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The anti proliferative and cytotoxic activity of sodium butyrate (SB) as a microbial product on human colorectal carcinoma cell lines

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Background: Sodium butyrate (SB), a short chain fatty acid, is a histone deacetylase inhibitor (HDI) and produced in the colonic lumen as a consequence of anaerobic bacterial fermentation of dietary fiber, undigested starch and proteins. SB serves as an energy source of colonic epithelium and plays a role in the maintenance of colonic homeostasis; in addition HDIs induce growth arrest and apoptosis in a variety of human cancer cells. Colorectal cancer metastases result in a significant number of cancer related deaths.

Methods: The viability of cells was measured by MTT assay. The adherent SW480 and HCT116 human colorectal carcinoma cells were seeded in 96-well plates. Different concentrations of SB (0, 1.0, 2.5, 5.0, 10, 20 $\mu\text{mol/L}$) were added and then incubated for 12, 24, 48, and 72 hours at 37°C with 5% CO₂. MTT solution was added to each well. Dimethylsulfoxide was added after 4 hours and the absorbance measured at 550 nm in a spectrophotometer. The 50% inhibiting concentration IC₅₀ were determined graphically.

Results: After 24 hours, a dose dependent cytotoxicity and morphological changes were observed which were accentuated after 48 and 72 hours. MTT assay results confirmed the morphologic observations. IC₅₀ for SW480 and HCT116 cells was 10 and 20 $\mu\text{mol/L}$ respectively. Results confirmed the anti-proliferative effect of Sodium butyrate on two mentioned cell lines.

Conclusion: Although many risk factors involved in engender colorectal cancer but it has not been possible to harness a rational approach to its prevention or treatment until now. Our results may suggest that the gene expression which is contributed in cell proliferation and apoptosis may be changed under pressure of HD inhibition due to SB which is a byproduct of bacterial fermentation in colon and this suggested mechanism may play a role for prevention of colon cancer; whereas more future investigation is necessary for confirmation.

Biography

I was born in Tehran, in 29 May 1978, Where I Attended Aeen Roshan high school and graduated in 1996. After that I studied Medical Laboratory Sciences at the University of Tehran and attained My Bachelor of Science (B.Sc.) degree in 2006. In 2011, I was Accepted in Master of Sciences Immunology Examination and Now I have MSc in Medical Immunology. I am interested in clinical research in the field of cancer therapy. I have experience of working in several Medical Laboratories having about 11 years.

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