Decay bounds in a model for aggregation of microglia: application to Alzheimer's disease senile plaques

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Abstract

We study a model for aggregation, in space, of microglia. Using biological parameters found in the literature, testable thresholds are derived such that aggregation will not form if conditions are less than the threshold. This yields criteria which may determine usable bounds under which Alzheimer's disease senile plaques cannot form. The model we use has been developed by Luca *et al.* [1] and involves chemoattractant and chemorepellent chemicals. Our analysis applies to two and three dimensional spatial domains.

Keywords: Aggregation of microglia, Chemoattraction, Alzheimer's disease, Chemorepulsion, energy estimates.

References

[1] Luca, M., Chavez-Ross, A., Edelstein-Keshet, L. & Mogilner, A. 2003 Chemotactic signaling, microglia, and Alzheimer's disease senile plaques: is there a connection. *Bull. Math. Biol.* **65**, 693–730.