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Non-coding RNAs as potential diagnostic and therapeutic targets in cancer: Modulatory effect of miRNA inhibitors on oncomiRs in breast cancer

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The regulatory mechanisms of oncomiR and tumour suppressor microRNAs play a critical role in carcinogenesis events. Increased expression of oncomiR in cancerous cells inhibits tumour suppressor genes, while decreased expression of tumour suppressor miRNAs potentially enhances the expression of oncogenes. Early-stage detection of BC is a critical factor for effective treatment of the disease and can increase the survival rate of BC patients. Maternally expressed 3 (MEG3) is a long non-coding RNA (LnCRNA) can act as a decoy by sequestering miRNAs-29 and 182 and it was reported to be a tumour suppressor in breast cancer. In BC, overexpression of miR-29 inhibits the expression of PTEN: the tumour suppressor. The deregulation of the expression of miRNAs has been shown to pave the way for the development of miRNA-based anti-cancer therapeutics. MEG3 rs7158663 G/A was genotyped and serum MEG3, miRNA-182, and miRNA-29 were measured in breast cancers, fibroadenoma, and controls by qPCR. The results showed that serum MEG3 levels were significantly decreased, according to the presence of the A allele in different study groups, while the expression of miR-182 and miRNA 29 was significantly elevated. In conclusion, MEG3, miR-182 and miRNA-29 are key genes involved in the development of BC and are considered novel potential non-invasive diagnostic biomarkers for BC. MiRNA-29 inhibitor is an anti-miRNA oligonucleotide that can directly bind to its target miRNA-29 (oncomiR) and block its function, restoring the expression levels of PTEN, which promotes apoptosis and inhibits tumour cell migration and invasion.

Key words: LnCRNA – miRNA-inhibitor – OncomiR- BC

Biography

Amr M. Abdelhamid is working as an Associate Professor of Biochemistry & Molecular Biology at MSA University with 15 years of cumulative work experience in academic and research fields. Dr. Amr earned his Master's Degree at the Faculty of Pharmacy, Cairo University in 2014 and holds his PhD from the Faculty of Pharmacy, Suez Canal University in 2017. He is also Microsoft certified in Azur AI Fundamentals and Machine Learning expert in 2021. His research interests are reflected in his wide range of publications in various international journals, with an interest in molecular diagnosis, SNPs, and non-coding RNAs as diagnostic biomarkers, prognostic tools, and therapeutic targets in many types of cancer. Dr. Amr is an academic scientific reviewer for many international journals. He supervised 15 graduation projects and research thesis, having 14 publications and attended 20 international and national conferences, with a Scopus h index of 7.