

P013 Investigating the role of MicroRNAs in human mesenchymal stem cell behaviour

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Mesenchymal stem cells isolated from bone marrow are able to self renew and are multipotent. These cells are capable of differentiating into many cell types including adipocytes.

The aim of this study is to determine the role of miRNAs in MSC adipogenesis.

Drosha is a key protein in the biogenesis of miRNAs and without it new miRNAs cannot be synthesised. We are using lentivirally-delivered shRNA to regulate knockdown of Drosha in MSCs.

Under adipogenic differentiation conditions these MSCs produce significantly more fat cells than control MSCs.

MSCs were derived from 4 different healthy young volunteers.

Adipogenesis was initiated and after 20 days we isolated a pure population of differentiating adipocytes. RNA was isolated from the differentiating cells and from undifferentiated cells as a control. MiRNA analysis was then carried out using MiChip- a microarray platform specific for the short nature of these molecules.

GeneSpring analysis of the microarray data demonstrated that 11 miRNAs are significantly downregulated and 9 are significantly upregulated in all donors as MSCs differentiate to adipocytes.

RT-PCR confirmed the changes for 2 of 4 of the miRNAs studied; analysis of other miRNAs is ongoing. The next step will be to overexpress and knockdown these miRNAs in MSCs.