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Synthetic canonical miR-31 , a pleiotropically acting anti-metastasis miR-based therapeutic in invasive breast cancer

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Background and Aims: MicroRNAs are a novel group of short RNAs, that regulate gene expression in a post-transcriptional manner by affecting the stability or translation of mRNAs. Emerging roles for miRs in metastasis (metastamiR) have been shown the potentials of miRNA as a new paradigm for therapeutic intervention. MiR-31 has been shown to have roles in multiple steps of the metastatic cascade. miR-31 was recently reported to inhibit cell invasion, promote anoikis, and suppress colonization of ectopic sites.
Methods: The double strand oligo of mature miR-31 were designed and cloned to pcDNA 6.2gw/EmGFP according to the manufacturer instruction of the BLOCK-iT™ Pol II miR RNAi Expression Kit. Both MDA-MB231 and MCF-7 were cultured. Their miRNA have been extracted by high pure miRNA isolation kit and the expression of miR-31 have been quantified by Real time-PCR before treatment by pcDNA6.2 containing miR-31. Then the constructs have been transfected to MDA-MB231 and MCF-7 cell lines by lipofectamin 2000. The expression of miR-31 were quantified after 72 hours and invasion assay has been carried out for assessing the level of migration and invasion.
Results: The result of Real time PCR before treatment have been shown that the expression of mir-31 is very low in MDA-MB231 in comparison to MCF-7, but after transfection of construct to MDA-MB231 the quantification of miR-31 expression showed the significant increase in mir-31 expression and reduction in migratory and invasive characteristics.
Conclusions: Many specific characteristics of microRNAs in combination with compelling therapeutic efficacy data and a clear involvement in human disease have triggered the exploration of the possibilities of viewing microRNAs as therapeutic entities. Metastasis process is the major reason of cancer deaths, so developing a therapeutically useful modality could be a valuable step in treatment of cancer.

Keywords: MiR-31; Metastasis; MDA-MB231