

**The 'sweet' spot of cellular pluripotency: protein glycosylation in human pluripotent stem cells and its applications in regenerative medicine.**

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**Public Summary:**

We are analyzing the role of glycoproteins in pluripotency and differentiation of human pluripotent stem cells. This review summarizes our progress.

**Scientific Abstract:**

**INTRODUCTION:** Human pluripotent stem cells (hPSCs) promise for the future of regenerative medicine. The structural and biochemical diversity associated with glycans makes them a unique type of macromolecule modification that is involved in the regulation of a vast array of biochemical events and cellular activities including pluripotency in hPSCs. The primary focus of this review article is to highlight recent advances in stem cell research from a glycobiological perspective. We also discuss how our understanding of glycans and glycosylation may help overcome barriers hindering the clinical application of hPSC-derived cells. **AREAS COVERED:** A literature survey using NCBI-PubMed and Google Scholar was performed in 2014. **EXPERT OPINION:** Regenerative medicine hopes to provide novel strategies to combat human disease and tissue injury that currently lack effective therapies. Although progress in this field is accelerating, many critical issues remain to be addressed in order for cell-based therapy to become a practical and safe treatment option. Emerging evidence suggests that protein glycosylation may significantly influence the regulation of cellular pluripotency, and that the exploitation of protein glycosylation in hPSCs and their differentiated derivatives may lead to transformative and translational discoveries for regenerative medicine. In addition, hPSCs represent a novel research platform for investigating glycosylation-related disease.

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