

## **Characterization of human multipotent adipose-derived stem (hMADS) cells upon transient and stable microRNA over-expression**

For the first time in recorded history, the number of overweight people worldwide exceeds the number of those who are underweight. The obesity epidemic and its associated diseases have become major health problems in developed and developing countries. In 2009 it was found that not only babies, but also adult humans, possess functional brown adipose tissue (BAT), in addition to white adipose tissue (WAT). Brown adipocytes are not used for triglyceride storage and show uncoupled mitochondrial respiration mediated via UCP1 (uncoupling protein 1), thereby dissipating energy by non-shivering thermogenesis. Elucidating possible transformation mechanisms from energy storing (white) to energy dissipating (brown) fat is of utmost interest. In human multipotent adipose tissue-derived stem cells (hMADS) a shift from a white to brown adipocyte phenotype has already been shown. The RNA Biology Group is now investigating the effect of a promising microRNA candidate regulator of this process. MicroRNAs are small (22nt) regulatory molecules mediating either mRNA degradation or translational inhibition. We found that transient over-expression of our miRNA up-regulates UCP1 expression during adipocyte differentiation. Furthermore, the miRNA-mediated repressive effect on target genes was investigated. Over and above, a vector expressing our miRNA constitutively has been introduced into hMADS cells, referred to as xMADS and x-control-MADS (xcMADS) cells. After intense characterization of this novel cell model, we found no constant up-regulation of the microRNA and therefore cannot correlate the expression of our microRNA to UCP1. In addition to assessing human adipogenesis, mouse samples from BAT and WAT were analyzed. After the establishment of 36B4 as reference gene, we examined the mRNA levels of brown adipocyte marker genes and putative microRNA target genes in the stromal vascular and adipocyte fraction.