

GenBio Aims to Address Bone Loss and Repair

Osteoporosis affects approximately 6.3% of men over the age of 50 and 21.2% of women over the same age range globally

ALISO VIEJO, CA, UNITED STATES, May 27, 2025 /EINPresswire.com/ --Increasing Bone Repair

Healthy humans undergo continual bone remodeling, which requires the removal of old bone by osteoclasts and formation of new bone by osteoblasts, with about 10% of the human adult the skeleton is being replaced each year.



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You can't help getting older, but you don't have to get old."

George Burns

acids and hydrogen sulfide.

An attractive hypothesis links the regulation of bone

the immune system, endocrine system, and microbial

remodeling to the gut microbiome through

metabolites such as short-chain fatty

Overgrowth of pathogenic bacteria in the gut may lead to

increased toxic metabolites in the circulation, such as the pro-inflammatory cytokines. These Gut microbiome changes may then lead to chronic debilitating disorders of bone function and repair, including <u>osteoarthritis</u>, most notable for degradation of the articular cartilage and synovial membrane inflammation, causing pain and loss of function, and <u>osteoporosis</u> including decreased bone density and quality, which increases the risk of fracture.

Regulation of osteoclasts and osteoblasts is recognized as an effective therapeutic mechanism in disorders of bone remodeling. Anthocyanins such as cyanidin glucoside from purple fruits, including the Queen Garnet and Davidson's plums, may improve bone regeneration by mechanisms such as antioxidant and anti-inflammatory actions and by regulating the gut microbiome. Most studies have used isolated cells or animal models to study the effect of anthocyanins on bone repair, but some human studies have supported

these effects.

Anthocyanin-containing fruits have shown promise in reducing the symptoms of arthritis in

animal models. In mice made osteoarthritic by destabilizing the medial meniscus, cyanidin (50 mg/kg/day for 8 weeks) was protective by regulating the Sirt6/NF-ĸB signaling

axis. Further, cyanidin suppressed interleukin-1β-induced inflammatory changes in human

chondrocytes.

Anthocyanins from purple corn showed antiinflammatory effects on AGE-induced human

articular chondrocytes by inactivation of the NF-κB and MAPK signaling pathways.

Davidson's plum, containing cyanidin 3glucoside (8 mg/kg/day) reduced obesityinduced

degeneration of knee cartilage in rats with diet-induced metabolic syndrome. In osteoporosis, bone regeneration may be stimulated by anthocyanins by stimulating bone

formation and inhibiting bone resorption; examples include peonidin 3-glucoside and cyanidin.

Anthocyanins may also alter bone remodeling in osteoporosis by epigenetic regulation of

osteoblast differentiation and apoptosis, and bone mineralization. Further, purple corn

anthocyanins and protocatechuic acid

produced anti-inflammatory effects on advanced

glycation end-products in human articular chondrocytes by inactivation of the NF-κb and MAPK signaling pathways.

The gut microbiota may alter bone metabolism and absorption, and so changes in the Microbiota may be a potential intervention to improve osteoporosis. Treatment options for osteoarthritis and osteoporosis may then include altering bone formation and removal, decreasing inflammation and reversing gut microbiota changes with anthocyanins. Are these



Normal Bone

Bone with Osteoporc



Professor Lindsay Brown

mechanisms useful for bone remodeling in humans? In a small, randomized crossover trial in 14 postmenopausal women, moderate consumption of blueberries increased net bone calcium retention which should decrease long-term bone loss. Clearly, larger patient cohorts and longer interventions are needed to thoroughly assess both efficacy and safety.

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