FEATURES

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SWI/SNF in Cardiac Progenitor Cell Differentiation

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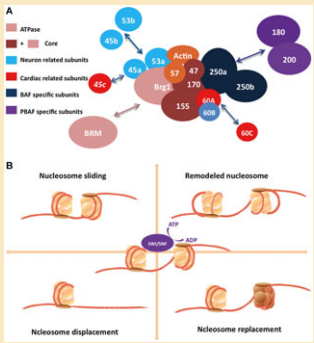

Cardiogenesis requires proper specification, proliferation, and differentiation of cardiac progenitor cells (CPCs). The differentiation of CPCs to specific cardiac cell types is likely guided by a comprehensive network comprised of cardiac transcription factors and epigenetic complexes. In this review, how the ATP-dependent chromatin remodeling SWI/SNF complexes work synergistically with transcription and epigenetic factors to direct specific cardiac gene expression during CPC differentiation is described. Furthermore, it is discussed how SWI/SNF may prime chromatin for cardiac gene expression at a genome-wide level. A detailed understanding of SWI/SNF-mediated CPC differentiation will provide important insight into the etiology of cardiac defects and help design novel therapies for heart disease.

Investigation of Rett Syndrome Using Pluripotent Stem Cells

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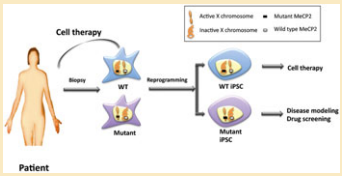

Rett syndrome (RTT) is one of most prevalent female neurodevelopmental disorders. De novo mutations in X-linked MECP2 are mostly responsible for RTT. Since the identification of MeCP2 as the underlying cause of RTT, murine models have contributed to understanding the pathophysiology of RTT and function of MeCP2. Reprogramming is a procedure to produce induced pluripotent stem cells (iPSCs) by overexpression of four transcription factors. iPSCs obtain similar features as embryonic stem cells and are capable of self-renewing and differentiating into cells of all three layers. iPSCs have been utilized in modeling human diseases in vitro. Neurons differentiated from RTT-iPSCs showed the recapitulation of RTT phenotypes. Despite the early success, genetic and epigenetic instability upon reprogramming and ensuing maintenance of iPSCs raise concerns in using RTT-iPSCs as an accurate in vitro model. Here, the current iPSC-based RTT modeling and its concerns and challenges is updated.

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