



# Chlorella sorokiniana W-87(CRYPTO™) induces mitochondrial-mediated apoptosis in human non-small cell lung cancer cells and inhibits xenograft tumor growth in vivo

## 引藻可誘導粒線體調控的人類非小細胞肺癌細胞凋亡並抑制異種移植腫瘤生長

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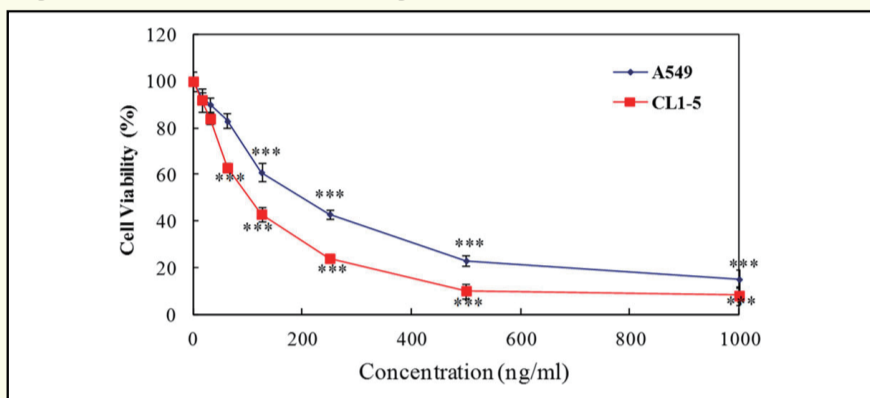
### 結論

研究結果證明引藻藉由抑制Bcl-2, XIAP和survivin的蛋白質表現誘導非小細胞肺癌細胞的線粒體調控途徑的細胞凋亡，且口服引藻也可顯著抑制皮下異種移植的腫瘤生長。

### Conclusions

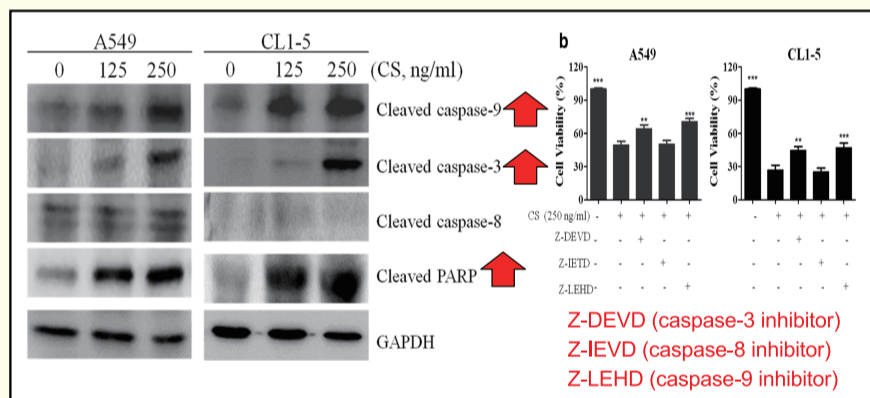
We demonstrated that *Chlorella sorokiniana* W-87(CRYPTO™) induces mitochondrial-mediated apoptosis in NSCLC cells via downregulation of Bcl-2, XIAP and survivin. In addition, we also found that the tumors growth of subcutaneous xenograft in vivo was markedly inhibited after oral intake of *Chlorella sorokiniana* W-87(CRYPTO™).

#### ◆ Cytotoxic and cell viability effects of CS in A549 and CL1-5 cells



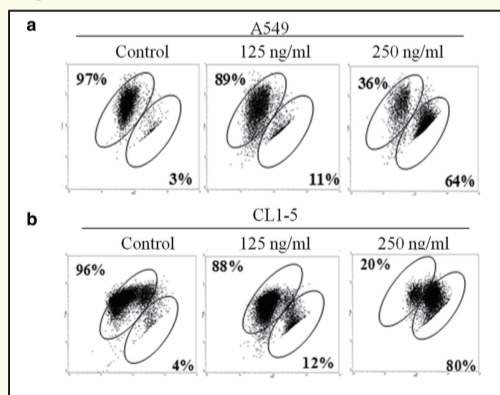
引藻產品對於兩種細胞株的存活率均具有劑量相關性的抑制效果

#### ◆ CS induces caspase-dependent cell death in A549 and CL1-5 cells



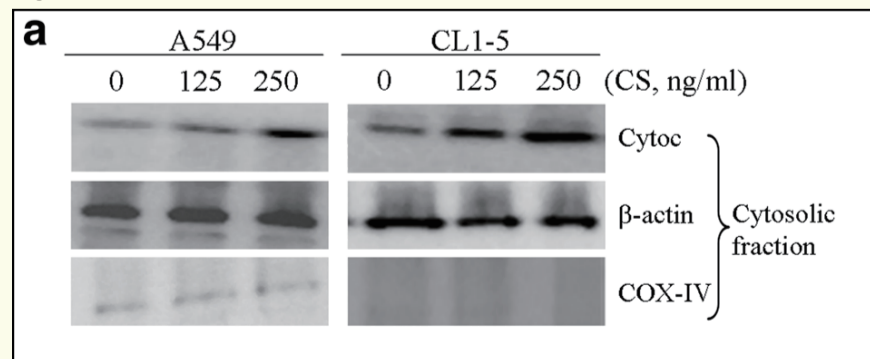
引藻產品活化caspase-9與caspase-3蛋白(且沒有活化caspase-8蛋白)顯示其細胞凋亡的途徑是走內在的粒線體途徑

#### ◆ CS caused loss of mitochondrial membrane potential and cytochrome C release



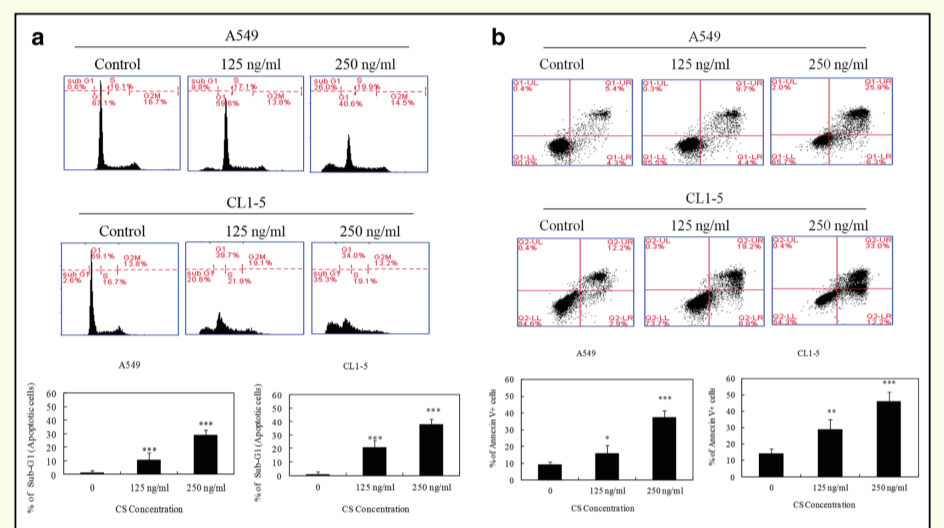
透過JC-1粒線體螢光染劑可發現粒線體電位差隨著引藻處理量增加而變低，顯示粒線體的膜系已受到破壞，並逐漸走向細胞凋亡途徑。

#### ◆ CS caused loss of mitochondrial membrane potential and cytochrome C release



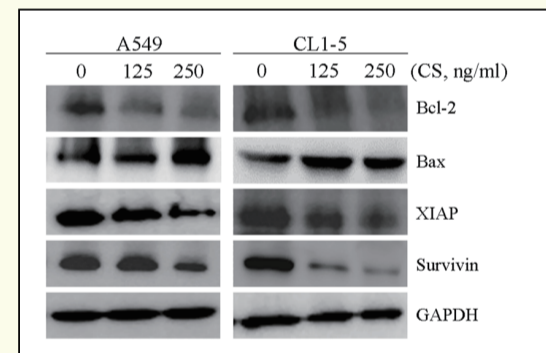
除了粒線體電位差的下降之外，細胞色素C的滲漏也是細胞凋亡的重要指標。透過西方墨點分析，可發現引藻處理的A549與CL1-5兩株細胞其細胞質部分都有較高的細胞色素C滲漏。

#### ◆ Effects of CS on cell-cycle distribution and apoptosis in A549 and CL1-5 cells



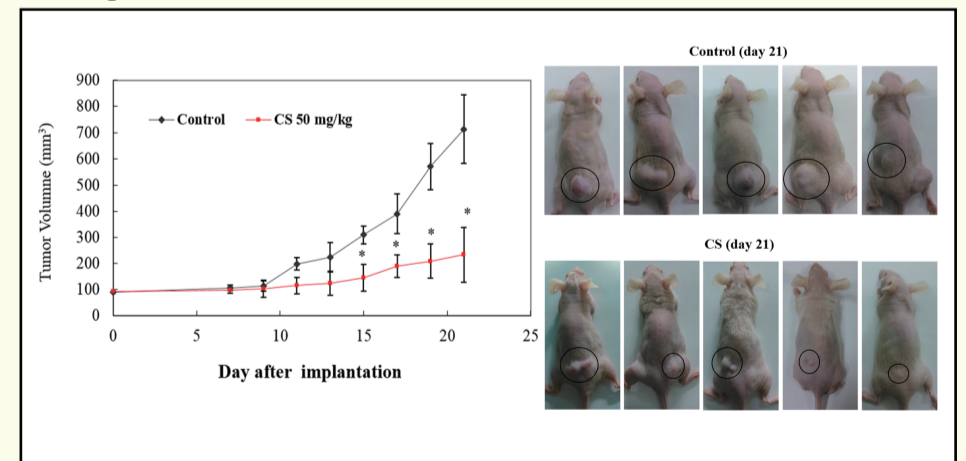
引藻產品增加sub-G1細胞週期的百分比及annexinV染色比例，顯示引藻確實是誘發A549與CL1-5細胞株的細胞凋亡

#### ◆ CS reduced Bcl-2, Bcl-xl and IAPs protein expression in A549 and CL1-5 cells



處理引藻24小時會造成A549和CL1-5細胞株的Bcl-2蛋白質表現量下降並增加Bax蛋白質的表現，此外也抑制兩種IAP家族蛋白(surviving與XIAP)的表現。

#### ◆ CS inhibits CL1-5 tumor growth in a subcutaneous xenograft tumor model



口服引藻產品可顯著抑制小鼠皮下異種移植的腫瘤生長

#### Acknowledgment

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