

Abstract

According to research data, it is estimated that 1 to 2 % of the population will experience a chronic wound during their lifetime in developed countries. Patients, especially who have chronic disease with poor blood circulation and less effective wound healing mechanism, may get infection and even cause death if the wounds are not well treated. To help protect these people from wound infection, our study was to explore any potential sources of natural phytochemicals which could speed up wound healing, in an in vitro model of human fibroblasts.

The five major ingredients in Huang Long Gao, Amur Corktree Bark (黃柏), Chinese Angelica (當歸), Baikal Skullcap (黃芩), Rhubarb (大黃) and Common Gardenia Fruit (生梔子), and two major ingredients in Comfrey Balm, Comfrey (紫草) and Chinese Angelica (當歸), were first prepared and extracted. The samples were then administered separately at the concentrations of 1.25 mg/ml and 0.625 mg/ml for 12 hours to find out their efficacy in recovering the wound of human fibroblast cells. The wounds were the cell-free gaps scratched by a p20 pipette tip on a 96-well microplate or created by culture inserts. Dose-dependent studies revealed 0.625 mg/ml being the optimum concentration. In the subsequent Exclusion Test, by removing one of the components out of the six samples (A-F), the boosted wound-healing effect revealed the inhibitory effects of sample B and sample C, therefore the remaining samples A, D, E and F were selected for further tests. In the Synergy Test, combined treatment groups of AD, AE, AF, DE, DF and EF were tested in comparable studies with individual treatments of samples A-only, D-only, E-only and F-only. Sample A (Amur Corktree Bark (黃柏) at 0.625 mg/ml) and sample D (Common Gardenia Fruit (生梔子) at 0.625 mg/ml) were synergistic in wound healing, causing 2.55- and 2.83-fold stimulation in cell migration in the wounds.

This combined AD sample was added into alginate dressing which demonstrated 73.9% drug releasing efficacy in a UV absorbance test at 400nm.

簡介

根據研究數據，估計發達國家中有 1% 到 2% 的人口在其一生中曾有過慢性傷口。如果傷口處理不當，患有慢性疾病，血液循環不暢，傷口癒合機制較差的患者，可能會因為傷口感染而導致死亡。為了幫助保護這些人免受傷口感染，我們小組利用人體皮膚纖維細胞體外模型進行了一些研究，目的是探討天然植物化學物質對傷口癒合的效果。

民間治療傷口配方「黃龍膏」中的五種主要成分：黃柏、當歸、黃芩、大黃和梔子花及「紫雲膏」中的兩種主要成分：紫草和當歸被分別提取出來。樣品然後被稀釋至 1.25 mg/ml 和 0.625 mg/ml 的濃度，分別加入種有人體皮膚纖維細胞的細胞培養皿內進行 12 小時的測試，以了解培養皿底部被 p20 移液器吸頭所划出的傷口及用細胞間隔框架製造出的 500 μm 無細胞間隙的癒合情況。劑量依賴性研究表明 0.625 mg/ml 是最佳加速傷口癒合的濃度。在隨後的排除試驗中，通過從六個樣品 (A-F) 中去除其中一種成分，結果發現，樣品 B 和樣品 C 抑制了傷口的癒合情況，因此剩餘的樣品 A、D、E 和 F 被選為下一輪測試的樣品。在協同測試中，AD、AE、AF、DE、DF 和 EF 的組合與只有 A、只有 D、只有 E 和只有 F 的樣品進行了比較，並證實了樣品 A (0.625 mg/ml 黃柏) 及樣品 D (0.625 mg/ml 生梔子) 有顯著的協同效應，能有效促進人體皮膚纖維細胞的傷口癒合分別 2.55 及 2.83 倍的功效。

將這種組合的 AD 樣品添加到藻酸鹽敷料中，在 400nm 的紫外線下測試敷料釋放藥物的功效，發現它的藥物釋放效率高達 73.9%。這項研究結果或意義重大，因為它為傷口癒合敷料的進一步開發提供了基礎。