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Toxicity of Acrylonitrile on Human KB Cells in Culture

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Acrylonitrile is widely used in the manufacture of plastics, surface coatings, adhesives *etc.* The toxicity of this compound *in vivo* has been reported. Apparently the toxicity related to the cyanide effects (Hashimoto 1975).

We report here the *in vitro* toxicity of this compound using our cell culture systems (Mochida and Yamasaki 1984).

MATERIALS AND METHODS

Acrylonitrile was obtained from Wako Pure Co., Osaka, Japan. This compound was dissolved in dimethyl sulphoxide and then diluted in Eagle's minimum essential medium (Mochida *et al.* 1983).

The human carcinoma cell line KB and the method of cultivation was as described (Mochida and Yamasaki 1984). Toxicity test methods used were as reported (Mochida and Yamasaki 1984). The ID50 values (50% inhibitory dose to growth of cells) was used as an index of the toxicity of the compound.

Cultured human KB cells were fixed with glutaraldehyde and O_sO_4 and morphological changes in the cell surface were observed under a scanning electron microscope (SEM).

RESULTS AND DISCUSSION

Typical morphogical changes were seen using SEM (Fig. 1). In case of 72-h incubation with 5.7 μg/mL of acrylonitrile, the cytoplasmic projections contracted and bleb-like shapes appeared on the cell surface.

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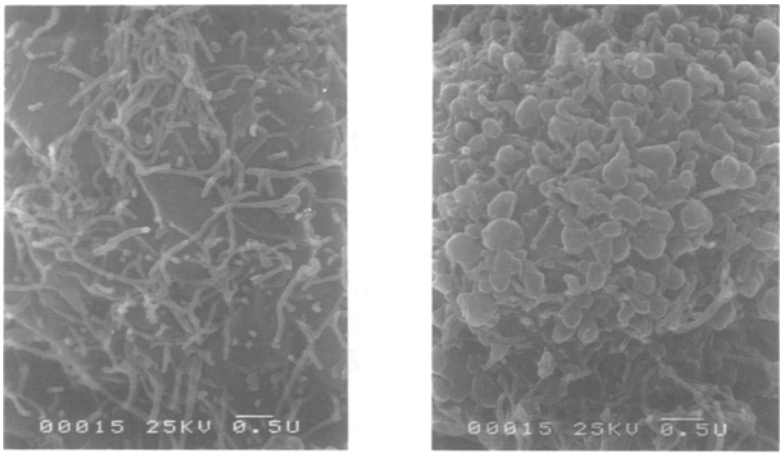

Figure 1. Human KB cells were cultured in the absence (A) and presence (B) of 5.7 μg/mL acrylonitrile for 72-h. Calibration scale=0.5 μ.

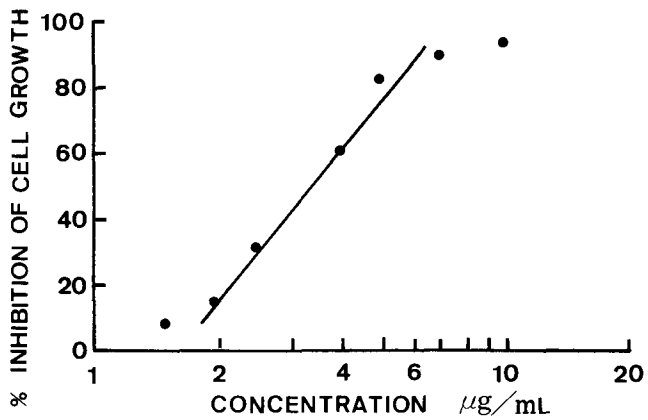

Figure 2. Dose-response curve obtained for acrylonitrile compound, determined using KB cells.

Fig. 2 shows the dose-response curve obtained with acrylonitrile. After 72-h of incubation, acrylonitrile completely inhibited the growth of KB cells *in vitro*, at a concentration of 30 μg/mL. Acrylonitrile had an ID50 of 3.5 μg/mL in this cell culture system. Acrylonitrile proved to be more toxic than carbon disulfide (ID50 : 160 μg/mL), 1,2-dichloroethane (ID50: 1500 μg/mL), nitrobenzene (ID50 : 42 μg/mL), tetrachloroethylene (ID50 : 195 μg/mL), trichloroethylene (ID50 : 630 μg/mL), 1,1,1-trichloroethane (ID50 : 420 μg/mL), trichloromethane (ID50 : 2200 μg/mL), bromodichloromethane (ID50 : 420 μg/mL), dibromochloromethane (ID50 : 140 μg/mL) and tribromomethane (ID50 : 80 μg/mL) in the same cell culture system (Mochida and Yamasaki 1984, Mochida and Saito 1985, Mochida *et al.* 1986).

These findings should aid in the development of toxicity tests using cell culture systems.

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