

CAHN-HILLIARD SYSTEM: FROM NONLOCAL TO LOCAL

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We provide a rigorous mathematical framework to establish the limit of the nonlocal model of cell-cell adhesion introduced in [2] to a local model. When the parameter of the nonlocality goes to 0, the system tends to a Cahn-Hilliard system with degenerate mobility and cross interaction forces. The proof is based on the strategy developed in [1] for the single Cahn-Hilliard equation. Numerical simulations show that the latter model preserves the diversity of cell sorting patterns seen in experiments and previous nonlocal models. It also has the advantage of having explicit stationary solutions.

References

- [1] C. Elbar and J. Skrzeczkowski. Degenerate Cahn-Hilliard equation: From nonlocal to local. *Journal of Differential Equations*, 364:576–611, 2023.
- [2] C. Falcó, R. E. Baker, and J. A. Carrillo. A local continuum model of cell-cell adhesion. to appear in *SIAM Journal on Applied Mathematics*.