

國立屏東科技大學食品科學系碩/博士班

題目:

中文題目：骨碎補萃取物對骨母細胞 MC3T3E1 增生及分化影響

英文題目：Effects of Drynariae Rhizoma extracts on the proliferation and differentiation of osteoblastic MC3T3-E1 cells

研究生專題報告書面摘要

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### 摘要

隨著年齡增長需要藥理成分來預防骨質疏鬆，骨質疏鬆症是易被忽略的骨骼代謝疾病，是全球第二大流行病，造成嚴重的醫療負擔。骨碎補為傳統中草藥常用於治療骨傷，但其機制均尚未清楚，故研究骨碎補萃取物對骨母細胞 (MC3T3-E1) 增生及分化影響，其結果顯細胞 DNA 合成、與骨碎補萃取物濃度 50-150 $\mu\text{g}/\text{mL}$  有顯著性依賴性，此外，鹼性磷酸酶及脯胺酰羧化酶活性亦被骨碎補萃取物所誘導，然而骨碎補萃取物濃度於 30-100 $\mu\text{g}/\text{mL}$  可抑制前列腺素 E2 活性，故骨碎補具有抗骨頭再吸收能力，綜合上述結果顯示骨碎補萃取物具有預防骨質疏鬆潛力。

關鍵字：骨母細胞 (MC3T3-E1)、骨碎補、增生、分化、鹼性磷酸酶

### Abstract

Osteoporosis is a bone metabolic disease that is often overlooked by aging adults who in fact require pharmacological treatment to manage bone loss. It is considered an epidemic disease that is ranked second in the world causing financial burden to the economy. Drynariae Rhizoma (DR) is an herb that is used traditionally for treating injuries of the bones. The mechanism of actions of DR has not been studied, thus the effect of DR extracts on the proliferation and differentiation of osteoblastic MC3T3-E1 cells were investigated. The results showed that DR increased DNA synthesis (significant at 50–150 g/mL) in a dose-dependent manner. Moreover, DR increased alkaline phosphatase (ALP) activity and prolyl hydroxylase activity in MC3T3-E1 cells (50–150 g/mL). DR at concentrations ranged from 30–100 g/ml inhibited prostaglandin E2 production in MC3T3-E1. These results indicated that DR directly stimulates cell proliferation and differentiation of osteoblasts and possesses antiresorptive action on bone cells.

Keywords: MC3T3-E1, DrynariaeRhizoma, proliferation, differentiation, alkaline phosphatase

## References

1. Harada SI and Rodan GA. 2003. Control of osteoblast function and regulation of bone mass. Nature Publishing group 423:349-355.
2. Hung TY, Chen TL, Liao MH, Ho WP, Liu DZ, Chuang WC, Chen MR. 2010. *Drynaria fortunei* J. Sm. promotes osteoblast maturation by inducing differentiation-related gene expression and protecting against oxidative stress-induced apoptotic insults. Journal of Ethnopharmacology 131:70-77.
3. Jeong JC, Lee JW, Yoon CH, Lee YC, Chung KH, Kim MG, Kim CH. 2005. Stimulative effects of *Drynariae Rhizoma* extracts on the proliferation and differentiation of osteoblastic MC3T3-E1 Cells. Journal of Ethnopharmacology 96:489-495.
4. Time-lapse MC3T3-E1 cells - YouTube  
([https://www.google.com.tw/search?q=mc3t3-e1&biw=1093&bih=498&source=lnms&tbm=isch&sa=X&ved=0CAYQ\\_AUoAWoVChMIhsOHt6uvyAIVARimCh0ShAaQ#imgrc=OBkH8MSmYjGYfM%3A](https://www.google.com.tw/search?q=mc3t3-e1&biw=1093&bih=498&source=lnms&tbm=isch&sa=X&ved=0CAYQ_AUoAWoVChMIhsOHt6uvyAIVARimCh0ShAaQ#imgrc=OBkH8MSmYjGYfM%3A))
5. Wu JB, Fong YC, Tsai HY, Tsuzuki M, Tang CH. 2008. Narin-induced bone morphogenetic protein-2 expression via PI3K, Akt, c-Fos/c-Jun and AP-1 pathway in osteoblasts. European Journal of Pharmacology 588:333-341.
6. 骨碎補易誤用中採藥材  
([http://www.fda.gov.tw/upload/133/Content/10-07\\_%E9%AA%A8%E7%A2%8E%E8%A3%9C.pdf](http://www.fda.gov.tw/upload/133/Content/10-07_%E9%AA%A8%E7%A2%8E%E8%A3%9C.pdf))