Modulation of translation factor's gene expression by histone deacetylase inhibitors in breast cancer cells

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Abstract

The histone deacetylase inhibitors sodium butyrate (NaBu) and trichostatin A (TSA) exhibit anti-proliferative activity by causing cell cycle arrest and apoptosis. The mechanisms by which NaBu and TSA cause apoptosis and cell cycle arrest are not yet completely clarified, although these agents are known to modulate the expression of several genes including cell-cycle- and apoptosis-related genes. The enzymes involved in the process of translation have important roles in controlling cell growth and apoptosis, and several of these translation factors have been described as having a causal role in the development of cancer. The expression patterns of the translation mechanism, namely of the elongation factors eEF1A1 and eEF1A2, and of the termination factors eRF1 and eRF3, were studied in the breast cancer cell line MCF-7 by real-time quantitative reverse transcription-polymerase chain reaction after a 24-h treatment with NaBu and TSA. NaBu induced inhibition of translation factors' transcription, whereas TSA caused an increase in mRNA levels. Thus, these two agents may modulate the expression of translation factors through different pathways. We propose that the inhibition caused by NaBu may, in part, be responsible for the cell cycle arrest and apoptosis induced by this agent in MCF-7 cells.

Keywords: breast cancer; MCF-7 cells; sodium butyrate; translation factors; trichostatin A