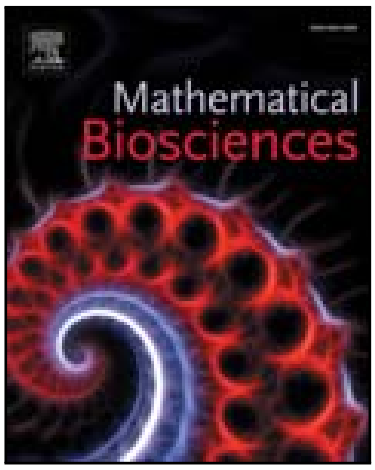

Simulation of the effects of oxygen carriers and scaffold geometry on oxygen distribution and cell growth in a channeled scaffold for engineering myocardium

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Highlights

- This study develops a mathematical model taking into consideration the shear stress, nutrient supply and cell growth in *channeled scaffolds* for engineering myocardium.
- A 55% increase in cell density occurred by using 6.4% perfluorocarbon (PFC) oxygen carrier compared to pure culture medium without PFC supplementation.
- A 30% increase in cell density occurred by increasing channel numbers of scaffold construct from 37 to 145.
- A 23% increase in cell density was observed by reducing the scaffold length from 0.5 cm to 0.2 cm.
- In overall, the average cell density of cardiac cells could be increased 2-fold by using PFC oxygen carrier and optimizing the scaffold's geometry, simultaneously.