to and activating a structure on the cell surface called cannabinoid receptor-1, CB1. The method developed by researchers uses cultured cells with the cannabinoid receptor on the cell surface. The researchers add the substance to be tested and measure if, and how much, the receptor is activated.

By measuring the effects of eight different concentrations of the substance, they can measure the effect in relation to dose. Once the analysis is ready, the information is sent directly to the Public Health Agency. A huge advantage of this procedure is that the Public Health Agency no longer has to wait for data on new substances to be published

in scientific journals.

Fifteen of the 17 substances examined turned out to be able to activate the cannabinoid receptor.

"Fourteen of the substances we tested were quickly classified as narcotics in Sweden. This is very good proactive collaboration that makes a difference in combating drugs, and we researchers are tremendously grateful for being able to contribute to results in society," says Henrik Green.

The method is quick and relatively simple to use. The researchers have further developed the method so as to also measure effects on the cellular systems affected by substances similar to, for example, amphetamine, cocaine, heroin, morphine and fentanyl. The project between the Public Health Agency, the National Board of Forensic Medicine and Linköping University has also led to collaboration with the European Monitoring Center for Drugs and Drug Addiction, EMCDDA, who also want this information for their risk assessments.

More information: Matilda Bäckberg et al, Using in vitro receptor activity studies of synthetic cannabinoids to support the risk assessment of new psychoactive substances—A Swedish strategy to protect public health from harm, *Forensic Science International* (2023). DOI: 10.1016/j.forsciint.2023.111691

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