

Evidence that synthetic drugs can cause cancer

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Almost weekly, a new synthetic psychoactive drug comes onto the market somewhere in Europe that can be ordered legally and easily, for example as an incense blend, via the Internet. Synthetic cannabinoids are difficult to identify chemically and the possible unwanted toxic effects that can occur following their consumption have so far barely been investigated. As part of the international EU project "SPICE II Plus", which is now coming to an end, scientists from the MedUni Vienna's Institute for Cancer Research have now also found evidence that synthetic substances damage the DNA of human cells and can therefore possibly have cancer-causing effects.

Synthetic cannabinoids, similar to tetrahydrocannabinol (the psychoactive ingredient of marijuana), bind to cannabinoid receptors in the human brain, triggering similar neurophysiological effects. These synthetic cannabinoids are marketed in incense mixtures as "legal highs" via the Internet and are "flooding the market", as Siegfried Knasmüller from the Institute for Cancer Research at the MedUni Vienna warns.

"The substances are directly active, in other words they are not activated via enzymes that metabolise foreign substances", explains Knasmüller.

"The respiratory organs and the digestive tract especially are subjected to increased concentrations of these drugs. Our investigations on human cell lines in the laboratory have shown that synthetic cannabinoids, in the high concentrations found in cells in the oral cavity or in the lungs, for example, are likely to trigger damage to the DNA that may have significant consequences for the consumers of such substances. They damage chromosomes, and this is directly associated with cancer."

Effects on consumers cannot be quantified

Synthetic cannabinoids bind very differently and some have an effect even in very small quantities. Consumers have absolutely no information about the varying levels of effect, since they are unaware of the detailed composition of synthetically manufactured drugs. Even with "known" products, the type and quantity of ingredients added change constantly. The risk of an unwanted overdose is correspondingly great. As a result, there have been repeated cases of damage to users' health or poisoning, and in some cases users have even died.

Between 2005 and 2012, the European Union's early warning system registered just under 240 new psychoactive substances that were disguised as incense blends, bath salts or plant fertiliser, and around 140 of them contained synthetic [cannabinoids](#).

SPICE I and SPICE II Plus are international cooperation projects at EU level that have been led by the Institute of Medical Jurisprudence at the University Hospital of Freiburg (Prof. Volker Auwärter) and which have also involved the MedUni Vienna and the Goethe University of Frankfurt, the University of Helsinki, the Institute of Therapy Research in Munich, as well as input from partners such as the Federal Criminal Office of Wiesbaden.

More information: "Toxicological profiles of selected synthetic cannabinoids showing high binding affinities to the cannabinoid receptor subtype CB₁." *Arch Toxicol.* 2013 Jul;87(7):1287-97. [DOI: 10.1007/s00204-013-1029-1](https://doi.org/10.1007/s00204-013-1029-1)

Provided by Medical University of Vienna

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