



Application of Calcium Isotope Analysis to the Early Detection of Bone Lesions or Metastatic Cancer

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Intellectual Property

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Invention Description

Cancer originating in or metastasizing to the bone may alter a person's skeletal bone mineral balance (BMB), causing either a net gain or loss in bone mass. Moreover, treatments for both bone and non-bone related cancers may also have adverse effects on BMB. Researchers at ASU previously developed a method to measure short term changes in BMB using analysis of natural calcium (Ca) isotope variations, but, it was only envisioned for osteoporosis applications. Applying this Ca isotope technique to detect tumors, bone lesions and/or monitor BMB response to cancer treatments, could tremendously benefit research and clinical practice in the study and treatment of cancer.

Researchers at Arizona State University and their colleagues have developed a new use for their novel Ca isotope measurement technique, enabling detection of multiple myeloma, bone lesions and cancers originating in and metastasizing to the bone. Additionally, this can be used to monitor changes in BMB in cancer patients treated with certain medicines known to affect BMB. The Ca isotope technique uses mass spectrometry to analyze changes in the natural isotope composition of calcium in blood and urine, without the need for radiologic tracers. Changes in BMB may be revealed with unprecedented speed and detail.

Ca isotope analysis provides a powerful means to monitor bone loss and therapeutic efficacy of treatment, and may allow for new and quicker diagnoses of lesions, bone cancers and metastatic cancers affecting bones.

Potential Applications

- Early detection/monitoring of:
 - Bone lesions
 - Bone cancers
 - Multiple myeloma
 - Breast cancer metastases to bone
 - Prostate cancer metastases to bone
- Assessment of bone cancer treatment effectiveness
- Continuous monitoring for BMB changes resulting from cancer treatments
- Accelerating the pace of discovery of new treatments for bone cancers and cancers metastasized to bones

Benefits and Advantages

- Natural isotope variations are measured – does not use radiologic tracers
- Early detection – long before bone damage occurs
- Rapid results – two orders of magnitude faster than using X-ray densitometry
- High level of detail
- Safe – only uses blood or urine, not radiologic means