

Abstract Submitted
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A Model of R8 Cell Specification in the *Drosophila* Eye

MATTHEW PENNINGTON, DAVID LUBENSKY, University of Michigan — R8 photoreceptors are specified in a precise hexagonal pattern behind an advancing front as it traverses the eye imaginal disc during *Drosophila* development. In an attempt to better understand this patterning event, we have developed a mathematical model consisting of coupled differential equations on a lattice incorporating auto-activation, long-range activation, and short-range inhibition. The model is based on known elements of the regulatory gene network involved in patterning, and an analogy with discrete Nagumo systems is helpful in understanding its dynamics. We have developed analytic and numeric results for its behavior on a 1D lattice. Significantly, this model can reproduce patterns similar to those seen both in wild-type eye discs and in several mutant phenotypes. We argue that much of the model's behavior is a consequence of the fact that self-activation is cell-autonomous; this behavior represents a novel mode of pattern formation distinct from classical ideas such as Turing patterns or morphogen-dependent positional information.

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