

Pigment pattern formation in zebrafish during late larval stages: a model based on local interactions

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ABSTRACT: We present a model to explain pigment cell pattern formation in the late larval stages of zebrafish, *Danio rerio*, and its mutants, based on new time sequence experimental data. The model stresses the importance of differential intercellular adhesion and the mechanisms of stem cell regulation to explain pigment pattern formation in zebrafish. All interactions included in the model are local in contrast to the previous models for pattern formation which are based on long range interactions. The hypotheses of the model are tested through a mathematical (cellular automaton) model. Simulations show that differential cellular adhesion together with an appropriate mechanism of stem cell regulation are able to reproduce the main characteristics of pattern formation in the wild type zebrafish and mutants. The results obtained with the simulations are compared with experimental data and specific experimental tests to the predictions of the model are provided.