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Unique single miRNA expression model allows for further gene regulation study.

August 24, 2009 (Toronto, ON) – A team of scientists led by Sunnybrook researcher, Dr. Burton Yang, have developed a unique model, the first to track the path of a single strand microRNA for longer-term *in vitro* and *in vivo* studies of specific microRNAs. Their study published this month in *Nature Cell Biology* shows overexpression of the specific microRNA, miR-17 decreases cell adhesion, migration and proliferation *in vitro* and in transgenic mice.

MicroRNAs (miRNAs) are single-stranded regulatory RNAs (ribonucleic acids) often expressed as clusters of 18 – 24 nucleotides. MiRNAs are known to play key regulatory roles in aging, self-renewal, and disease-associated angiogenesis or disease-induced imbalance of the growth of new blood vessels from pre-existing ones which fuels disease progression in for example, tumour growth in cancers. One miRNA may regulate the expression of many genes.

"We anticipate our unique model of single miRNA expression may be evolved to allow the manipulation of individual miRNA functions *in vitro* and *in vivo*, and to serve as a novel model for studying gene regulation by miRNAs in gene therapy development," says Dr. Burton Yang, senior scientist, molecular and cellular biology, Odette cancer research program, Sunnybrook Research Institute.

Previous studies have detected clusters of miRNAs and their important roles in biological activity but the precise role of each miRNA in the cluster is unknown.

To monitor the functions of individual miRNAs, Dr. Yang and the team developed a novel expression vector with the capacity to express one, two or four copies of pre-miRNAs and mature miRNAs, and used green fluorescent protein (GFP) to track the path and functioning.

"Now that we have shown the role of MiR-17 in reduced cell proliferation, we are now looking at this miRNA's potential effect on tumour growth," says Dr. Yang, professor, laboratory medicine and pathobiology, Faculty of Medicine, University of Toronto.

Dr. Yang and his team previously demonstrated the role of miR-378 in enhancing tumour cell survival and tumour growth, work published in the Proceedings of the National Academy of Sciences of the United States of America.

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