Scientists separate medical benefits of cannabis from unwanted side effects

July 9 2015

Scientists at the University of East Anglia in collaboration with the University Pompeu Fabra in Barcelona have found a way to separate the medical benefits of cannabis from its unwanted side effects.

The research comes from the team that discovered how the main psychoactive ingredient in cannabis, known as THC, reduces tumour growth in cancer patients.

Their latest findings, published today in the journal *PLOS Biology*, reveal how the cognitive effects of THC are triggered by a pathway which is separate from some of its other effects.

That pathway involves both a cannabinoid receptor and a serotonin receptor. When it is blocked, THC can still exert several beneficial

effects - including pain relief - while avoiding impairment of memory.

The research was carried out in mice, but it is hoped that the breakthrough will pave the way for safe cannabis-based therapies that do not cause alterations in mood, perception or memory.

Dr Peter McCormick, from UEA's school of Pharmacy, said: "THC, the major active component of marijuana, has broad medical use - including for pain relief, nausea and anxiety. Our previous research has also found that it could reduce tumour size in cancer patients. However it is also known to induce numerous undesirable side effects such as memory impairment, anxiety and dependence.

"There has been a great deal of medical interest in understanding the molecular mechanisms at work in THC, so that the beneficial effects can be harnessed without the side-effects.

"THC acts through a family of cell receptors called cannabinoid receptors. Our previous research revealed which of these receptors are responsible for the anti-tumour effects of THC. This new research demonstrates how some of the drug's beneficial effects can be separated from its unwanted side effects."

The research team carried out behavioural studies in mice and investigated how pathways in their brains operate under THC. They found that the absence of a particular serotonin receptor (5HT2AR) reduced some of the effects of THC - such as its amnesic effect, based on a standard memory test. But treatment to reduce 5HT2AR did not change other effects of THC, including pain relief.

"This research is important because it identifies a way to reduce some of what, in medical treatment, are usually thought of as THC's unwanted side effects, while maintaining several important benefits including pain

reduction."

But Dr McCormick added that patients should not be tempted to self-medicate.

"Patients should not use cannabis to self-medicate, but I hope that our research will lead to a safe synthetic equivalent being available in the future."

More information: 'Cognitive impairment induced by delta9-tetrahydrocannabinol occurs through heteromers between cannabinoid CB1 and serotonin 5-HT2A receptors' is published in the journal *PLOS Biology* on Thursday, July 9, 2015.

Provided by University of East Anglia