

Boesenbergin A, a chalcone from Boesenbergia rotunda induces apoptosis via mitochondrial dysregulation and cytochrome c release in A549 cells in vitro : involvement of HSP70 and Bcl2/Bax signalling pathways

ABSTRACT

The anti-cancer effect of Boesenbergin A (BA) isolated from Boesenbergia rotunda, via the induction of apoptosis resulting from mitochondrial dysfunction was assessed in human non-small cell lung cancer (A549) cells. The apoptotic mechanisms of BA induction on cancer cells were studied in the present study for the first time. Nuclear stain, measuring the accumulation of sub-G1 cell population and DNA ladder were done to determine the apoptosis. Further investigations into the depletion of mitochondrial membrane potential and release of cytochrome c determined that BA treatment induced apoptosis via the regulation of the expression of pro-survival and pro-apoptotic Bcl-2 family members. The involvement of both intrinsic and extrinsic caspases (caspase 3/7, 9 and 8) were significantly increased. Moreover the role of free radicals was significantly found to be elevated with concomitant decrease in HSP70. In conclusion the results from the current study indicated BA could be a promising agent for the treatment of lung cancer.

Keyword: Boesenbergia rotunda; Boesenbergin A; Apoptosis; Mitochondria; HSP70.