

论文

甲氨蝶呤对破骨细胞的作用及机制研究

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摘要:

本文在诱导培养并纯化破骨细胞的基础上, 研究甲氨蝶呤对破骨细胞活性及功能的影响, 探讨甲氨蝶呤抑制炎症性骨破坏的作用机制。研究采用MTT法测定甲氨蝶呤对破骨细胞增殖的影响; 流式细胞术测定甲氨蝶呤对破骨细胞凋亡的影响; TRAP染色和骨吸收陷窝染色计数、骨吸收陷窝面积测定分别观察甲氨蝶呤对破骨细胞活性及功能的影响; ELISA法测定甲氨蝶呤对破骨细胞中MMP-9分泌的影响; RT-PCR法测定甲氨蝶呤对破骨细胞中MMP-9、RANK基因表达的影响。结果显示, 甲氨蝶呤(0.1~10 μmol·L⁻¹)可抑制破骨细胞增殖, 对破骨细胞的活性及骨吸收功能均有显著的抑制作用, 并可促进破骨细胞的凋亡。同时, 甲氨蝶呤(0.01~10 μmol·L⁻¹)对破骨细胞中RANK的mRNA表达具有一定的抑制作用; 但对MMP-9表达的影响较弱, 只在1~10 μmol·L⁻¹时才对MMP-9的mRNA表达具有抑制作用。以上结果表明, 甲氨蝶呤抑制炎症性骨破坏的作用与其对破骨细胞活性及功能的抑制密切相关。

关键词: 甲氨蝶呤 破骨细胞 炎症性骨破坏

Effects of methopterin on osteoclasts and study of its mechanism of action

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Abstract:

This study is to observe the effects of methopterin on the activation and bone resorption function of murine osteoclasts, which were obtained by induction from bone marrow cell and purified to the purity of 70%-80%. The mechanism underlying the inhibitory effects of methopterin on inflammatory bone destruction was explored. MTT method was used to determine the effect of methopterin on the proliferation of osteoclasts. Flow cytometric analysis was used to determine the effect of methopterin on the apoptosis of osteoclasts. TRAP stain, bone resorption lacuna stain and measurement of lacuna area were executed to determine the effects of methopterin on the activation and function of osteoclasts. ELISA method was used to determine the effect of methopterin on the MMP-9 secretion from osteoclasts. RT-PCR method was used to determine the effect of methopterin on the mRNA expression of RANK and MMP-9 in osteoclasts. The results showed that methopterin (0.1-10 μmol·L⁻¹) inhibited the proliferation of osteoclasts, methopterin (0.1-10 μmol·L⁻¹) could inhibit the activation and bone resorption function of osteoclasts and induced the apoptosis of osteoclasts. Methopterin (0.01-10 μmol·L⁻¹) also decreased the mRNA expression of RANK, but only at 1-10 μmol·L⁻¹ decreased the mRNA expression of MMP-9. These results indicated that there were intense relation between the inhibitory effects on the activation and function of osteoclasts and the inhibition of inflammatory bone destruction by methopterin.

Keywords: osteoclast inflammatory bone destruction methopterin

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