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A new mathematical model for cell motility with nonlocal repulsion from saturated areas

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The main purpose of this work is the mathematical modelling of large populations of cells under different deterministic interactions among themselves, in balance with random diffusion. We focus on cell-cell interaction mechanisms for a single population confined to an isolated domain. We derive a macroscopic mathematical model including a nonlocal saturation coefficient depending on a crowding capacity, as part of a nonlocal drift term. Then, this capacity acts as a threshold above which repulsion effects appear. This macroscopic model is approached using two different microscopic discrete models based on Eulerian or Lagrangian reference systems, respectively.

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