molecular interventions
pharmacological perspectives from biology, chemistry and genomics

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DEPARTMENTS

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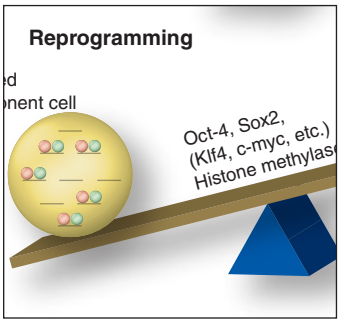
VIEWPOINTS

15 Histone Methylation: Bivalent Profiles in Pluripotency



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Histone methylation: The tipping point of pluripotency

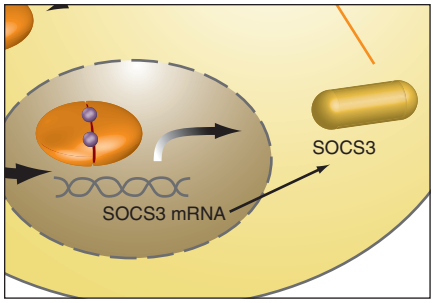
Histone modifications, specifically, methylation of lysine residues in histone 3 (H3), determine chromatin structure and accessibility for transcription. A recent study by Bernstein and Lander identified a unique pattern of H3 methylation at the promoter region of developmental genes in pluripotent stem cells. The pattern consists of the simultaneous presence of a silencing mark [methylation of Lys^{27} on H3 (H3K27me)] and an activation mark (H3K4me). This bivalent mark seems associated with a poised state of transcription and resolves upon differentiation largely into either H3K27me or H3K4me. Skin fibroblasts that can be reverted in culture to the pluripotent stage show re-establishment of the bivalent chromatin pattern. This switch in chromatin states may be key to our understanding of developmental and tissue specific regulation of gene expression and may be therapeutically useful in regenerative medicine.

Kathrin Muegge, Sichuan Xi, and Theresa Geiman

19 SOCS3: A Mediator in Hepatocarcinoma and Liver Regeneration

Cytokine responses are stringently controlled by a family of proteins termed the suppressors of cytokine signaling (SOCS), and deregulation of SOCS function is associated with many diseases, including several cancers, disorders in hematopoiesis, and autoimmune diseases. Our current understanding of the divergent roles of SOCS3 has recently improved and indicates that SOCS3 is critical in modulating cytokine-mediated and neoplastic-proliferative responses in the liver. The generation of hepatocyte-specific Socs3 knockout mice suggests that loss of SOCS3 expression encourages hepatocyte proliferation, survival, and hepatocellular carcinoma formation. By elucidating the regulation of pathways leading to liver regeneration we may gain useful insights to control liver disease and tumor growth.

Joanne Elliott



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A "shoe-in" as a molecular target?

REVIEWS