

A herbal compound preparation can affect bone metabolism through multiple biological signals

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Many of the traditional herbs have been used to treat osteoporosis and other bone diseases in china. We found a Chinese herbal compound preparation (including Epimedii, Medlar, Angelica, Bidentatae, Eucommia and Gentiana) could be effective in the treatment of postmenopausal osteoporosis(PMO) by affecting bone metabolism in multiple biological signals. A clinical trial conducted in a prospective, randomized, double blinded method lasting for 6 months with placebo and positive control indicated that the efficacy and safety in the treatment of PMO, and it also could increase estrogen levels and improve bone structure in ovariectomized rats. We observed the compound preparation could upregulate the expression of bone morphogenetic protein 2(BMP-2), transforming growth factor β 1 (TGF- β 1), osteoprotegerin (OPG), and insulin-like growth factor I (IGF-I), type I collagen (Col I), osteocalcin, alkaline phosphatase(ALP), Runx2 and adenylate cyclase, inhibit the expression of IL-6, matrix metalloproteinase-1 (MMP-1) in bone tissue, and also regulate neuroskeletal signalling pathways through the influence of the beta2-adrenergic receptor (ADRB2), γ -amino butyric acid (GABA), glutamate, metabotropic glutamate receptor (of mGluR1, mGluR2/3), N-methyl-Daspartate receptor (of NMDAR1) and 5-serotonin transporter (5-HTT). The serum containing ingredients of the compound preparation could affect the differentiation and mineralization of osteoblasts and osteoclasts apoptosis through regulating the signals of estrogen receptor, BMP-2/Smads, nitric oxide synthase/nitric oxide (NOS/NO), OPG/RANKL/RANK, IL-1, IL-6, IGF-I and mitogen-activated protein kinases (MAPK) in vitro. These research results show the network pharmacological mechanisms of the compound preparation for the regulation of bone metabolism through multi-target and multi-link, which is different from the current drugs of affect single bone formation or bone resorption, provide a new choice for the prevention and treatment of osteoporosis and other bone diseases.

Biography

Zhang Ronghua, Ph.D., a professor of Jinan University College of Pharmacy, P.R. China. He is the Director of China Geriatrics Association of Integrative Medicine. He has been engaged in the study of the biological signals and drug intervention, as well as geriatrics. He has published more than 100 papers in reputed journals and serving as an editorial board member of three journals. He has developed three drugs for the treatment of osteoporosis, hyperlipidemia, and depression respectively.

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