

Isotopic Biomarkers for Rapid Assessment of Bone Mineral Balance in Biomedical Applications

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Technology description

Loss of bone mineral content leads to a variety of significant medical problems including osteoporosis. Development of new treatments for metabolic bone disease as well as evaluation of the efficacy of current treatments is severely hampered by the lack of a reliable tool for quickly measuring changes in bone mineral balance (BMB). Methods to sensitively measure BMB could tremendously benefit research and clinical practice in the study and treatment of bone disease.

Researchers at Arizona State University have developed a novel technique that utilizes tracer-less calcium isotopes to measure net bone mineral balance. This technique analyzes changes in the natural isotope composition of calcium in blood and urine resulting from the balance of bone formation vs. resorption. Utilizing mass spectrometry, changes in bone mineral balance may be revealed with unprecedented speed and detail. Measurement of a complimentary strontium isotope biomarker provides, with equal rapidity, information on the speed of exchange of calcium between soft tissue and mineralized compartments.

Ca isotope analysis provides a powerful means to monitor bone loss and therapeutic efficacy of treatments. Moreover, it may allow for new and quicker diagnoses of metabolic bone diseases in a safe and rapid manner.

Application area

Bone mineral balance research

Early detection of bone disease

Assessment of effectiveness of current treatments

Accelerate the pace of discovery of new treatments for metabolic bone disease

Advantages

Early detection - long before bone damage occurs

Rapid results

High level of detail

Safe – only uses blood or urine

Institution

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