Chinese Journal of Tissue Engineering Research (https://www.cjter.com) ›› 2022 (https://www.cjter.com/EN/article/showTenYearVolumnDetail.do?nian=2022), Vol. 26 (https://www.cjter.com/EN/article/showTenYearVolumnDetail.do?nian=2022) ›› Issue (8) (https://www.cjter.com/EN/volumn/volumn_1734.shtml): 1266-1271. doi: 10.12307/ (https://doi.org/10.12307/2022.234)

Previous Articles (https://www.cjter.com/EN/abstract/abstract17192.shtml) Next Articles (https://www.cjter.com/EN/abstract/abstrac

Research progress of pulsed electromagnetic field in the treatment of postmenopausal osteoporosis

Xiao Hao1, 2, Liu Jing1, 2, Zhou Jun1, 2

PDF

10

(../../fileup/2095-4344/PDF/2022-8-1266.pdf)

Abstract

Abstract: BACKGROUND: Pulsed electromagnetic fields generate pulsed currents, and improve bone metabolism through the stress coupling mechanism. In recent years, evidence has proved that pulsed electromagnetic fields can inhibit postmenopausal osteoporosis in many ways involving bone marrow mesenchymal stem cells, o osteoclasts, and bone cells.

OBJECTIVE: To review the effect and therapeutic mechanism of pulsed electromagnetic field on postmenopausal osteoporosis.

METHODS: We searched PubMed, CNKI, WanFang, VIP, and CBMdisc databases for relevant articles with the keywords of “pulsed electromagnetic field; postm osteoporosis; bone homeostasis; bone metabolism; bone density; biomechanical property; bone marrow mesenchymal stem cells; osteoblasts; osteoclasts; bone cells” in C English, respectively. Finally, 66 articles met the criteria for review.

RESULTS AND CONCLUSION: Pulsed electromagnetic fields can increase bone density, improve bone biomechanical properties, promote bone formation, and inhibit the osteoclasts to inhibit postmenopausal osteoporosis. At present, pulsed electromagnetic fields are of high feasibility to mediate osteogenic differentiation via Wnt/β-cateni pathway and OPG/RANKL signaling pathway. Research on the mechanism of bone marrow mesenchymal stem cells, osteoblasts, and osteoclasts indicates a series of conc initial stage, including that SIRT1 inhibits NLRP3 inflammasome to mediate bone marrow mesenchymal stem cell pyrolysis, long-chain non-coding RNA and related pathwa osteogenic differentiation, and hypoxia-inducible factors drive osteoclast differentiation. It is of important value to explore whether pulsed electromagnetic fields can regul inflammasome signals through SIRT1 to inhibit the pyrolysis of bone marrow mesenchymal stem cells, thereby exerting an anti-osteoporosis effect.

Key words: pulsed electromagnetic field, postmenopausal osteoporosis, bone homeostasis, biomechanical properties, bone marrow mesenchymal stem cells, osteoblasts, o bone cells

CLC Number:

R446

R496

R318

Figures/Tables 1

References

Related Articles 15

Metrics

Comments