



Increased strontium uptake in trabecular bone of ovariectomized calcium-deficient rats treated with strontium ranelate or strontium chloride

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Abstract:

Based on clinical trials showing the efficacy to reduce vertebral and non-vertebral fractures, strontium ranelate (SrR) has been approved in several countries for the treatment of postmenopausal osteoporosis. Hence, it is of special clinical interest to elucidate how the Sr uptake is influenced by dietary Ca deficiency as well as by the formula of Sr administration, SrR versus strontium chloride (SrCl₂). Three-month-old ovariectomized rats were treated for 90 days with doses of 25 mg kg⁻¹ d⁻¹ and 150 mg kg⁻¹ d⁻¹ of SrR or SrCl₂ at low (0.1% Ca) or normal (1.19% Ca) Ca diet. Vertebral bone tissue was analysed by confocal synchrotron-radiation-induced micro X-ray fluorescence and by backscattered electron imaging. Principal component analysis and k-means clustering of the acquired elemental maps of Ca and Sr revealed that the newly formed bone exhibited the highest Sr fractions and that low Ca diet increased the Sr uptake by a factor of three to four. Furthermore, Sr uptake in bone of the

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SrCl₂-treated animals was generally lower compared with SrR. The study clearly shows that inadequate nutritional calcium intake significantly increases uptake of Sr in serum as well as in trabecular bone matrix. This indicates that nutritional calcium intake as well as serum Ca levels are important regulators of any Sr treatment.

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