

## Cytotoxic Effect on Human Cancer Cells and Antioxidant Activity of Extracts of *Codonopsis lanceolata* Root using Different Solvent Fractions

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### [Introduction]

Several research findings have shown that traditional medicinal plants have *in vitro* mutagenic or toxic and carcinogenic properties. It is important to explore medicinal plants for their cytotoxicity. Plant foods are potential sources of natural antioxidants, such as vitamin C, tocopherol, carotenoids, flavonoid, and phenolic acids which prevent free radical damage. *Codonopsis lanceolata* (CL) is well known to affect various pharmacological effects, and its consumption is increasing. In this study, the antitumor effects of the different solvent fractions extract of CL were evaluated by studying cytotoxic effects against three human cancer cell lines *in vitro* apoptosis, and we also examined the phenolic compound content and antioxidant activity.

### [Materials and Methods]

The cytotoxicity of CL extracts was assayed using human cancer cell lines, including HeLa, Calu-6, and MCF-7 for human cervical carcinoma, pulmonary carcinoma, and breast adenocarcinoma, respectively. The cell lines were purchased from the Korean Cell Line Bank for the MTT assay. Total phenols were determined by the modified method the Folin-Ciocalteu assay. Total flavonoid was measured using the modified method of Zhishen *et al.* (1999). The spectrophotometric analysis of ABTS scavenging activity of PG was determined according to the method described previously (Re *et al.*, 1999). The nitrite scavenging activity was determined according to a method using Griess reagent.

### [Results and Discussions]

At all extracts concentration, the cytotoxic effect on different fractions against human cancer cells was higher in n-hexane and butyl alcohol fractions than in the other fractions. The IC<sub>50</sub> value on HeLa cell showed the lowest on hexane fraction. Total polyphenol content on different solvent fractions varied from 102.43 to 153.52 mg/g. The DPPH and ABTS radical scavenging activity showed that the increase was proportional to the concentration, and the scavenging activity also showed the highest in ethyl acetate fraction. The nitrite scavenging activity of each fraction at pH 1.2 was in the order of EA>BA>MC>n-H>DW, and there was no distinct detection at pH 6.0. The results of this study suggested that the extract of CL root may assist in the potential biological activities, and it was found that the activity was different depending on the organic solvent fraction and the water fraction.

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