

JWH-018

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Background

JWH-018 is a potent synthetic cannabinoid. Its chemical name is 1-pentyl-3-(1-naphthoyl) indole but it is also known by other names, including Relaxinol and Jawa. In Finland, it is known as Jehova or Jehowa. First developed in the 1990s, JWH-018 is intended for [research purposes](#) only. It was created in an effort to develop a better understanding of the human endocannabinoid system and to discover cannabinoid receptor antagonists that would lack the undesired intoxicating effects that currently limit therapeutic usage. The letters JWH come from the name of Professor John W Huffman, the scientist who first synthesised the substance. Several other JWH molecules have since been created, including JWH-073, JWH-122 and JWH-201. The numbers refer to their different molecular structures.

By the late 2000s, JWH-018 had become one of the key active ingredients in the so-called [Spice substances](#). This increased the popularity of JWH-018 around the world, but as legislation was tightened in Germany and other countries, the Spice manufacturers replaced the substance with another, for the moment legal, cannabinoid derivative. By selling cannabinoid derivatives, the manufacturers hoped to circumvent legislation on illicit drugs. This why Spice substances containing JWH-018 are marketed as incense although in reality they are mainly used as recreational drugs. Users may find it easier to order and use a "legal" chemical than to buy illicit narcotics like cannabis. In Finland, JWH preparations ordered from abroad are classed as medicines under the Medicine Act and importing them without a licence is illegal. Many countries, including Sweden, Estonia, France and the United States, have already moved to ban JWH-018.

Cannabinoid receptors in brief

There are at least two different types of cannabinoid receptors. Subtype 1, known as CB1, is expressed mainly in the central nervous system but also elsewhere. Substances that bind to the CB1 receptors can activate other receptors, which can cause a variety of different effects in the body. These include elevated mood, but also slowness, nervousness and panic. The effects may also have an impact on memory, the perception of time, temperature control, perception of pain, sight and hearing as well as appetite. The cannabinoid receptor subtype 2, known as CB2, is expressed mainly in the cells responsible for mounting the immune response and also in the central nervous system. CB2 receptors contribute to the control of inflammation and pain, but also have other effects. There is ongoing active research into cannabinoid receptors and medicines that regulate them.

Mechanism of action

JWH-018 binds to both the CB1 and CB2 receptors. The effects of JWH-018 are primarily attributable to the binding and activation of CB1 receptors. In practice, the compound suppresses the release of neurotransmitters in the central nervous system, which explains the multitude of effects. Spice substances often contain other active ingredients leaving the exact mechanism of action of JWH-018 unclear for the time being. JWH-018 is stronger than THC or tetrahydrocannabinol, the key active ingredient in cannabis. A small dose is sufficient to induce an intoxicating effect. JWH-018 binds the CB1 receptor four times more tightly and the CB2 receptor ten times more tightly than THC.

Administration, effects and side effects

Like cannabis, JWH-018 is smoked but can also be taken orally. Pure JWH-018 is a light coloured or yellowish powdery substance that may take on a darker brownish tinge over time. The effects of JWH-018 are similar to those of [cannabis](#). Desirable effects include a feeling of well-being, relaxation, heightened sensory experiences and a "high".

When smoked, the onset of effect is extremely rapid – usually a matter of minutes. Taken orally, the effects are delayed by up to 1-2 hours or even longer. Taken orally but dissolved into liquid the effects are faster, commencing after roughly one hour.

A common dose, when smoked, is usually a few milligrams, often 1 to 5 milligrams of pure JWH-018. Oral doses are slightly higher, ranging from 3 to 20 milligrams. The oral effects last for considerably longer than when smoked. Users have reported periods of 2 to 4 hours. Traces of JWH-018 may be found in blood samples up to a day or two later. Tests

on animals have indicated a half-life of some two hours.*

Side effects can develop rapidly after smoking and are similar to those of cannabis. The onset of side effects is slower when JWH-018 is consumed orally and the total effect may be milder. Side effects include anxiety, panic attacks, hypertension and palpitations. It may be difficult to think clearly and users may be left feeling indifferent. JWH-018 can also cause paranoia, memory loss and hallucinations, bloodshot eyes and dryness in the mouth. Users have also described other effects, including increased appetite. Some mild side effects may occur the day after consumption.

JWH-018 is known to cause both mental and physical addiction and withdrawal symptoms. However, little data is currently available on its toxicity. It appears that tolerance can build quickly, leading to increased doses. Susceptibility is regained after a break. The withdrawal symptoms resulting from persistent use may last for days or even a week. They are similar to cannabis addiction and usually appear within 24 hours after the last cessation. Symptoms include sweating, anxiety, nightmares, disturbances in sleep, nausea, tremors, diarrhoea and headaches. Further possible symptoms include muscle twitching, a sensation of pins and needles and loss of sensation in limbs. Persistent use can be particularly harmful if the user has an underlying mental health condition. As cannabis can induce temporary psychotic episodes and increase the risk of permanent conditions such as schizophrenia,** similar effects are possible with JWH-018. Many users have reported severe and undesired effects on their mood.

Risks

Little research has been carried out into the effects of recreational synthetic cannabinoid derivative use on animals and humans. Studies investigating JWH-018, for example, have tended to be small-scale. The personal experiences of individual users found on online forums can be useful as indicators of wider trends but cannot be considered a reliable source of information. There is not sufficient evidence available on the long-term effects of these derivatives. JWH-018 is known to convert to a number of different metabolites in the body and their effects on humans are not known. JWH-018 is also thought to suppress certain enzymes, which may have an impact on the efficacy of certain medicines.* JWH-018 is a fat-soluble compound, which may be stored in adipose tissue following persistent use. However, tests on animals have not shown any evidence of this.*

It should be noted that cannabis contains more than 90 different cannabinoids. Some of these block THC and may offer protection from some of the side effects of cannabis. Pure JWH-018 lacks this "protection". JWH-018 can fully activate CB1 and CB2 receptors, which leads to a more powerful effect. If the Spice substances containing JWH-018 also include other active ingredients, the overall effect is made even more potent.

JWH-018 is stronger and more dangerous than cannabis and carries a significant risk of overdose. Users' own experiences support this claim. Experienced cannabis users may misjudge their dose of JWH-018 or Spice, causing them to overdose. The manufacturers may not provide complete details of what is contained in the products and JWH-018 may still be found around the world. There is also significant variation in the concentrations found in Spice products. Synthetic cannabinoids represent an especially high risk to young users in particular, as their bodies are not yet fully developed. Concomitant use with alcohol and other illicit drugs should be avoided. A number of Finnish young people were admitted to hospital in spring 2011 following JWH-018 use. No deaths directly attributed to JWH-018 alone have been reported. Animal studies suggest that extremely high doses may lead to respiratory depression, which can prove fatal.*

If JWH-018 is used for recreational purposes, doses should be kept small to reduce the risk of overdose. In addition, users should leave sufficient time to allow the effects to occur before taking another dose. Many users have reported taking subsequent doses too quickly, resulting in an overdose. In case of overdose, symptomatic treatment should be administered. The symptoms should pass with time. However, if they are unusually strong or persistent, emergency medical treatment should be sought.

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** A seemingly high-quality rat study has been made available online but details of the sponsor or investigator have been omitted. The study is claimed to have been carried out in the Netherlands in 2008 but the findings have not been published in any scientific journal. Only unofficial "raw data" is available. In the absence of other data, data from this "study" has been included in this article. However, the information should be treated with extreme caution.*

*** The role of cannabis as a cause of schizophrenia (cf. increasing the risk of schizophrenia) is a highly contentious issue. This article does not address the matter in any detail.*

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