

상황머섯(*Phellinus linteus*)의 자실체로부터 분리한 ergosterol과 phenolic compound의 ALP 활성

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Ergosterols and Phenolic Compounds from the Fruit Body of *Phellinus linteus* Increase ALP Activity of Human Osteoblast-like Cells

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Objectives

Phellinus linteus is a well-known fungus belonging to the family Hymenochaetaceae. The extracts have been used as a traditional oriental medicine in Korea and Japan for the treatment of various diseases. Secondary metabolites from *Phellinus linteus* were evaluated for their proliferative effect on human osteoblast-like cell (Saos-2). MTT assay and ALP activity assay were used to assess the effect of those isolates on Saos-2.

Materials and Methods

○ Materials

IR spectra were obtained with a Perkin Elmer Spectrum One FT-IR spectrometer. EI-MS data was recorded on a JEOL JMSAX-505-WA. ¹H-NMR (400 MHz) and ¹³C-NMR (100 MHz) spectra were recorded on a Varian Unity Inova AS-400 FT-NMR spectrometer.

○ Methods

Phellinus linteus (1 kg) was extracted with 80% aqueous MeOH. Activity guided fractionation led to the isolation of ergosterols and phenolic compounds through the solvent extraction, solvent partitioning and repeated silica gel and ODS column chromatographies.

Results

From the result of spectroscopic data including NMR, MS and IR, the chemical structures of the compounds were determined as 1*H*-cyclopentanthracene (1), episterol (2), dehydroperoxyergosterol (3), ergosterol peroxide (4), 6-*O*-methycervisterol (5), cervisterol (6), 4-hydroxybenzalacetone (7), 2-(3',4'-dihydroxyphenyl)-1,3-benzodioxole-5-aldehyde (8), 3,4-dihydroxybenzalacetone (9), protocatechualdehyde

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(10) and protocatechuic acid methyl ester (11), respectively. Compounds 1~9 and 11 have been first isolated from *P. linteus* in this study. In addition, all phenolic compounds stimulated proliferation of Saos-2 cells and increased their ALP activity from $100.0 \pm 49.5\%$ to $271.4 \pm 24.7\%$ compared to the control. The present data demonstrate that phenolic compounds in *Phellinus linteus* stimulated mineralization in bone formation caused by osteoporosis.

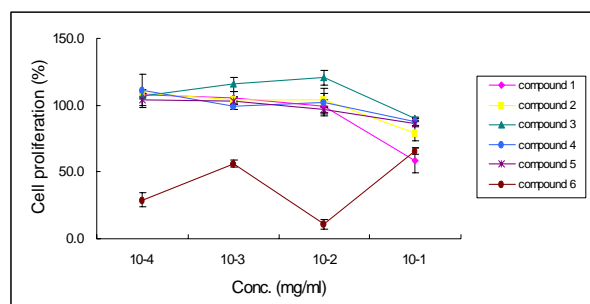


Fig. 1. Cell proliferation of ergosterols from the fruit body of *P. linteus* on Saos-2 cell.

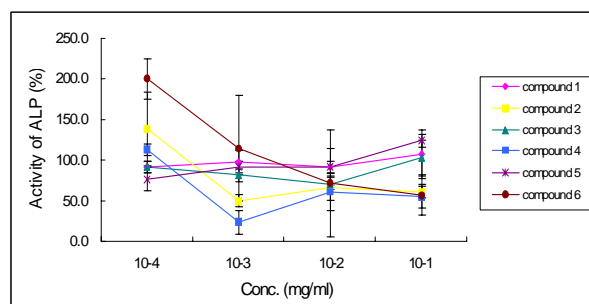


Fig. 2. ALP activity of ergosterols from the fruit body of *P. linteus* on Saos-2 cell.

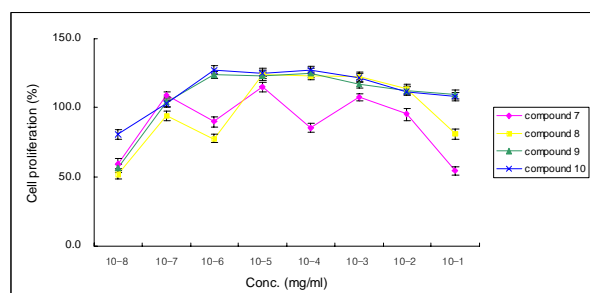


Fig. 3. Cell proliferation of phenolic compounds from the fruit body of *P. linteus* on Saos-2 cell.

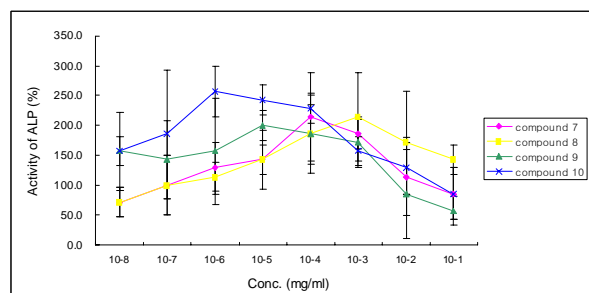


Fig. 4. ALP activity of phenolic compounds from the fruit body of *P. linteus* on Saos-2 cell.

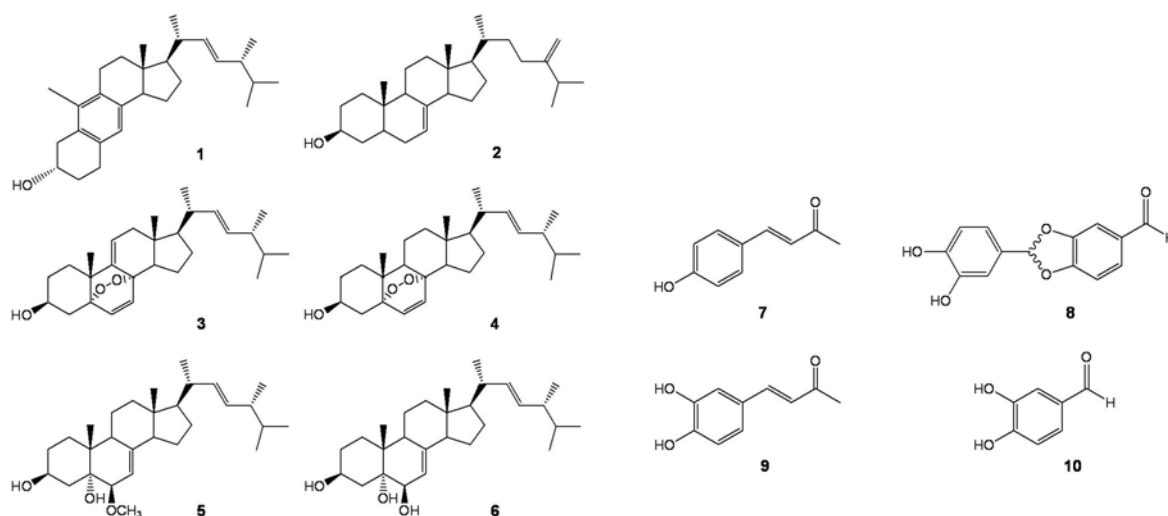


Fig. 5. Secondary metabolites from *Phellinus linteus*.