

## Modeling of Oxygen Supply Profiles in Stirred-Tank Aggregated Stem Cells Cultivation Process

**Authors :** Vytautas Galvanauskas, Vykantass Grincas, Rimvydas Simutis

**Abstract :** This paper investigates a possible practical solution for reasonable oxygen supply during the pluripotent stem cells expansion processes, where the stem cells propagate as aggregates in stirred-suspension bioreactors. Low glucose and low oxygen concentrations are preferred for efficient proliferation of pluripotent stem cells. However, strong oxygen limitation, especially inside of cell aggregates, can lead to cell starvation and death. In this research, the oxygen concentration profile inside of stem cell aggregates in a stem cell expansion process was predicted using a modified oxygen diffusion model. This profile can be realized during the stem cells cultivation process by manipulating the oxygen concentration in inlet gas or inlet gas flow. The proposed approach is relatively simple and may be attractive for installation in a real pluripotent stem cell expansion processes.

**Keywords :** aggregated stem cells, dissolved oxygen profiles, modeling, stirred-tank, 3D expansion

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