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THE DEVELOPMENT OF NOVEL, SAFER AND MORE EFFECTIVE THERAPEUTICS FOR POSTMENOPAUSAL OSTEOPOROSIS

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In aged women, postmenopausal osteoporosis (PO) is one of the most common diseases, and osteoporosis-related fractures are a major cause of disability, mortality and economic burden. Unfortunately, current drugs for PO have certain limitations with regard to their safety and/or efficacy. Therefore, there is a great need for the development of new, safer and more effective therapeutics for PO. Our prior study found that age-related iron accumulation and its associated oxidative damage in the skeleton of ovariectomized (OVX) rats, an animal model for PO, play important causal roles in osteoporotic development. More significantly, our study also found that the OVX rats treated with our chelating agents are protected from bone mineral density (BMD) loss and microstructural deterioration of vertebrae. To confirm these novel findings and further define our chelating agent's ability to systematically protect bones from osteoporosis, we have examined the BMD of the whole OVX animal body and tibiae, using dual X-ray absorptiometry and peripheral-quantitative computerized tomography technologies. The results have shown that the chelation treatment significantly mitigates the loss of BMD in OVX rats compared to OVX controls. In addition, we performed bone histomorphometric analyses, and found that one possible mechanism of the chelation protective action is to significantly reduce bone resorption. Moreover, our study did not find any obvious signs of toxicity associated with the chelation. Thus, these new studies pave the way for further developing our novel therapeutic approach, which would ultimately lead to safer and more effective drugs for PO and other age-related bone loss.