

Could cannabis-derived medicine help type 2 diabetes sufferers?

June 19 2012



In an article published in today's issue of the Society of Biology's magazine, *The Biologist*, GW Pharmaceuticals' Director of Botanical Research and Cultivation, Dr David Potter, discusses how cannabis could be bred to provide raw starting material for a medicine to treat metabolic disorders.

Researchers at the UK's only legal [cannabis](#) production facility are researching ways to use highly-standardised extracts from the plant to tackle metabolic syndrome, and are studying how such products could potentially treat conditions as diverse as cancer pain, epilepsy, ulcerative colitis, psychosis and brain injury. GW Pharmaceuticals' first licensed medicine, Sativex, is already used to treat muscle spasticity in MS patients and primarily contains two principal cannabinoids: THC and

CBD. But the medical potential of the remaining, minor cannabinoids is also huge.

Dr Potter says: “Metabolic syndrome is a disruption of the way the body metabolises food to produce energy or to store as fat. It is most common in obese people and can lead to major health problems such as Type II diabetes.”

Obesity, with all its effects on human health, is widespread. The GW Pharmaceuticals team is exploring how they can use cannabis-derived medicines to tackle one aspect of the problem. Phase IIa clinical studies are evaluating specific cannabinoids as potential treatments for metabolic syndrome and Type II diabetes. This builds upon pre-clinical data demonstrating the desirable effects of a number of cannabinoids on insulin resistance, cholesterol and liver fat, all features of metabolic disease.

Dr Potter’s team has successfully bred cannabis plants which produce high levels of a cannabinoid called THCv (delta-9-tetrahydrocannabivarin). THCv is normally only present in minor quantities; its structure is similar to THC but it exhibits very different pharmacology. It has shown promise as a potential treatment for Type II diabetes by virtue of controlling and modulating a range of factors involved in lipid deposition, cellular energy expenditure and insulin resistance - the key pathophysiological features of metabolic syndrome.

Dr Mark Downs, Chief Executive of the Society of Biology, says:

“Metabolic syndrome, and the health problems it leads to, is a huge strain on the NHS, and can massively reduce the quality of life of those affected. It is always exciting to see new avenues being explored to tackle the issue.”

There are many potential therapies for [metabolic syndrome](#) and the other conditions highlighted, and the therapeutic use of compounds found in the cannabis plant is one of the various promising routes for new treatments.

Minor cannabinoids

GW's licensed medicine, Sativex, primarily contains the two most common cannabinoids, tetrahydrocannabinol (THC) and cannabidiol (CBD). It is currently prescribed to MS sufferers and is currently undergoing Phase III trials for the treatment of pain in the advanced stages of cancer.

Although THC and CBD are the most well-known cannabinoids and appear at the highest concentrations, there are nearly 60 less common cannabinoids (such as THCV) and GW has studied approximately 20 of these.

One of the technical challenges of studying these minor cannabinoids is to breed cannabis plants with high concentrations of the cannabinoid of interest.

Dr Potter says: "My team's task is to run a selective breeding programme for minor cannabinoids which have been identified as having clinical potential. Thankfully cannabis has a fast growing cycle, with several crops per year. This means we can often produce suitable plants within a few years or even less."

Epilepsy and brain injury

Compounds developed by GW have shown promise in the treatment of epilepsy, and the company has recently discovered that cannabinoids are

able to reduce the expression of certain epilepsy-related genes. This opens up an exciting possibility of using cannabinoids as personalised epilepsy medicines; patients most likely to respond can be identified by the presence of a specific gene.

Dr Potter points out that modern ‘skunk’ cannabis has been bred by recreational users to increase the concentration of THC while decreasing the concentration of CBD. Whereas THC has been linked to psychosis, CBD has anti-psychotic properties, so may provide some protection from the effects of THC. The lack of CBD in skunk potentially makes this form of cannabis more likely to induce harmful psychoses, especially in young teenagers whose brains are not yet fully developed.

GW Pharmaceuticals is also testing the use of medicines based on CBD for the treatment of psychiatric disorders. Encouraging in vivo studies suggest that, because of its anti-inflammatory properties, CBD could also be useful in treating brain injury, both in accident victims and newborns starved of oxygen at birth.

Dr Potter says: “As rigorous modern research with cannabinoids comes to fruition, a new era of treatment options may have arrived.”

Provided by Society of Biology

Citation: Could cannabis-derived medicine help type 2 diabetes sufferers? (2012, June 19) retrieved 17 July 2024 from <https://medicalxpress.com/news/2012-06-cannabis-derived-medicine-diabetes.html>

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