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Background

Nuclear long non-coding RNAs (LncRNAs) regulate various cellular processes including the organization of nuclear sub-structures, the alteration of chromatin state, and the regulation of gene expression. Nuclear Enriched Abundant Transcript 1 (NEAT1) is a nuclear lncRNA transcribed from chromosome 11q13. Two transcripts are produced from the NEAT1 gene, 3.7-kb NEAT1_v1 and 23-kb NEAT1_v2. Both isoforms participate in the formation of the nuclear paraspeckles . NEAT1 is reported to be overexpressed in prostate cancer and a direct transcriptional target of hypoxia-inducible factor in many breast cancer cell lines.The aims of this study were to determine the effects of silencing NEAT1 on breast cancer cell survival.

Method

MCF7 and MDA-MB 231 cells were transfected with siRNAs to different NEAT1 sequences or NEAT1 antisense oligonucleotides (ASO). Controls received scrambled siRNA or scrambled oligonucleotide, as appropriate. In some experiments, cells were exposed to ultraviolet-((UV-C) light post-transfection to induce apoptosis, and then culture viability and apoptosis were assessed. NEAT1 expression was evaluated by qRT-PCR TaqMan® analysis.

Results

In MCF7 and MDA-MB-231 cells, siRNA-mediated silencing of NEAT1 reduced basal survival and after UV-C irradiation and decreased their colony forming ability. NEAT1 ASOs were more effective in silencing NEAT1 and caused a greater reduction in cell viability. NEAT1 silencing also affected cell cycle profile by enhancing the proportion of cells in GO/G1 phase.

Conclusion

NEAT1 regulates the survival of Breast cells. Down regulation of NEAT1 expression decreased cell survival, proliferation and modulated cell cycle progression of breast cancer cells, indicating a link between the NEAT1 expression levels and carcinogenesis of breast cancer.