Yun-Kyung Kim et al., Med Aromat Plants 2017, 6:6 (Suppl)
DOI: 10.4172/2167-0412-C1-015

Polygoni Multiflori Radix augments osteoblast formation and reduces osteoclast differentiation

Yun-Kyung Kim, Sang-Yong Han and Tae-Won Rho
Wonkwang University, Republic of Korea

Background: *Polygoni Multiflori Radix* (PMR) is a traditional Korean medicinal herb, which is known to have pharmacological effects including anti-hyperlipidemic, anti-cancer, anti-inflammatory effects and anti-osteoporotic effect. However, its molecular mechanism on osteoclast differentiation has not been elucidated.

Purpose: Our study aimed to investigate the *in vitro* and *in vivo* anti-osteoporotic effect of PMR water extract on the regulation of osteoblast and osteoclast activity.

Methods: The effects of PMR water extract on Receptor Activator Of Nuclear factor-kB Ligand (RANKL)-induced osteoclast differentiation and survival of mouse Bone Marrow Macrophages (BMMs) obtained from femurs were determined by Tartrate-acid Resistant Acid Phosphatase (TRAP)-positive cells and XTT assay. Expression of osteoclast-related genes such as c-Fos, Nuclear Factor Of Activated T-cell (NFATcl), TRAP, osteoclast-associated receptor (OSCAR), ATPase, H+ transporting, lysosomal 38 kDa, V0 subunit d2 (Atp6vod2) and Cathepsin K were measured by Western blot analysis and Real-time PCR. Additionally, we investigated the effects of PMR water extract on osteoblastic proliferation and differentiation by Alkaline Phosphatase (ALP) activity assay, alizarin red staining and levels of mRNA encoding the bone differentiation markers including ALP, runt-related transcription factor 2 (RUNX2), osterix and osteocalcin in mouse derived osteoblast. Moreover, the effects of PMR water extract on Lipopolysaccharide (LPS)-induced bone loss model using ICR mice.

Results: We found that PMR inhibited RANKL-induced osteoclast differentiation of BMMs in a dose-dependent manner without any cytotoxicity and suppressed expression of the main osteoclast differentiation markers c-Fos and NFATc1. In addition, PMR also decreased the mRNA expressions of NFATc1 target genes including TRAP, OSCAR, Atp6vod2 and Cathepsin K. These inhibitory effects were mediated by the p38 and Extracellular Signal-Regulated Kinase (ERK)/Nuclear Factor kappa B (NF-κB) pathway. Conversely, PMR enhanced the differentiation of primary osteoblasts and increased the mRNA expression of Runx2, ALP, osterix and osteocalcin. In addition, PMR improved lipopolysaccharide (LPS)-induced trabecular bone loss in mice.

Conclusion: Collectively, PMR regulates bone remodeling by reducing osteoclast differentiation and stimulating osteoblast formation. These results suggest that PMR could be used for the treatment of bone diseases, such as osteoporosis and rheumatoid arthritis.

Biography

Yun-Kyung Kim has completed her PhD from Kyunghee University and has worked as Researcher at Korea Institute of Oriental Medicine. She has published more than 90 papers in reputed journals and has been serving as a Consultant for Korean Government.

hestia@wku.ac.kr

Notes: