

Osteoporosis' effect on astronauts

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By Wendy Haaf



Dr. Angela Cheung

Krembil researchers are helping NASA come up with better bone strength guidelines

DR. ANGELA CHEUNG isn't just a renowned osteoporosis researcher; you might say her expertise is out of this world. She and her team pioneered research to better understand how various factors affect bone health, which then helped NASA create guidelines for more accurately measuring bone strength in astronauts. The space agency wants to ensure the bone loss that occurs in space flight doesn't place them at risk of potentially dangerous fractures after returning to Earth. A hip fracture, for instance, can lead to permanent disability, including arthritis, and the need for long-term care.

A living tissue, bone is continually being remodelled by two teams of cells: osteoclasts, which tear it down, and osteoblasts, which rebuild it. If the "demolition crew" outpaces the "bricklayers," bone becomes weak, which is what happens in osteoporosis. (Weight-bearing exercise, like walking, prods the bricklayers to keep working, which is why low gravity causes bone loss.)

Typically, doctors use what's called dual X-ray absorptiometry to measure bone density, but it can't "see" whether the framework inside the bone is sturdy or spindly; soundly or shoddily constructed. However, high-resolution peripheral quantitative computer tomography (HR pQCT), which uses low-dose CT and sophisticated software, can provide information about a bone's structure, says Dr. Cheung.

Scanning may be a better way to evaluate astronauts, as you need both bone structure and mineral content to determine bone strength, she says. HR pQCT is sensitive enough to monitor whether bone loss treatments, such as medication, work in space flight.

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