

冬蟲夏草對幹細胞增生及分化的影響

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摘要

冬蟲夏草又稱為蟲草，為真菌孢子寄生於蝙蝠蛾幼蟲所產生之真菌與蟲體的組合體，功效依不同菌種而有所差異，長久以來即被中國人視為保健聖品，為一良好的補益藥材，目前常被使用的冬蟲夏草品系為 *cordyceps sinensis*，基於其臨床上對人體的補益功效，故本實驗主要目的在探討 *cordyceps sinensis* 的萃取液對幹細胞分化作用的影響與其可能的機轉。

取 C57BL/6 小鼠股骨與脛骨骨髓細胞，以冬蟲夏草萃取液 (1 $\mu\text{g}/\text{mL}$) 培養細胞，骨髓幹細胞培養第 3 天後，萃取基質細胞中的核醣核酸，分析核心結合因子 (Cbfa) 的基因表現量；培養 10 天後，以鹼性磷酸酶染劑染色，評估造骨細胞之活性；培養第 14 天後以茜素紅 (Alizarin red) 染骨組織，比較冬蟲夏草萃取液對骨生成作用的影響。為探討其對造骨細胞與破骨細胞分化的影響機制，於第三天後，萃取細胞中的核醣核酸，分析破骨細胞分化因子的基因表現量。

結果顯示，在骨髓幹細胞培養方面，萃取物除了可增加基質細胞群落，亦可誘發 Cbfa 基因表現量，及增加造骨細胞活性，顯示有促進骨髓微環境的細胞分化的能力。此外，萃取液可抑制破骨細胞分化因子 (ODF) 基因的表現量。由以上結果可推論，冬蟲夏草萃取物可促進骨生成的能力，其機轉可能透過增加 Cbfa 基因表現量及降低 ODF 基因表現量來達成。

關鍵字：冬蟲夏草，幹細胞，造骨細胞，破骨細胞

Effects of cordycep on stem cells proliferation and differentiation

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Abstract

Cordyceps is a composite of fungus and insect, which has been served as health food and excellent herb medicine for Chinese for a long time. Different cordyceps has different efficacy, however, the most common used strain is cordyceps sinensis. This research aimed at the exploration of cordyceps sinensis extract on the differentiation of stem cells and possible related mechanisms.

Bone marrow stem cells were sampled from the femur and tibia bones of C57 mice, and cultured with cordyceps sinensis extract (1 μ g/mL). Three days after culture, the DNA of stromal cells was extracted, and the Cbfa gene was analyzed. On the 10th day, the cells were dyed with ALP stain to evaluate the activity of osteoblasts. Besides, the bone tissue was stained with Alizarin red to probe the effect of cordyceps sinensis on osteogenesis on the 14th day after culture. To investigate the acting mechanism of cordyceps sinensis on the differentiation of osteoblasts and osteoclasts, after the next 3 days, chromosomes of the cells were extracted for analyzing the ODF (osteoclast differentiation factor)-gene expression of stromal cells.

Results of the study revealed that the extract was able to increase stromal cell colonies, and promote Cbfa gene expression as well as the activity of osteoblasts indicating that the extract was effective in enhancing cell differentiation of the bone marrow microenvironment. Besides, the extract was also effective in increasing bone formation possibly via enhancing gene expression of Cbfa and reducing that of ODF gene.

Keywords : cordyceps, stem cell, osteoblast, osteoclast