"Stem Cell Expansion and Differentiation in Microcarrier-Based Bioreactors for Large Scale Production"

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Abstract

Microcarriers have been widely used for various biotechnology applications because of their high scale-up potential, high reproducibility on regulating cellular behaviors, and their compliance with current Good Manufacturing Practices (cGMP). Recently, microcarriers have been investigated for stem cell expansion and differentiation, enabling potential scale-up of stem cell-derived products in large bioreactors. This presentation summarizes recent advances of using microcarriers for mesenchymal stem cell (MSC) and pluripotent stem cell (PSC) cultures in bioreactors. From the reported data, efficient expansion and differentiation of stem cells on microcarriers relies on their ability to modulate cell shape (round or spreading) and cell organization (i.e. aggregate size). Nonetheless, current screening of microcarriers remains empirical, and accurate understanding of how stem cells interact with microcarriers still remains unknown. Accurate characterization of biochemical and biomechani...

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