Overexpression of miR-133c and miR-362-3p in mouse oligodendroglioma could be part of a tumor suppression mechanism

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Oligodendroglioma is a type of glioma that originates from oligodendrocytes and it is sustained by cancer stem cells. Cancer stem cells may generate tumors through their self-renewal and “differentiation” into tumor cells constituting the tumor bulk. The transcription factor Sox2 is essential to maintain cancer stem cells within several tumor types (including some gliomas and lung tumors).
Cells from a mouse PDGFB-induced oligodendroglioma model overexpress the transcription factor Sox2; they show hyper-proliferation in culture and they are able to generate tumors after transplantation in mouse brain. These phenotypes are lost after Sox2 deletion.

Genome-wide analysis showed that in Sox2-deleted cells, 63 miRNAs are up-regulated and 3 miRNAs are down-regulated, so we hypothesized a tumor suppression mechanism based on miRNAs ability to inhibit target genes. In fact the miRNAs which are up-regulated in Sox2-deleted cells (no longer tumorigenic because they lost Sox2), could have a role against tumor phenotypes in wild-type cells, and their low expression in oligodendroglioma cells (tumorigenic cells) could promote tumor generation.
Conversely, the up-regulation of some among these miRNAs could represent a mechanism whereby Sox2 deletion blocks the proliferation and tumorigenic properties of mouse oligodendroglioma cells.

To test this hypothesis we plan to overexpress the two miRNAs that are most up-regulated in Sox2-deleted oligodendroglioma cells, through lentiviral transduction, in Sox2-WT oligodendroglioma cells.
If these miRNAs (miR-133c and miR-362-3p) antagonize genes involved in tumor progression, we expect a decrease in cell proliferation, and an antagonistic effect onto tumorigenesis, as shown in Sox2-deleted cells.