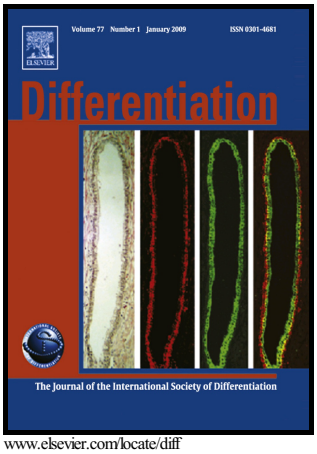

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Differentiation of hepatocyte-like cells from human pluripotent stem cells using small molecules[☆]

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Abstract

A variety of approaches have been developed for the derivation of hepatocyte-like cells from pluripotent stem cells. Currently, most of these strategies employ step-wise differentiation approaches with recombinant growth-factors or small-molecule analogs to recapitulate developmental signaling pathways. Here, we tested the efficacy of a small-molecule based differentiation protocol for the generation of hepatocyte-like cells from human pluripotent stem cells. Quantitative gene-expression, immunohistochemical, and western blot analyses for SOX17, FOXA2, CXCR4, HNF4A, AFP, indicated the stage-specific differentiation into definitive endoderm, hepatoblast and hepatocyte-like derivatives. Furthermore, hepatocyte-like cells displayed morphological and functional features characteristic of primary hepatocytes, as indicated by the production of ALB (albumin) and α-1-antitrypsin (A1AT), as well as glycogen storage capacity by periodic acid-Schiff staining. Together, these data support that the small-molecule based hepatic differentiation protocol is a simple, reproducible, and inexpensive method to efficiently drive the differentiation of human pluripotent stem cells towards a hepatocyte-like phenotype, for downstream pharmacogenomic and regenerative medicine applications.

Abbreviations:

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