Medical Xpress

Drugs related to cannabis have pain-relieving potential for osteoarthritis

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Chemical compounds synthesised in the laboratory, similar to those found in cannabis, could be developed as potential drugs to reduce the pain of osteoarthritis.

These compounds could also reduce joint inflammation, according to new research carried out at the Arthritis Research UK Pain Centre at The University of Nottingham.

Cannabis contains a number of natural chemicals called cannabinoids and the brain has the ability to respond to such compounds. Cannabis and synthetically manufactured cannabinoid compounds can relieve pain in animal models of arthritis, but their use has been limited because of undesirable psychological side-effects.

Now a team of researchers led by Professor Victoria Chapman at the Arthritis Research UK Pain Centre at The University of Nottingham have shown that selectively targeting one of the molecules involved in the body's natural pain-sensing pathways, called cannabinoid receptor2 (CB2) can also reduce pain in animal models of osteoarthritis. This works in part through the central nervous system (spinal cord and brain). The compound used in this study, called JWH133, is a synthetic cannabinoid molecule manufactured in a laboratory and is not derived from the cannabis plant.

When the research was extended to humans, studies of the human spinal cord tissue showed for the first time the presence of this receptor and,

interestingly, that the amount of receptor was related to the severity of the osteoarthritis. This provides evidence from patients that this drug target may have clinical relevance to osteoarthritis pain.

Cannabinoids are known to have anti-inflammatory effects, and the team have demonstrated that JWH133 reduced the levels of inflammation in their studies of osteoarthritis. Thus, cannabinoid CB2 targeted drugs may have a dual beneficial effect for people with osteoarthritis by providing pain relief as well as reducing inflammation in the joint.

Their findings are published online in the journal *PLOS One*.

Victoria Chapman, Professor of Neuropharmacology, said: "This finding is significant, as spinal and brain pain signalling pathways are known to make a major contribution to pain associated with osteoarthritis. These new data support the further evaluation of the selective cannabinoid-based interventions for the treatment of osteoarthritis pain."

Professor Alan Silman, medical director of Arthritis Research UK, added: "Millions of people are living with the severe, debilitating pain caused by osteoarthritis, and better pain relief is urgently needed. This research does not support the use of recreational cannabis use. What it does suggest is that there is potential to develop a synthetic drug that mimics the behaviour of cannabinoid receptors without causing serious side effects."

Osteoarthritis affects eight million people the UK and occurs when the cartilage at the ends of bones wears away, causing joint pain and stiffness, and is a major cause of pain and disability. Current treatment is limited to pain relief, exercise, physiotherapy weight-loss and joint replacement. There are currently no drugs that slow down its progression, and more effective treatment is urgently needed.

More information: "Cannabinoid CB2 Receptors Regulate Central Sensitization and Pain Responses Associated with Osteoarthritis of the Knee Joint," James J. Burston, Devi Rani Sagar, Pin Shao, Mingfeng Bai, Emma King, Louis Brailsford, Jenna M Turner, Gareth J Hathaway, Andrew J Bennett, David A Walsh, David A Kendall, Aron Lichtman, Victoria Chapman. Published: November 25, 2013. *PLOS ONE*, DOI: 10.1371/journal.pone.0080440