國立臺中科技大學
NATIONAL TAICHUNG UNIVERSITY
OF SCIENCE AND TECHNOLOGY

# 中護健康學院升等宣講

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# Genistein protects against ultraviolet B–induced wrinkling and photoinflammation in in vitro and in vivo models

Sheau-Chung Tang[1], Yu-Ping Hsiao[2,3*] and Jiunn-Liang Ko[2,4*]

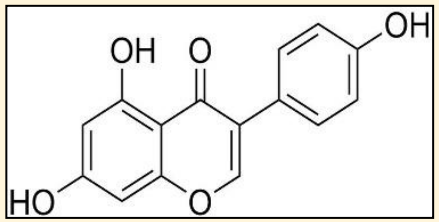
以**營養**為出發點，探究**生物化學**的抗氧化作用，反映在**人體生理**皮膚的保護特性

**Methods:** Food frequency questionnaire data and serum and skin parameter data from 120 volunteers (a group with a genistein-rich diet [RG group] and a control group). Human keratinocytes were pretreated with genistein before ultraviolet B (UVB) irradiation. Genistein was topically applied to the dorsal skin of rats.

**Results:** The blood samples of the RG group had lower serum uric acid levels and blood urea nitrogen levels. The dynamic elasticity level in the RG group was higher than that in the controls. Genistein pretreatment suppressed the expression of proinflammatory cytokines (CXCL1, IL-1, MIF, and PLANH1) and the proteins released by UVB-treated keratinocytes. Topical application of genistein to the dorsal skin of rats reduced the severity of UVB-induced wrinkling. Both intake and topical application of genistein combated UVB-induced inflammation and aging.

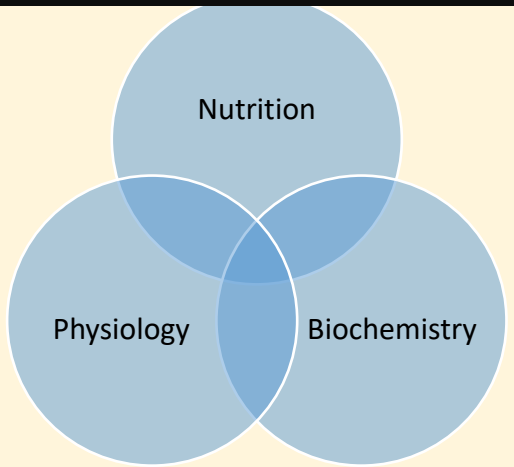
**Conclusions:** Genistein could be used as a safe and natural compound for use in novel anti-inflammatory agents for topical application.

**Keywords:** Genistein, Ultraviolet B, Skin, Inflammation, Photoaging




Genistein

The isoflavone genistein (5,7,40-trihydroxy isoflavone) is abundant in vegetable protein sources, such as soybean.



**Background:** Chronic exposure to ultraviolet (UV) rays causes severe skin damage by inducing oxidative stress and inflammation. Identifying a safe and natural substance for skin protection is a crucial research goal.
**Objective**: The aim of this study was to clarify the effects of genistein on skin inflammation and photoaging by using 3 models (humans: skin parameters; animals: wrinkle formation; and cells: anti-inflammatory effects)

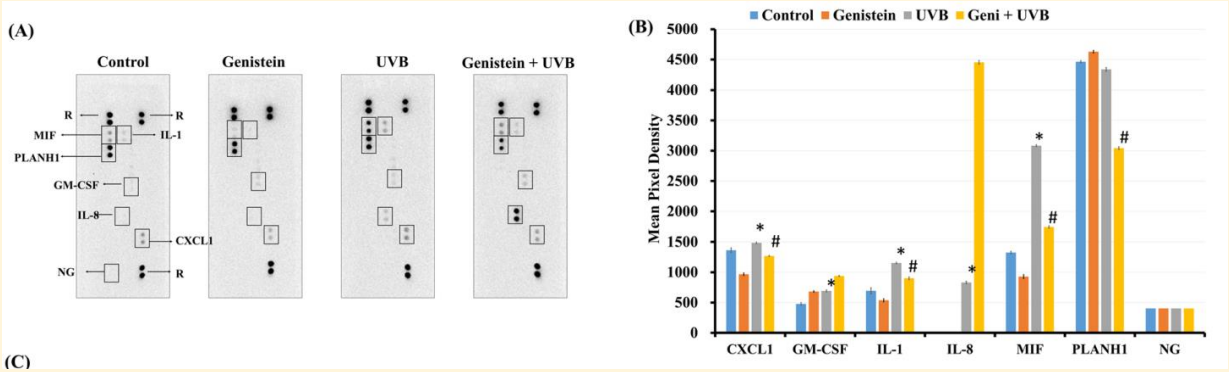
**Methods**: Food frequency questionnaire data and serum and skin parameter data from 120 volunteers (a group with a genistein-rich diet [RG group] and a control group). Human keratinocytes were pretreated with genistein before ultraviolet B (UVB) irradiation. Genistein was topically applied to the dorsal skin of rats**.**

目的：本研究首先建構三種不同的生物模型

- 第一種模型為**120位志願者**，收集**飲食問卷**、收集十二種**皮膚參數**、**血液尿液**樣本。
- 第二種模型為小鼠**動物**模式，**塗抹**不同濃度的金雀異黃酮分析其在紫外線照射下的**皺紋**形成
- 第三種生物模型為體外皮膚角質培養細胞株，分析其**抗發炎激素**分泌的差異）

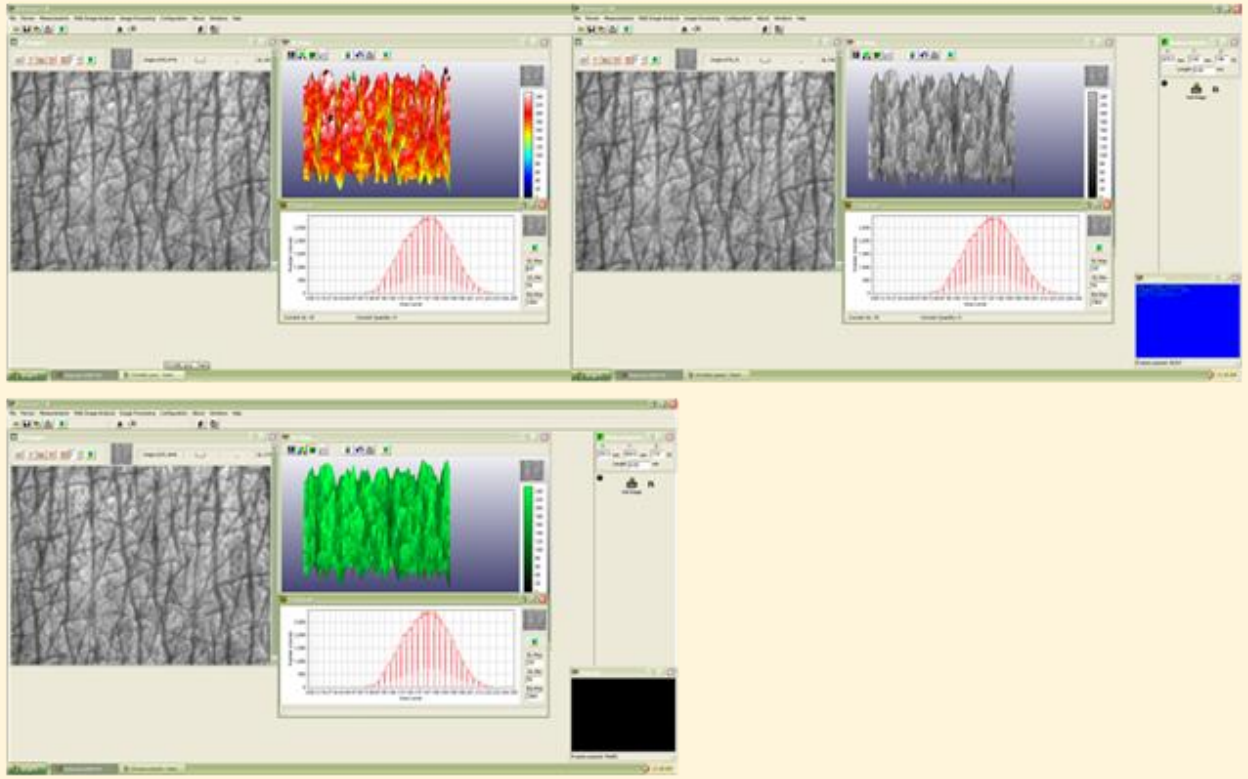
藉由三種不同的模型以闡明金雀異黃酮對於皮膚發炎作用和抵抗光照射引起老化的影響。

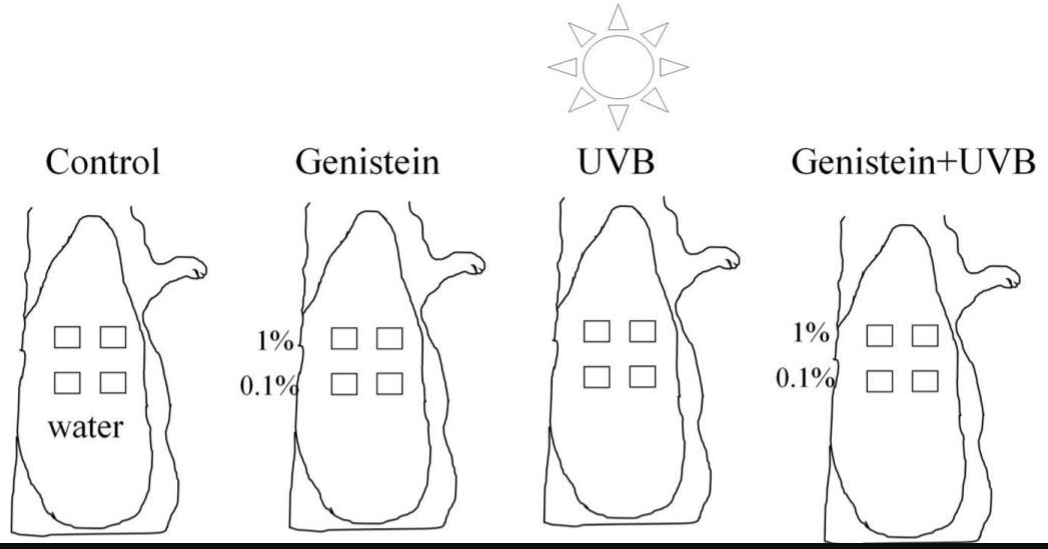
**Genistein**

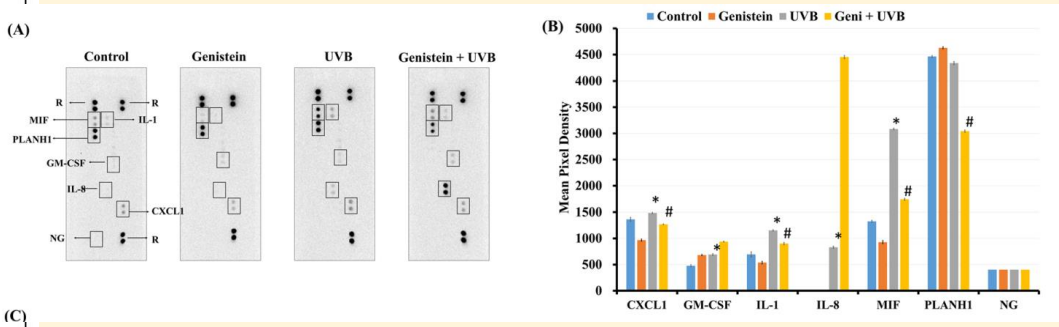



皮膚檢測示意圖(A)

表皮水分　黑色素/紅斑值　pH值　彈性






**Conclusions: Genistein could be used as a safe and natural compound for use in novel anti-inflammatory agents for topical application.**

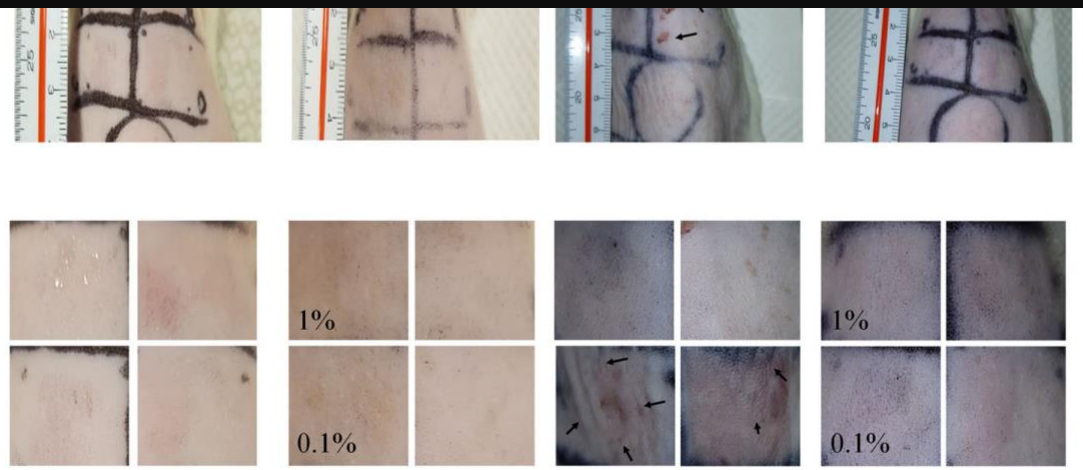
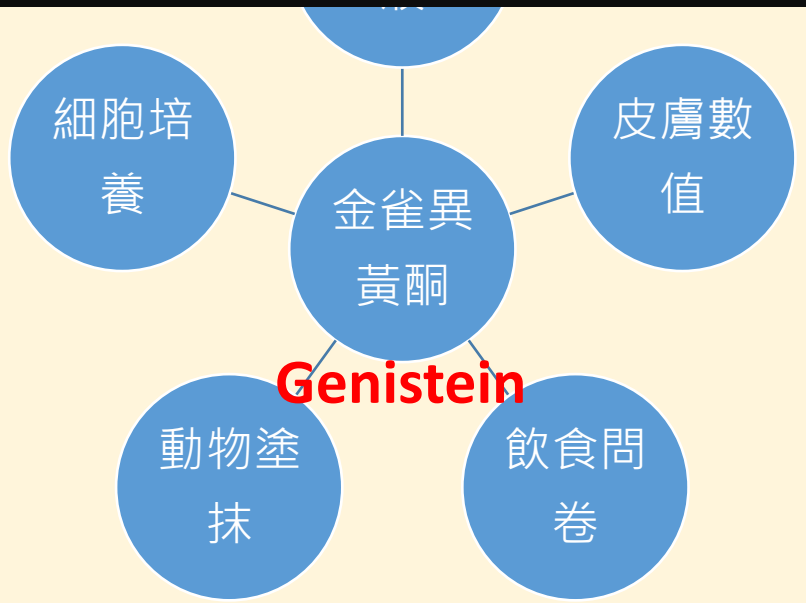
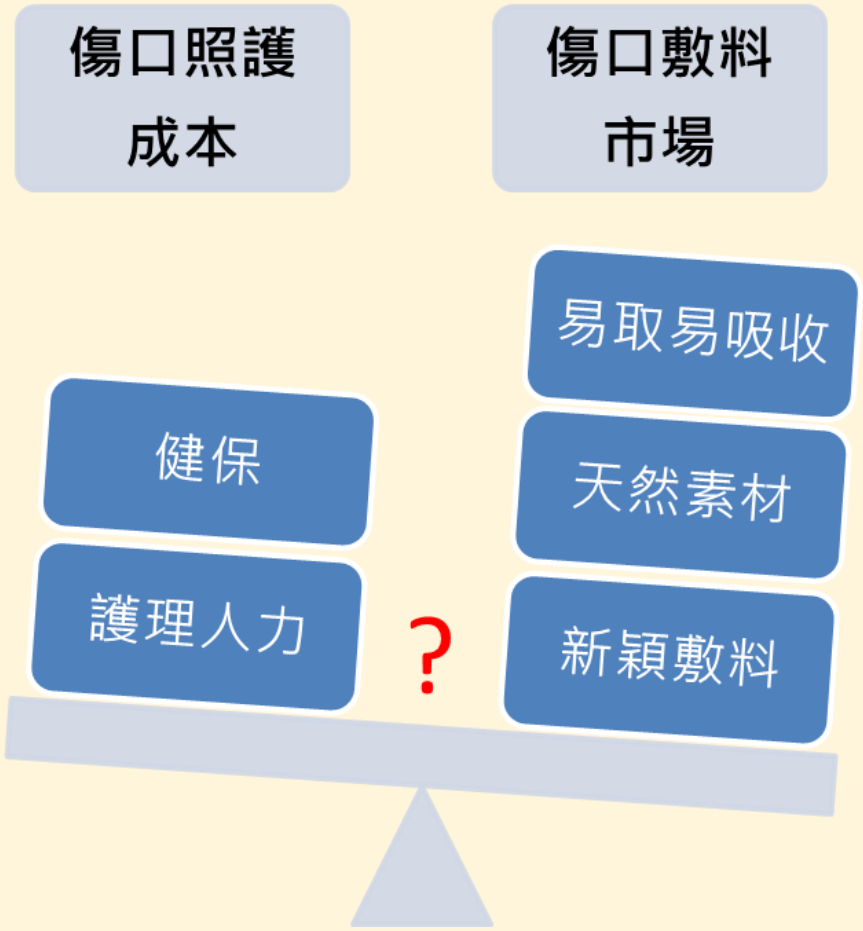


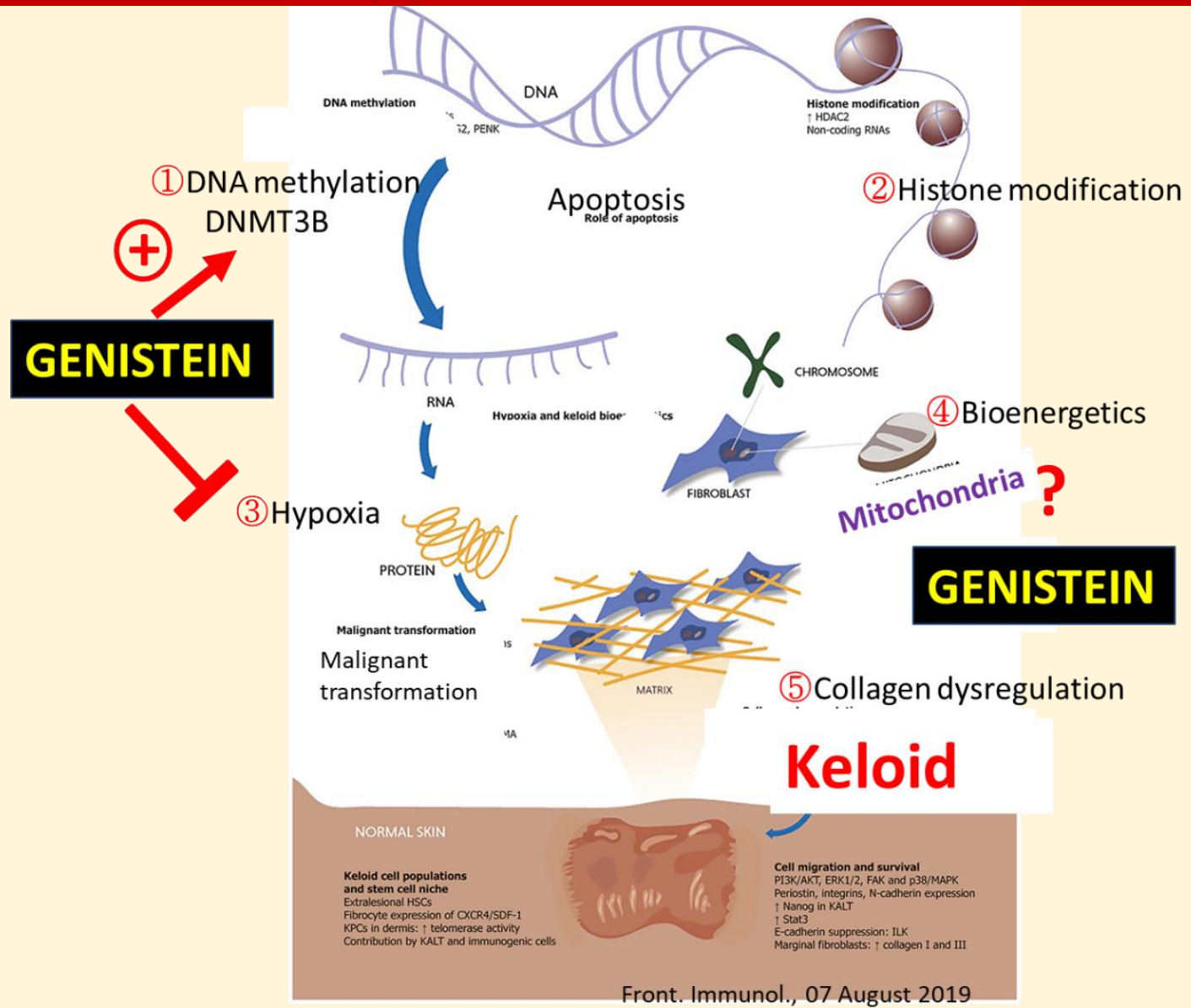

**Fig. 5** Animal model observations from the application of genistein. Male SD rats (3 to 4 weeks old) were divided into 4 groups ($n$ = 6 per group). The hair on the back of the rat was removed 2 to 3 days before the experiments. The back of each animal was marked with India ink, and the marked area was divided into 4 squares (0.3 × 0.3 $cm^2$ each); these squares were treated with 10 μL of each concentration (0.1% and 1%) of genistein solution in water, and one square was treated with water as a control area. The rats were pretreated with genistein once before exposed to UVB radiation (50 $mJ/cm^2$); subsequently, skin wrinkling was investigated (magnification: 10×)



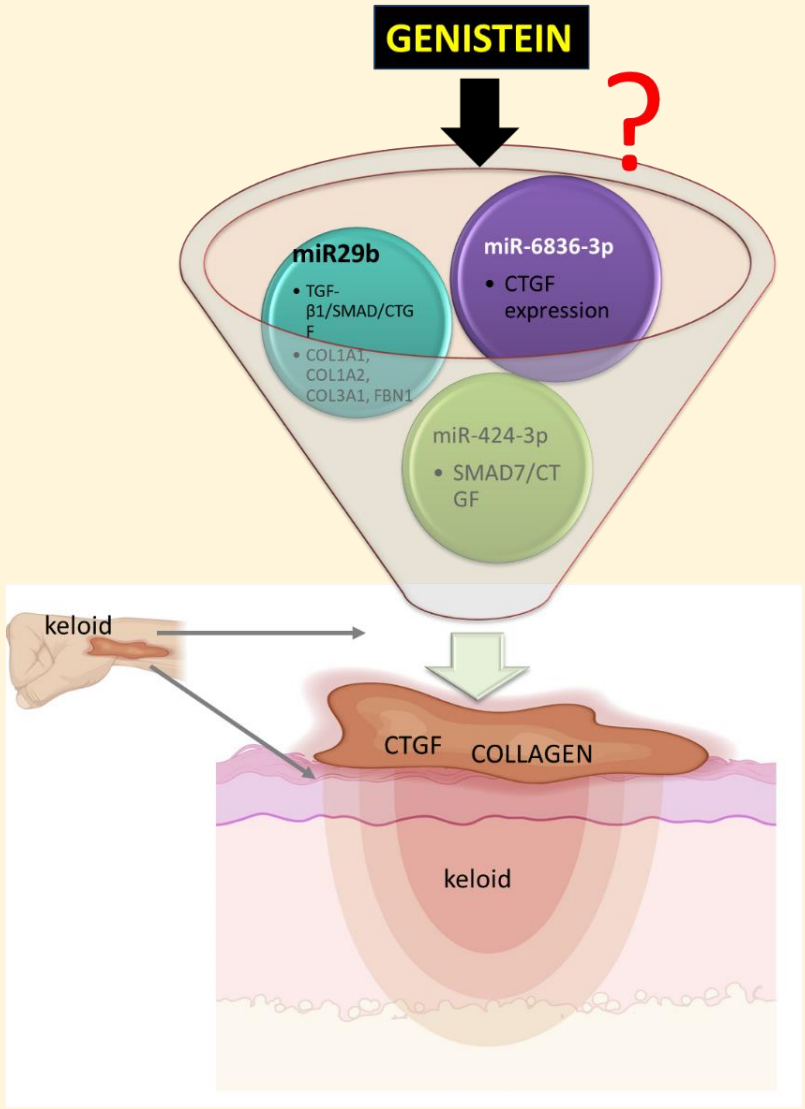
# 傷口照護與癒合機制 (蟹足腫 keloid)



# 傷口照護與癒合機制 (蟹足腫 keloid)




Front. Immunol., 07 August 2019



# 傷口照護與癒合機制 (蟹足腫 keloid)

目前蟹足腫治療常用的方法為: 外科切除、冷凍、雷射、磨皮、注射(肉毒)
蟹足腫治療常用的醫材如下:

外力施壓效果不彰，抑制keloid效果有限

+

醫療照護上經常使用OP side防水透氣敷料， 搭配免縫膠帶垂直貼，才能施壓傷口避免增生

# 傷口照護與癒合機制 (蟹足腫 keloid)

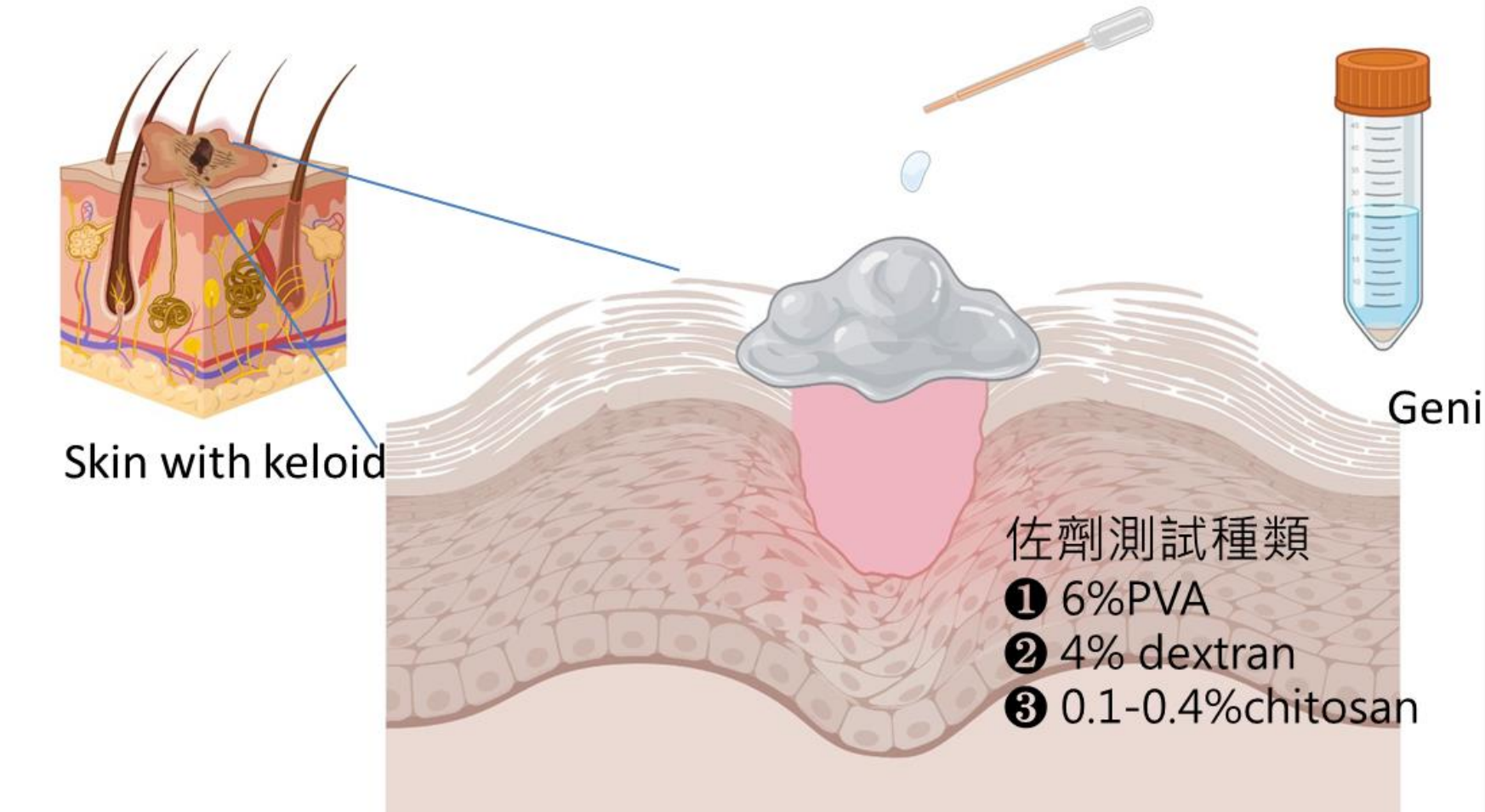
## 應從機制著手，Genistein凝膠介入細胞的增生機制，一邊癒合一邊調控

可利用市面上已有的凝膠型保護膜商品，添加Genistein有效濃度，與佐劑相容且易保存

Genistein

易取得.易保存
天然安全
凝膠對微環境施壓效果佳

# 傷口照護與癒合機制 (蟹足腫 keloid)



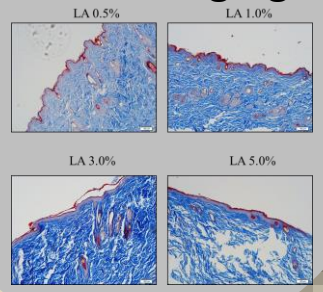
# 研究主題聚焦在解決臨床的照護問題

Keloid sample

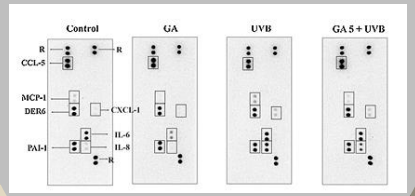
volunteer

Skin wound healing

UVB skin aging




Epigenetic Inflammation



Thanks for your attention