

Lawrence Zhang
miRNA 205: Suppressing Inpp4b and Wnt5a Expression

MicroRNA (miRNA) 205 plays an important role in skin cancer by suppressing certain target genes. miRNA suppresses its target by binding to unique nucleotide sequences (seeds) in the 3'UTRs of the target's mRNA. Because Inpp4b and Wnt5a, both regulators of cell growth, have prominent miRNA 205 seeds, the miRNA may suppress their expression.

miRNA 205 seeds on the 3'UTRs of Inpp4b and Wnt5a were mutated using PCR to prevent the miRNA from binding. A Luciferase assay was performed to provide quantitative data of protein activity and miRNA 205 binding efficiency because there is no direct way to measure Inpp4b and Wnt5a activity. First, the mutated and wild-type 3'UTRs were ligated into Luciferase plasmids. A total of six different types of plasmids were created (mutated and wild-type Inpp4b, mutated and wild-type Wnt5a, and positive and negative controls). These plasmids were amplified through *E. coli* transformation, and later transfected into Mouse Epidermal Keratinocytes.

The results of the Luciferase assay show that the Luciferase activity of the plasmids with mutated 3'UTRs are significantly higher than the wild-type ones. Thus, miRNA 205 did bind to its seeds in the wild-type 3'UTRs to restrict protein synthesis.

In conclusion, miRNA 205 does suppress the expression of both Inpp4b and Wnt5a. Because miRNA 205 suppresses both Inpp4b and Wnt5a, it directly causes fluctuations in their expression levels, which in turn can cause cancer. Thus, miRNA 205 can be potentially used as an early marker to detect Inpp4b and Wnt5a-related cancers.