

Cannabidiol, a non-intoxicating component of cannabis, suppresses nausea and vomiting in rats and shrews

What is this research about?

The cannabis plant and related medicinal products have been used for centuries to suppress nausea and vomiting. Several chemical components of cannabis have been linked to these effects, including delta-9 THC and cannabidiol (CBD). Delta-9 THC is the main psychoactive (intoxicant) component of cannabis, while CBD is a non-intoxicant component. Some research has shown that CBD may be able to reduce inflammation and treat anxiety, depression, and addiction – although CBD’s therapeutic potential is still being investigated. CBD can also act as an antioxidant, which may potentially prevent damage from cerebral ischemia (a stroke caused by lack of blood flow to the brain). It is believed that the protective and anti-nausea/anti-vomiting effects of CBD are caused by its attaching to certain chemical receptors in a part of the brain called the dorsal raphe nucleus (DRN). These receptors, called 5-HT_{1A} receptors, normally bind to serotonin (a chemical produced naturally by the brain), which regulates many body functions, including appetite, nausea, and mood. Like serotonin, CBD is thought to “activate” 5-HT_{1A} receptors, which may explain CBD’s ability to suppress nausea and vomiting.

What did the researchers do?

The ability of CBD to prevent vomiting (in shrews) or nausea (in rats) was measured by administering CBD to house musk shrews by systemic injection or to rats either by systemic injection or directly into the DRN region of the brain. Shrews received CBD alone or CBD along with a chemical known to inactivate the 5-HT_{1A} receptors. Following injection with one of three chemicals known to cause vomiting (lithium chloride, cisplatin, or nicotine), the researchers counted the number of vomiting episodes. A similar procedure was also carried out in rats, to see if CBD could prevent the establishment of lithium-induced conditioned gaping (an open mouth behaviour associated with nausea in rats), and if this effect was prevented by blocking the receptors. The researchers also measured the ability of different doses of CBD to attach to (and activate) 5-HT_{1A} receptors in rat brainstems.

What you need to know:

Cannabidiol suppressed drug-induced vomiting in shrews and nausea-associated behaviours in rats. This effect was reversed, however, if the rodents were also given chemicals that blocked serotonin receptors in a part of the brainstem. Cannabidiol may help naturally produced serotonin activate these receptors more effectively.

What did the researchers find?

In shrews, CBD suppressed vomiting caused by nicotine, lithium chloride, and lower doses of cisplatin. In rats given lithium chloride, CBD also suppressed the gaping reaction associated with nausea. The anti-nausea and anti-vomiting effects of CBD were reversed, however, if the rats or shrews also received chemicals that inactivated the 5-HT_{1A} receptors, indicating the importance of the receptors. The researchers also found that CBD may work by helping the serotonin naturally produced by the body attach more effectively to the 5-HT_{1A} receptors.

How can you use this research?

Pharmaceutical developers can use this research to understand how cannabidiol and similar chemicals may be used to suppress nausea and vomiting.

Oncologists and other physicians can use this research to understand how cannabis, and cannabidiol in particular, may help address the nausea and vomiting caused by chemotherapy and other drug treatments. This research suggests that the non-intoxicating compound, cannabidiol, found in cannabis may be an effective alternative to the intoxicating compound, THC, which is available as an approved treatment for nausea and vomiting in Canada.

Keywords:

Cannabis, cannabidiol, nausea, vomiting, serotonin receptors, rats, shrews

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