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### 13(E)-Labd-13-ene-8 $\alpha$ ,15-diol isolated from *Brachyglottis monroi* Induces Apoptosis on Human Breast Cancer MDA-MB231 cell line

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The inhibitory effect of 13(E)-Labd-13-ene-8 $\alpha$ ,15-diol(1), isolated from the ethanol extract of *Brachyglottis monroi*, on the proliferation of human breast cancer MDA-MB231 cells was examined. Compound (1) at concentration as high as 16 $\mu$ g/ml has inhibited the proliferation of MDA-MB231 and this cytotoxic effect was increased in a time and dose-dependent manners. The mode of cell death induced by (1) was found to be apoptosis, which was judged by the morphological alteration of the cells using DAPI staining and by the detection of DNA fragmentation using agarose gel electrophoresis. As cell death induced by (1) in MDA-MB231 cells show classic apoptosis feature, these results suggest that (1) induces apoptosis on MDA-MB231.

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### Antioxidant Effects of Hirsutanone Derivatives from *Alnus Japonica* on Copper Mediated human LDL Oxidation

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Subendothelial accumulation of foam cells plays a key role in the initiation of atherosclerosis. These foam cells accumulate in fatty streaks that evolve to more complex fibrofatty or atheromatous plaques. Oxidized LDL may also be involved in atherogenesis by inducing smooth muscle cell proliferation and smooth muscle foam cell generation.

In this study, two kinds of hirsutanone derivatives 1 and 2 were isolated from the methanolic extract of the leaves of *Alnus japonica* and characterized by their spectroscopic data. We explored the effect of compounds 1 and 2 on Cu<sup>2+</sup>-mediated human LDL oxidation. Compounds 1 and 2 exhibited significant LDL-antioxidant activity in the thiobarbituric acid-reactive substance (TBARS) assay with IC<sub>50</sub> values of 1.5  $\mu$ M and 3.3  $\mu$ M, respectively. More specifically,

LDL incubated with Cu<sup>2+</sup> had a lag-phase time (the elapsed time before the onset of rapid formation of conjugated lipid hydroperoxides) of 85 min. However, when 2  $\mu$ M of compounds 1 and 2 were present during incubation, the lag phase time was extended to 151 min and 110 min, respectively.

In conclusion, these compounds from the *Alnus japonica* have proven to be an antioxidant against lipid peroxidation of LDL. As LDL oxidation is a key event in the formation of early atherosclerotic lesion, the use of these natural antioxidant may be proven beneficial to attenuate atherosclerosis.

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