Cancro, sintetizzati nuovi antitumorali da molecole prodotte dai funghi

I ricercatori del MIT (Massachusetts Institute of Technology) di Cambridge e dell'Università dell'Illinois di Urbana-Champaign (Usa) hanno dimostrato le potenzialità anticancro di composti sintetizzati utilizzando come modello delle **molecole naturalmente prodotte dai funghi** per difendere il loro territorio. Secondo quanto pubblicato sulle pagine della rivista Chemical Science, fra le 60 molecole ottenute in laboratorio riproducendo tali e quali gli **alcaloidi secreti dai funghi**, modificandoli aggiungendo o rimuovendo alcuni gruppi chimici e sintetizzando altri composti simili ad essi con caratteristiche tali da far ipotizzare che potessero svolgere un'azione antitumorale, le 25 più efficaci nei confronti di linee cellulari di cancro alla cervice e di linfoma sono state testate anche su cellule di cancro al polmone, al rene e alla mammella. Ne è emerso che **i composti più efficaci sono i dimeri, cioè quelli formati da due alcaloidi uniti insieme, quelli contenenti almeno due atomi di zolfo e quelli con i gruppi chimici più grandi uniti alla tipica struttura ad anello presente in questi alcaloidi.**

Purtroppo le quantità dei composti prodotti naturalmente dai funghi sono troppo limitate per poter pensare di ricavare direttamente da questi organismi molecole da utilizzare nel trattamento dei tumori, ma secondo gli esperti il complesso lavoro svolto da questi ricercatori sarà essenziale per sviluppare nuove molecole di cui testare le potenzialità antitumorali. “Quello che per noi è stato particolarmente interessante – ha raccontato Mohammad Movassaghi, responsabile della ricerca – è stato osservare, in diverse linee cellulari tumorali, che alcune di queste sono abbastanza potenti”. Non solo, i composti che uccidono le cellule neoplastiche **sono molto selettivi**: la loro efficacia è 1.000 volte più elevata nei confronti dei tumori che in quelli delle cellule sane.

di Silvia Soligon

Data: 04/03/2013

In vivo and *in vitro* anti-tumor and anti-metastasis effects of *Coriolus versicolor* aqueous extract on mouse mammary 4T1 carcinoma

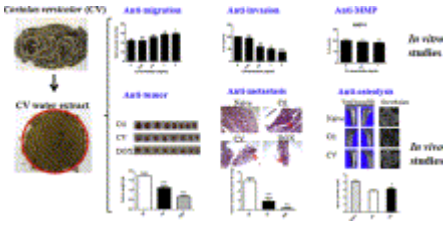
- Grace Gar-Lee Yue Clara Bik-San Lau

Affiliations

- Institute of Chinese Medicine, The Chinese University of Hong Kong, Shatin, New Territories, Hong Kong
- State Key Laboratory of Phytochemistry and Plant Resources in West China, The Chinese University of Hong Kong, Shatin, New Territories, Hong Kong

- Corresponding author at: E305, Science Centre East Block, Institute of Chinese Medicine, The Chinese University of Hong Kong, Shatin, New Territories, Hong Kong. Tel.: +852 39436109.

Graphical abstract



- View Large Image
- Download to PowerPoint

Abstract

Coriolus versicolor (CV), a medicinal mushroom widely consumed in Asian countries, has been demonstrated to be effective in stimulation of immune system and inhibition of tumor growth. The present study aimed to investigate the anti-tumor and anti-metastasis effects of CV aqueous extract in mouse mammary carcinoma 4T1 cells and in 4T1-tumor bearing mouse model. Our results showed that CV aqueous extract (0.125–2 mg/ml) did not inhibit 4T1 cell proliferation while the non-cytotoxic dose of CV extract (1–2 mg/ml) significantly inhibited cell migration and invasion ($p < 0.05$). Besides, the enzyme activities and protein levels of MMP-9 were suppressed by CV extract significantly. Animal studies showed that CV aqueous extract (1 g/kg, orally-fed daily for 4 weeks) was effective in decreasing the tumor weight by 36%, and decreased the lung metastasis by 70.8% against untreated control. Besides, micro-CT analysis of the tumor-bearing mice tibias indicated that CV extract was effective in bone protection against breast cancer-induced bone destruction as the bone volume was significantly increased. On the other hand, CV aqueous extract treatments resulted in remarkable immunomodulatory effects, which was reflected by the augmentation of IL-2, 6, 12, TNF-α and IFN-γ productions from the spleen lymphocytes of CV-treated tumor-bearing mice. In conclusion, our results demonstrated for the first time that the CV aqueous extract exhibited anti-tumor, anti-metastasis and immunomodulation effects in metastatic breast cancer mouse model, and could protect the bone from breast cancer-induced bone destruction. These findings provided scientific evidences for the clinical application of CV aqueous extract in breast cancer patients.

Ergosterol peroxide from Cordyceps cicadae ameliorates TGF-β1-induced activation of kidney fibroblasts

- Rong Zhu Rong Zheng
-

Affiliations

- Department of Nephrology, Longhua Hospital, Shanghai University of Traditional Chinese Medicine, Shanghai 200032, China
- Both the authors contributed equally to this paper.

,

07 October 2013.

abstract

Chronic kidney disease is a growing public health problem with an urgent need for new pharmacological agents. Ergosterol peroxide (EP) is the major sterol produced by *Cordyceps cicadae* Shing (*C. cicadae*), a widely used traditional Chinese medicine. *C. cicadae* has been used to treat many kinds of diseases and has a potential benefit on renoprotection. This study aimed to investigate the anti-fibrotic effects of EP as well as the underlying mechanisms. A normal rat kidney fibroblast cell line (NRK-49F) was stimulated to undergo fibroblast activation by transforming growth factor-β1 (TGF-β1) and EP treatment was applied to explore its potential anti-fibrotic effects. Cell proliferation was investigated using MTT analysis. Fibrosis-associated protein expression was analyzed using immunohistochemistry and/or Western blotting. EP treatment attenuated TGF-β1-induced renal fibroblast proliferation, expression of cytoskeleton protein and CTGF, as well as ECM production. Additionally, EP blocked TGF-β1-stimulated phosphorylation of ERK1/2, p38 and JNK pathway. Moreover, the TGF-β1-induced expression of fibronectin was attenuated by either inhibition of MAPKs or by EP treatment. In conclusion, our findings demonstrate that EP is able to suppress TGF-β1-induced fibroblasts activation in NRK-49F. This new information provides a line of theoretical evidence supporting the use of *C. cicadae* in the intervention of kidney disease and suggests that EP has the potential to be developed as a therapeutic agent to prevent renal fibrosis.