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INVESTIGATING THE IMPACT OF HYPOXIA, HGF STIMULATION, AND SERUM STARVATION ON LINC00467 EXPRESSION IN MDA-MB-231 BREAST CANCER CELL LINE

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Abstract

Background: Long non-coding RNAs (lncRNAs) are key regulators of gene expression and play critical roles in cancer progression. Among them, LINC00467 has been identified as an oncogenic lncRNA associated with tumor growth, migration, and poor prognosis in multiple cancers, including breast cancer. However, its regulation under tumor microenvironment stress conditions—such as hypoxia, growth factor stimulation, and nutrient deprivation—remains insufficiently understood.

Objectives: This study aimed to investigate how different tumor-associated stress conditions—hypoxia, hepatocyte growth factor (HGF) stimulation, and serum starvation—affect the expression of LINC00467 in the MDA-MB-231 triple-negative breast cancer cell line. The goal was to better understand the role of LINC00467 in tumor adaptation and stress response.

Methods: MDA-MB-231 breast cancer cells were cultured under controlled laboratory conditions and subjected to different treatments: normoxia (control), hypoxia, HGF stimulation, and serum starvation. Total RNA was extracted from treated cells, followed by cDNA synthesis. The expression levels of LINC00467 were analyzed using polymerase chain reaction (PCR) and visualized through gel electrophoresis. Comparative analysis was performed to evaluate expression changes under each condition.

Results: The results demonstrated that hypoxia significantly upregulated LINC00467 expression compared to normoxic conditions. Similarly, HGF stimulation led to an increase in LINC00467 expression, suggesting activation through growth factor signaling pathways. In contrast, serum starvation resulted in a downregulation of LINC00467 expression, indicating a possible dependence on nutrient availability and cellular metabolic status. These findings suggest that LINC00467 responds dynamically to environmental stress signals within the tumor microenvironment.

Conclusions: This study highlights LINC00467 as a stress-responsive lncRNA that is differentially regulated by key tumor microenvironment factors. Its upregulation under hypoxia and HGF stimulation suggests a role in promoting cancer cell survival, adaptation, and possibly metastasis, while its downregulation under serum starvation may reflect reduced cellular activity or increased stress-induced

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apoptosis. Overall, LINC00467 may serve as a potential biomarker and therapeutic target in breast cancer, particularly in relation to tumor microenvironment-driven progression.

Keywords: LINC00467, hypoxia, hepatocyte growth factor (HGF), serum starvation, breast cancer, MDA-MB-231, long non-coding RNA, stress response, cancer progression, tumor microenvironment.

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