

The Cone (*Pinus densiflora*) Induced Apoptosis and Autophagy in Hepatic Stellate Cells

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The cone of Red Pine (*Pinus densiflora*), which has been used as a drug in traditional medicine. Its ethyl acetate fraction was reported to exert antioxidant, anti-melanogenesis, and anti-inflammation activities. Apoptosis of hepatic stellate cells (LX-2) is regarded as a potential strategy for alleviation of hepatic fibrosis. We conducted to investigate whether the treatment of cone has a potential to control of some factors related in apoptosis and autophagy in cell signaling pathways. We suggest that the cone induced apoptosis through confirming the expression levels of genes (cPARP, Bcl-XL, Bax, p53, and caspase-3) in LX-2 cells. Also, the cone may regulate autophagy (LC3, p62, Beclin-1, and ATG12). Remarkably, the treatment of cone may affect to formation of autophagosomes in the immunofluorescence image in live cells. These findings suggest that the ethyl acetate fraction from the cone of Red Pine (*P. densiflora*) may have potential as an alternative therapeutic agent for the alleviation and prevention of liver fibrosis.

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