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Epimedium-derived Flavonoids Inhibit both Thrombomodulin and Lipid Deposition In Vitro

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Introduction: To explore the mechanism that epimedium-derived flavonoids (EF) could inhibit thrombosis and lipid deposition so as to prevent steroid-associated osteonecrosis (ON), we studied the effect of EF on supernate soluble thrombomodulin (TM) in human umbilical vein endothelial cell (HUVEC) damage model and adipocytopogenesis in NIH 3T3-L1 cells.

Materials and Methods: LPS at a concentration of 0.625 µg/mL for 24 hours was used for HUVEC damage model. Thrombomodulin was measured using commercialised Human Thrombomodulin ELISA Kit. Oil red O staining was used for measuring preadipocyte lipid deposition in NIH 3T3-L1 cells. Epimedium-derived flavonoids at the concentration of 20 µg/mL, 40 µg/mL, and 60 µg/mL were used for test.

Results: In both endothelial cell damage model and lipid deposition model, supernate soluble TM and OD value for Oil red O in induction group was significantly higher than the control group (p < 0.05), whereas EF dose dependently lowered supernate soluble TM and OD value for Oil red O at 3 different dosages when compared with induction group (p < 0.05 for all), respectively.

Discussion and Conclusion: These findings suggest that EF could inhibit thrombomodulin in HUVEC damage model and decrease the adipocytopogenesis in NIH 3T3-L1 cells, which provides an insight into the mechanism of EF on preventing steroid-associated ON.

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In-vitro Analysis of Gene Expressions of Osteoblastic Cells while Exposing to Various Concentrations of Magnesium Ions

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Calcium and strontium are essential elements for bone remodelling and preventing osteoporosis. Apart from calcium- and strontium-based supplements, people are also recommended to take magnesium-based supplements to maintain skeletal growth and development as well as to prevent osteoporosis. Previous studies reported that magnesium deficiency in diet might lead to bone loss after period of time. However, the function of magnesium in bone metabolism is still unclear. Hence, this study aimed at investigating the gene expression of osteoblasts when the cells expose to different concentrations of magnesium ions by using reverse transcriptase-polymerase chain reaction (RT-PCR). Our previous study revealed that the osteoblast viability varied by various concentrations of Mg2+ ranging from 19 to 1000 ppm. Therefore, the MC3T3-E1 pre-osteoblasts were cultured again based on the concentration gradient. Semiquantitative RT-PCR was applied to evaluate the gene expression of different bone markers including type I collagen, osteocalcin, and Runx2. The housekeeping gene GAPDH was used as a reference for normalisation. The viability test suggested that higher concentration of Mg2+ could significantly decrease osteoblast functions. The target genes were up-regulated when Mg2+ concentration was lower than 50 ppm. However, the expression started to drop while further increasing. The results were consistent with that of the viability testing. This study demonstrated that low Mg2+ level can stimulate gene expression of osteoblasts. With the results from in-vivo study, we can propose an optimal range of magnesium-based supplements in order to maintain the osteoblast activity in future.

Declaration: A potential conflict of interest was declared by one or more of the authors.