

## The Function of Circular RNA in Breast Cancer

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**Breast Cancer is widely known for its threat to the health of women. Circular RNAs are closely intertwined with cancer and have key roles. They can influence the resistance to breast cancer therapies and the growth of tumors. Circular RNAs can be under or overexpressed, which causes the promotion or inhibition of breast cancer cells. Circular RNAs can bind miRNA and regulate transcription. They both play important roles in tumor progression. Circular RNAs can also serve as biomarkers in breast cancer, including tissue-specific expression, and blood based. The article below explains the functions and impact of circular RNAs in Breast Cancer.**

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### Introduction

Circular RNAs are single-stranded RNA molecules that can be found in viruses and mammals. They were first discovered in plant viruses, and then found in humans in the 1970s [2]. They normally function as sponges, protein templates, and transcriptional regulators. They are created during the covalent binding of the 3' and 5' ends [2.] Because miRNAs are crucial in controlling the linked pathways of breast cancer, circular RNAs are assumed to cause alterations [2]. Evidence has been found that Circular RNA can be potential biomarkers in breast cancer. They also can develop resistance to drugs used in breast cancer. Different expressions of circular RNA breed different outcomes in breast cancer.

### Recent Progress

In a study of overexpression of circular RNA in breast cancer, it was found that 38 different

circular RNAs promote the development of breast cancer [3]. Hsa\_circ\_0003645 was expressed higher in breast cancer cells than in normal breast cells [3]. This circular RNA can quicken the production of breast cancer cells [3]. Another study showed that has\_circ\_0000515 in breast cancer patients lead to unreliable prognosis [3]. This circular RNA, when attached with certain miRNA, enhanced oncogene activity, which sped up the growth process of breast cancer cells [3].

Circular RNA can also have low expression [3]. Studies have shown that circular RNA can inhibit the growth of breast cancer by acting as an antitumor role [3]. CircCDYL is a type of circular RNA that exhibits a tumor suppressor role [3]. When this circular RNA is highly expressed, breast cancer patients survivability increases [3]. Circular RNA can encourage apoptosis and prevent the growth of

breast cancer cells [3]. CircNFIC enhances tumor suppressor expression, which stops breast cancer cell growth, relocation, and invasion.

Current methods used to diagnose breast cancer are expensive and invasive, and there is research to detect biomarkers more easily. Circular RNAs have emerged as a possibility in this category. Circular RNAs display tissue-specific expression [1]. Because of this, detecting these RNAs could help identify breast cancer and how they will react to different treatments [1]. Microarray techniques and RNA-sequencing are first used, and then digital droplet PCR and RT-qPCR are used to confirm the outcomes [1]. The tissue biomarker study showed that circular RNAs have the potential to be medically applicable biomarkers [1].

Circular RNAs could also have the potential to be blood-based biomarkers [1]. They are consistently found in the bloodstream because of their closed and circulated structure [1]. Liquid biopsy is a fast method to diagnose cancer [1]. It identifies the tumors by sensing biomarkers that flow in biofluids [1]. Many studies showed the enhancement of circular RNAs in plasma or serum sample found in patients with breast cancer [1]. To further determine the outcome of circular RNAs being used at blood-based biomarkers, a wet-lab experiment is conducted [1].

Circular RNAs have the ability to be biomarkers of resistance to some breast cancer therapies [1]. The existing breast cancer treatments include chemotherapy, surgery, hormone therapy, radiotherapy, and immunotherapy [1]. In chemotherapy, it was found that reestablishing the levels of circSMARCA5 enhanced the sensitivity of breast cancer tumors to chemotherapy [1]. In hormone therapy Circ-0025202 was conveyed as a possible biomarker of resistance to tamoxifen in hormone therapy, an endocrine therapy [1].

#### Discussion

The function of circular RNAs has recently emerged in breast cancer. They can either

encourage or discourage the growth of breast cancer cells. There is also an indication that circular RNA can be used as biomarkers. Although many studies have been conducted, there are still many factors of circular RNA that are still not understood. Some circular RNAs have not been identified yet. Not all circular RNA functions, including their regulatory methods and network, are known. In some of these studies, the sample size was small. Because of this, the data could be imprecise. In terms of using circular RNAs as biomarkers, none have been clinically approved. In order for approval, more trials should be conducted.

In conclusion, Circular RNAs serve great purpose in diagnosing and progressing of breast cancer. With further studies and research, circular RNAs could play a major factor in diagnosing and preventing breast cancer in women around the world.

#### References

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