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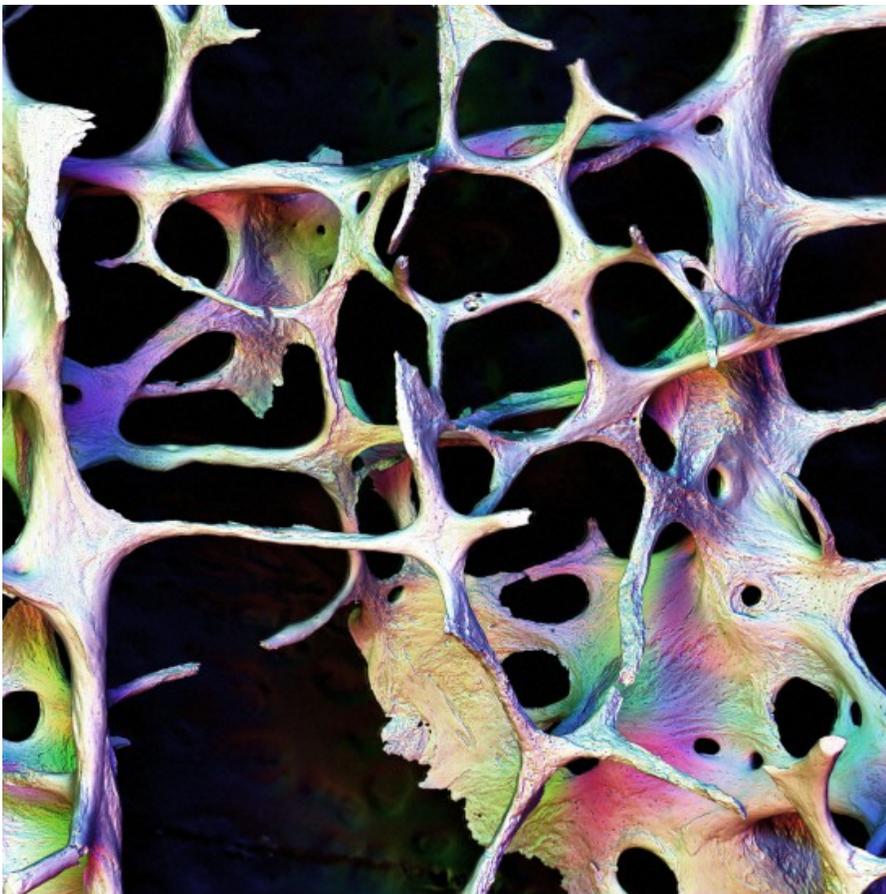
EXTRACT



Marijuana and bone health: Cannabis might be the next big thing in osteoporosis treatment

Emily Gray Brosious

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Wellcome Images

Scanning electron micrograph of osteoporotic bone shows the 4th lumbar vertebra of an 89 year old woman with osteoporosis showing very thin, and some fractured trabeculae. (Image credit: Professor Alan Boyde/Wellcome Images via Flickr cc)

Cannabis-based osteoporosis drugs gain viability as public fear mounts over potential side effects of standard treatments.

Given its diverse pool of user effects ranging from “the munchies” to pain relief and seizure reduction, it’s safe to say cannabis does many things. But one of the somewhat lesser-known benefits of cannabis is its effect on bone health.

Studies show cannabinoids help prevent bone loss and regenerate new bone growth. That should come as welcome news to the millions of Americans currently living with osteoporosis.

Cannabis-based osteoporosis and bone-health treatment is so promising, in fact, that one pharmaceutical company has decided to focus entirely on this area of medical research.

“We’re the only company that I’m aware of that’s focused on this set of indications,” Seth Yakatan, CEO and co-founder of Kalytera Therapeutics, told Extract. “We are approaching this from a very specific viewpoint, and we think that we can really help people.”

Osteoporosis is a bone disease that occurs when the body loses bone mass and cannot produce enough new bone to replace what is lost. Osteoporotic bones weaken as they lose density and can break much easier than healthy bones. In serious cases, bones may become so brittle that they break from a simple sneeze or minor bump.

According to the National Osteoporosis Foundation, roughly one in two women and up to one in four men ages 50 and older will break a bone due to osteoporosis.

Approximately 54 million Americans are currently living with osteoporosis and low bone mass. And that number is likely to increase as baby boomers move into retirement and the overall US population ages.

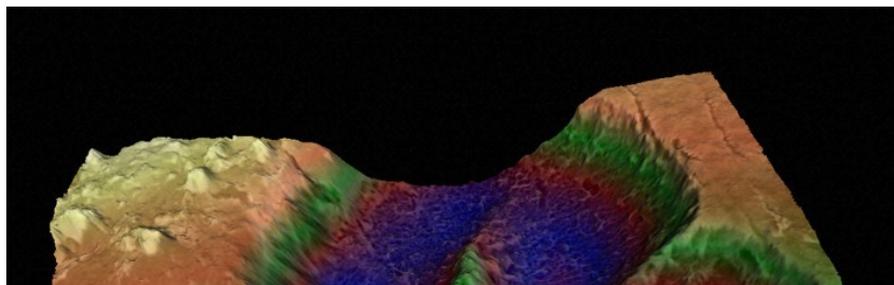
Current medications specifically approved for osteoporosis by the United States Food and Drug Administration fall into two groups: antiresorptives and anabolics.

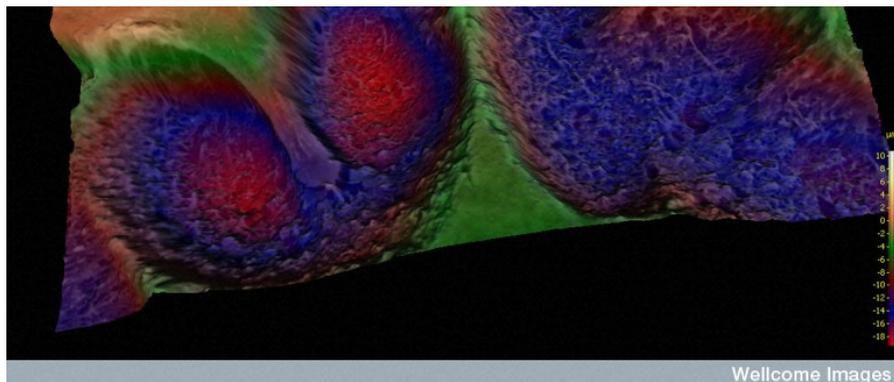
Antiresorptives help limit bone loss by reducing the speed at which osteoclasts (cells that absorb bone) absorb bone in the body. Anabolics help remodel bone tissue and restore lost bone mass.

Research shows these drug types are largely effective for osteoporosis treatment, but extremely rare side effects, including reports of rotting jaw bones and snapping thigh bones, have pushed standard osteoporosis drug options out of favor with many patients, as health reporter Gina Kolata detailed in a recent New York Times article.

Millions of Americans are too frightened of potential side effects to take these drugs, and instead, are simply opting to live and suffer with osteoporosis.

That’s where cannabis comes into the picture.





This image shows a 3D model of the pit caused by the reabsorption of bone by mouse osteoclast cells. There are two types of cells that work together in the formation of bone tissue: osteoblasts and osteoclast cells. The latter actively reabsorbs old or fatigued bone and the osteoblast cells replace it with new bone. If osteoclast cells reabsorb bone faster than the osteoblast cells can produce it, osteoporosis may occur. (Image credit: Kevin MacKenzie, University of Aberdeen/Wellcome Images via Flickr cc)

A large body of research links cannabinoids with bone health, including a 2009 Israeli study published in the *Annals of Medicine* that found marijuana compounds can even reverse bone loss.

Bone Laboratory researchers at the Hebrew University of Jerusalem determined that compounds in marijuana activate the body's CB2 cannabinoid receptor, which effectively stimulates bone growth and inhibits bone loss. Additionally, CB2 receptors are not associated with psychoactive effects of cannabis.

"It appears that the main physiologic involvement of CB2 is associated with maintaining bone remodeling at balance, thus protecting the skeleton against age-related bone loss," authors write.

"Taken together, the reports on cannabinoid receptors in mice and humans pave the way for the development of diagnostic measures to identify osteoporosis-susceptible polymorphisms in CNR2, and cannabinoid drugs to combat osteoporosis."

Kalytera's cannabis-based therapies aim to do just that.

"It appears that we have a nice early drug signal for osteoporosis that could be compelling," Yakatan said. "Our compounds not only inhibit bone loss, but also allow new bone to grow."

Unlike other existing osteoporosis drugs, Kalytera's cannabinoid-based therapy has shown no toxicity and no side effects in relevant animal models, he says.

Yakatan founded Kalytera in 2014. The company's research and development primarily focuses on nonpsychoactive synthetic cannabinoid therapies for bone health.

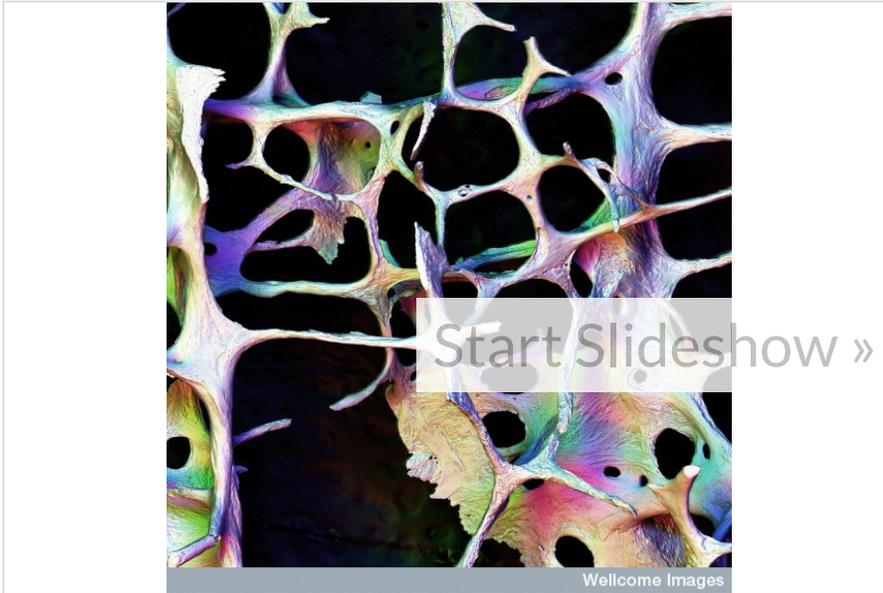
Why use synthetic cannabinoids rather than naturally occurring cannabis compounds? Aside from various patentability concerns associated with plant-based drugs, naturally occurring cannabis compounds are illegal under federal law. All marijuana is. Alternately, synthetic cannabis molecules are far more likely to gain FDA approval, Yakatan says.

"Medical cannabis very clearly has an effect on patients, but it's not an effect that's been proven under the set of requirements the FDA and US regulatory bodies demand," he explains. "Synthetic cannabinoids also affect patients — anecdotally, maybe not as well as natural occurring cannabinoids do — but because they are synthetic, researchers have been able to prove their effects. They've been proven in research studies and large trials, because the federal government has allowed that to happen with synthetic cannabinoids."

Yakatan hopes to get FDA approval for Kalytera's cannabinoid-based osteoporosis therapy sometime next year. The company is seeking to gain orphan designation for its product, which would allow it to fast track some regulatory processes and potentially hit the market by 2019, at the earliest.

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