Study on the Inhibitory Effect of Arctigenin and Nobiletin on Human Lung Adenocarcinoma Cell-Specific Metabolic Inhibition

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Abstract

Cancer cell is generated by gene mutation when normal cells divide into cells. In Japan, many people die of lung cancer. An antitumor agent is one of the methods for treating malignant tumors. However, although antitumor agents have an inhibitory effect on many malignant tumors, it shows a high side effect on normal cells. So far, scientists of the University of the Ryukyus have found a component that exhibits strong anti-cancer effects on lung adenocarcinoma cells A549. Arctigenin (ARC)and Nobiletin (NOB) showed strong anti-cancer effects on A549 cell. This study investigated the effects of lung adenocarcinoma cells by adding ARC and NOB contained in food using A549 cells. The MTS assay measures the viable cell ratio and cell activity by utilizing the reduction reaction of intracellular mitochondria. The PI assay measures cell viability by staining reagent with nuclei in cells killed by methanol fixation. A 549 was cultured in 96 well plates at a concentration of 2.0×10^4 cells / well. After 24 hours, ARC and NOB were added to 96 wells at concentrations of 0, 2.5, 5, 10, 20 and 40 μM respectively. After 48 hours, the MTS reagent was added and the absorbance was measured at 490 nm. After MTS measurement and washing with PBS, the sample was added with 100% methanol and incubated at room temperature for 10 minutes. Then, it was washed with PBS, added with 10 nM PI reagent, and incubated at room temperature for 1 hour. Then, the absorbance was measured at 536/600 nm. The synergistic effect can be determined by comparing the actually measured value with the value multiplied by the sample given alone. In MTS assay, a synergistic effect was observed when the ARC was 10 and 20 μM , and the NOB was 5 and 10 μM. In PI assay, more than 80% of the cell nuclei was stained with PI reagent. Then, when only ARC and NOB were added, the PI reagent stained more than 85% of the cells. Experimental results showed inhibitory effect in MTS assay, but high cell viability in PI assay. This result suggests that it is possible to suppress the degradation of MTS reagent performed by mitochondria in cancer cells. Future study will be conducted to evaluate the effect of simultaneous treatment of ARC and NOB in cancer cells using metabolome analysis.

Keywords: Antitumor agents, Arctigenin, Cancer cell, Nobiletin

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