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2. Title

   Analysis of bone resorptive mechanism under osteoporosis via activated dioxin receptor by smoking.

3. Period

   2017-2019

4. Summary

   Smoking is one of the risk factor for osteoporosis, rheumatoid arthritis and bone fracture, however the mechanism underlying by which smoke causes bone loss still unknown. In this study, we analyzed that the smoke toxin benzo [a] pyrene (BaP) associated with the aryl hydrocarbon receptor (AhR) to induce osteoclastic bone resorption and cartilage mineralization. The AhR signaling pathway plays an important role in receptor activator of nuclear factor (NF)-κB ligand (RANKL)-mediated osteoclastogenesis. BaP -treated MRL/lpr mice accelerated arthtitis lesions in vivo. Th17 cell subsets from BaP -treated MRL/lpr mice express the highest amounts of AhR among the T cell subsets. We also found that BaP-treated mice shows delayed fracture healing due to M1 macrophage subset infiltration at the early stage of bone fracture healing. Furthermore, we found that the mechanism underlying the regulation of AhR expressions by BaP-stimulation in osteoclasts and chondrocytes and the signaling pathway via which AhR regulates chondrogenesis and osteoclastogenesis.