

Gene Expression Signatures in Stem Cells - Lessons for Therapy

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ABSTRACT Stem cells that reside in adult tissues are principally quiescent, yet harbor enormous capacity for self renewal and differentiation. The “stemness” of these cells is dependant on the cues from the microenvironment or the niche, as well as from the genetic program of these cells, which was poorly understood till recent times. It has now been shown in model organisms that gene expression profiles comprise a phenotype that differs between individuals of different genetic backgrounds. Recent knowledge has also helped in identifying the molecular signature of the stem cells, that included several potentially relevant members of secretory pathways which would play a crucial role in identification of a core set of molecular components that define pluripotent cells. With the recently emerging models of cell- based therapies for different clinical situations, this information would be very useful in understanding the pathobiology of stem cells and also in evaluating the long-term success. It will also help in understanding the processes by which stem cells adopt specific cell fates, specifically with reference to pluripotent stem cells that have autologous as well as potential allogenic clinical applications.