Advanced in Liver Tissue Engineering: from 3D models to hepatocyte differentiation

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Human embryonic stem cells (hESC) have a limitless capacity for self-renewal and differentiation, promising an unlimited source of cells for cellular therapies and tissue engineering. ESC-derived hepatocytes could be used clinically to treat liver failure and by the pharmaceutical industry for drug screening.

Current techniques of hESC differentiation to hepatocytes result in mixed cell populations, low level of metabolic function, and limited engraftment. Interestingly, the cells that do engraft continue to display mature hepatic phenotype suggesting that the liver neonatal microenvironment provides the cues necessary to induce the final stage of hepatocyte maturation.

Here we report our findings of the development of an *in vitro* 3D model of the liver microenvironment supporting long-term liver specific function, and hESC differentiation to hepatocytes.