

Anticancer Research, 23, 4797-4803 (2003)

Changes in intracellular concentrations of polyamines during apoptosis of HL-60 cells.

C. Nakamura, E. Yasumoto, K. Nakano, T. Nakayachi, K. Hashimoto, K. Kusama, M. Fukuda, H. Sakashita, A. Shirahata (白幡 晶), H. Sakagami

Department of Meikai Pharmaco-medical Laboratory (MPL), Meikai University School of Dentistry, Sakado, Saitama, Japan.

Possible changes in the intracellular concentrations of polyamines were investigated during the apoptosis of human promyelocytic leukemic HL-60 cells. Treatment of HL-60 cells with gallic acid and epigallocatechin gallate(EGCG) resulted in the rapid decline of the intracellular concentration of putrescine, whereas that of spermidine and spermine was not significantly changed during the first 3 hours after treatments. Irradiation with UVB also selectively reduced the intracellular concentration of putrescine. On the other hand, cytotoxic concentrations of anticancer agents, such as etoposide and doxorubicin, only marginally reduced the intracellular concentration of putrescine during the first 3 hours. A significant decline of putrescine was observed at later stages when DNA fragmentation became more prominent. Three normal human cells (gingival fibroblast, pulp cell, periodontal ligament fibroblast) and human tumor cell lines (squamous cell carcinoma, submandibular carcinoma, malignant melanoma, hepatoma), which showed higher resistance to apoptosis inducer, had significantly higher putrescine concentrations than HL-60 cells. These data suggest that the intracellular concentration of putrescine may be a useful marker for the apoptosis induction or the sensitivity of the cells to apoptosis inducers.