# The Effect of Nuclear and Cytoplasmic hnRNPA2B1 Isoforms on Proliferation and Migration of Breast Cancer Cells

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## Abstract

In terms of the molecular mechanisms involved in breast cancer, there are many splicing factors that contribute to the aggressiveness of the cancer. One of them is hnRNPA2B1. Previous research shows that hnRNPA2B1 has a positive correlation with breast cancer cell proliferation but with respect to breast cancer metastasis, research studies differ in the conclusion- positive correlation or negative correlation. While hnRNPA2B1 is a splicing factor, it is itself alternatively spliced as well; the isoform that includes Exon2 produces nuclear protein while the one excluding Exon2 produces cytoplasmic protein. Since the previous research has focused on hnRNPA2B1 as a whole, here, we investigate the effect of each isoform of hnRNPA2B1 on both breast cancer cell proliferation and migration. Our results show that transfection with hnRNPA2B1 AMO led to a reduction in the cell proliferation and cell migration of MDAMB231 cells (breast cancer cell line).


## Introduction

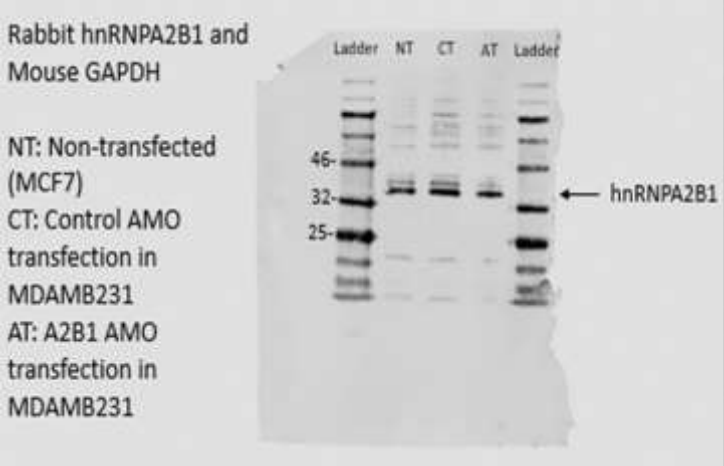
Breast cancer has the highest incidence rate worldwide and is the second highest cause of female mortality globally [GLOBOCAN, 2020]. hnRNPA2B1 is an RNA binding protein (RBP) that acts as a splicing factor impacting RNA processing and splicing which eventually affects translation process. Interestingly, hnRNPA2B1 does not only act as a splicing factor, but it is itself alternatively spliced as well. Several research studies have highlighted that hnRNPA2B1 expression has a direct/positive correlation with breast cancer metastasis leading to poor prognosis (Hu et al., 2017). However, some studies suggest otherwise: higher expression of hnRNPA2B1 is correlated with less metastasis in breast cancer patients [Liu et al., 2020]. However, the consensus from these studies is that cancer cell proliferation is positively correlated with hnRNPA2B1 expression (Hu et al., 2017).

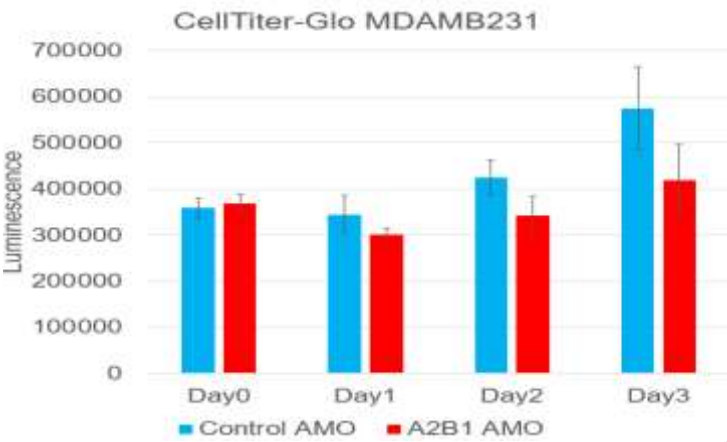
The alternative splicing of hnRNPA2B1 leads to the formation of two isoforms. While the retention of exon 2 is seen only in one isoform and is responsible for creating a nuclear protein, the absence of exon 2 leads to formation of a cytoplasmic protein. Interestingly, it has been shown that when exon 2 is excluded, the aggressiveness of the liver cancer is greater (Shilo et al., 2014). While hnRNPA2B1 plays an important role in breast cancer progression, it is still not clear what is the role of each of the two isoforms. To study the effect of both isoforms on breast cancer aggressiveness, we transfected the hnRNPA2B1 isoforms in MDAMB231 cells (breast cancer cell line) after which we tested its effect on breast cancer cell proliferation and migration.

## Methods

- Transfection of AMOs in MDAMB231 cells
- Western Blot to confirm that protein was not knocked down
- CellTiter-Glo Assay to test for cell proliferation
- Scratch Assay to test for cell migration

## Results




| Average Percentage of cell coverage 6 hours after the scratch was made | |
|---|---|
| Control AMO Transfection | hnRNPA2B1 AMO Transfection |
| 28.475% | 22.525% |

## Conclusion

In the case of cytoplasmic hnRNPA2B1 isoform, the cell proliferation and cell migration of MDAMB231 cells is lesser.

## References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