Stiffness mediated heterogeneity

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Abstract

1 Introduction

2 Implemetation

2.1 Program Flow

2.2 Cell/ECM properties and their range

Biological Cell

Prpoerty Name	Value
type	
age	
stiffness	(0,1)
divisionRate	(0,1)
size	(0,1)
contractility	(0,1)
invasiveness	(0,1)
degradationPotential	(0,1)
sensingRadius	1

ECM Site

Prpoerty Name	Value
type	0
fiberDensity	(1,10)
crossLinking	(0,1)

2.3 Function details

2.3.1 Update Division Rate

$$divisionRate = \frac{Number\ of\ ECM\ Sites\ in\ Neighbourhood}{Number\ of\ ECM\ Sites\ in\ Neighbourhood\ +\ 1} \quad (1)$$

2.3.2 Update Stiffness

$$stiffness = \frac{\sum_{\forall\ i\ and\ ECM\ Site\ \in\ Neighbourhood} crossLinking_i}{Number\ of\ ECM\ Sites\ in\ Neighbourhood} \quad (2)$$

2.3.3 Update Degradation Potential

$$degradationPotential = \frac{\sum_{\forall\ i\ and\ ECM\ Site\ \in\ Neighbourhood} fiberDensity_i}{\sum_{\forall\ i\ and\ ES\ \in\ Neighbourhood} fiberDensity_i\ +\ 2} \tag{3}$$

2.3.4 Update Fiber Density

$$fiberDensity_i = fiberDensity_i\ -\ \ fiberDensity_i * averageDegradationRate \tag{4}$$

where

$$Average\ Degradation\ Rate = \frac{\sum_{\forall\ i\ and\ BC\ \in\ Neighbourhood degradationPotential_i}}{Number\ of\ BC\ in\ Neighbourhood} \tag{5}$$

where BC is Biological Cell

2.3.5 Update State Of Transient Amplifying Cell

3 Results