Persistent Random Walkers and Durotaxis

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Abstract:
Motile biological cells in tissue often display the phenomenon of durotaxis, i.e. they tend to move towards stiffer parts of substrate tissue. The mechanism for this behavior is not completely understood. We consider extremely simplified models for durotaxis based on the classic persistent random walker scheme. We show that even a one-dimensional model of this type sheds interesting light on the classes of behavior the cells might exhibit. In particular, we claim that more realistic models that assume that cells sense only the local stiffness are unlikely to represent the real biology. Cells must be able to sense the gradient of stiffness in order to show the effects observed in experiment.