

microRNAs as novel regulators of stem cell pluripotency and somatic cell reprogramming.

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Public Summary:

Emerging evidence suggests that microRNA (miRNA)-mediated post-transcriptional gene regulation plays an essential role in modulating embryonic stem (ES) cell pluripotency maintenance, differentiation, and reprogramming of somatic cells to an ES cell-like state. Investigations from ES cell-enriched miRNAs, such as mouse miR-290 cluster and human miR-302 cluster, and ES cell-depleted miRNAs such as let-7 family miRNAs, revealed a common theme that miRNAs target diverse cellular processes including cell cycle regulators, signaling pathway effectors, transcription factors, and epigenetic modifiers and shape their protein output. The combinatorial effects downstream of miRNA action allow miRNAs to modulate cell-fate decisions effectively. Furthermore, the transcription and biogenesis of miRNAs are also tightly regulated. Thus, elucidating the interplay between miRNAs and other modes of gene regulation will shed new light on the biology of pluripotent stem cells and somatic cell reprogramming.

Scientific Abstract:

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