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**2 $\beta$ , 3 $\alpha$ , 23-trihydroxyurs-12-en-28-oic acid 처리에 의한  
인간 대장암 세포주 HCT-116의 apoptosis 유도**

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**2 $\beta$ , 3 $\alpha$ , 23-trihydroxyurs-12-en-28-oic Acid Induces the  
Apoptosis of Human Colon Carcinoma HCT-116 Cells**

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**Objectives**

2 $\beta$ , 3 $\alpha$ , 23-trihydroxyurs-12-en-28-oic acid was isolated from *Trapa pseudoincisa* S. et Z. It has a common structure of pentacyclic triterpenes and belongs to the amyrian ursolic acid group. The cytotoxic effect of this compound was investigated in human colon carcinoma (HCT-116) cells.

**Materials and Methods**

- Materials - 2 $\beta$ , 3 $\alpha$ , 23-trihydroxyurs-12-en-28-oic acid, MTT (3-[4,5-Dimethylthiazol-2-yl]-2,5-diphenyltetrazolium bromide), propidium iodide (PI), RNase A, YO-PRO-1 iodide
- Methods - cell culture, cytotoxicity assay, confocal microscopy, cell cycle analysis, DNA fragmentation assay

**Results**

2 $\beta$ , 3 $\alpha$ , 23-trihydroxyurs-12-en-28-oic acid showed dose-dependent cytotoxicity in HCT-116 cells. Confocal microscopy data showed that green fluorescence increased in 2 $\beta$ , 3 $\alpha$ , 23-trihydroxyurs-12-en-28-oic acid treated-HCT-116 cells in a time-dependent manner. 2 $\beta$ , 3 $\alpha$ , 23-trihydroxyurs-12-en-28-oic acid also increased the sub-G1 cell population of HCT-116 cells as well as ladder-like DNA fragmentation. Taken together, our results indicate that 2 $\beta$ , 3 $\alpha$ , 23-trihydroxyurs-12-en-28-oic acid induced apoptosis in HCT-116 cells.

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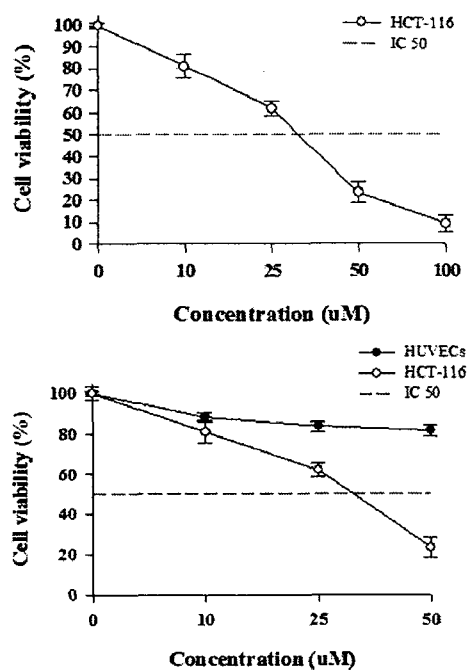


Fig. 1. Cytotoxicity of compound 2 $\beta$ , 3 $\alpha$ , 23-trihydroxyrus-12-en-28-oic acid against HCT-116 cells and HUVECs. The cells were treated with various concentrations of compound for 24 hrs and cell viability was determined by MTT assay. All data were represented as mean  $\pm$  S.D. of triplicates.

(IC 50: reports the concentration of compound that inhibits the growth of cells by 50%)

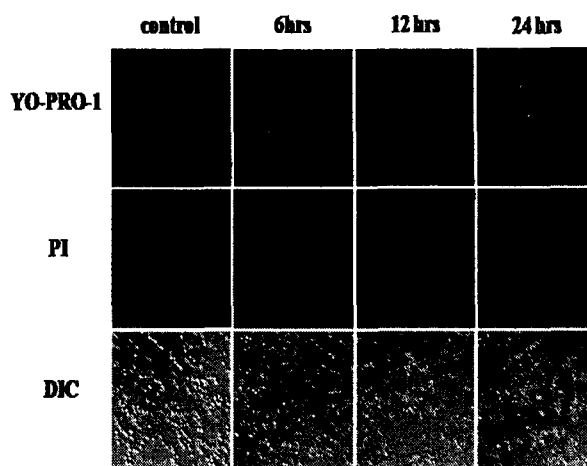


Fig. 2. Confocal microscopic image of compound 2 $\beta$ , 3 $\alpha$ , 23-trihydroxyrus-12-ene-28-oic acid treated HCT-116 cells. Marker for necrosis (propidium iodide staining) and apoptosis (YO-PRO-1) were used to stain control HCT-116 cells and treated-HCT-116 cells. HCT-116 cells were treated with 50  $\mu$ M of compound 2 $\beta$ , 3 $\alpha$ , 23-trihydroxyrus-12-en-28-oic acid for time course (6 hrs, 12 hrs, 24 hrs).