Andreas Reppas
Technische Universität Dresden
Germany

Error correction cell mechanism for lateral inhibition differentiation waves under the influence of extrinsic noise

Cell fate specification is an orchestrated procedure which is often regulated through differentiation waves. One of the most important and well-studied signaling pathways known to trigger such waves is the Notch/Delta mechanism. Notch/Delta induces the principle of lateral specification whereby a differentiated cell inhibits its neighbors from adopting the same fate. In the current work we investigate the effect of “extrinsic noise” on cell fate specification driven by Notch/Delta interactions. Extrinsic noise results in the emergence of furrows of “frustrated cells” within the “salt and pepper” pattern generated by lateral inhibition. Finally, we present an error-correction mechanism based on cell motility that balances the fluctuation caused by the noisy interactions and allows cell fate specification to be regulated through the Notch/Delta differentiation wave.