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Maria-Veronica Ciocanel* (veronica_ciocanel@brown.edu), Brown University, Box F, Providence, RI 02912, and **Bjorn Sandstede** and **Kimberly Mowry**. *PDE models for messenger RNA localization in Xenopus (frog) oocytes.*

Messenger RNA (mRNA) localization is essential for *Xenopus* (frog) egg cell development and embryo patterning. This accumulation of RNA at the cell periphery is not well understood, but is thought to depend on diffusion, bidirectional movement and anchoring mechanisms. Our goal is to test these proposed mechanisms using dynamical systems analysis of linear and nonlinear PDE systems, informed by numerical parameter estimation. The model analysis allows us to extract asymptotic quantities such as effective velocity and diffusion, and yields approximate traveling wave solutions. The different parameter estimates in various regions of the cell cytoplasm are used to predict localization patterns and timescales for both healthy and mutant egg cells. Our results confirm the hypothesis of bidirectional transport, and suggest new experimental directions. (Received September 11, 2016)