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## **Regulatory Control of Response Thresholds in Polarizing Cells**

Chemotactic cells can be either sensitive or insensitive to noisy environments. Some require sufficiently large heterogeneous stimuli to respond, others undergo random motion in the absence of directed stimuli, and yet others transition between the two behaviours. Motivated by recent experimental work on GTPase polarization in HeLa cells, we investigate biochemical control of response thresholds that determine these phenotypes. A minimal model of GTPase / Phosphoinositide interactions, developed based on these experiments, is presented. Using a new nonlinear PDE bifurcation technique, we show the presence of both threshold and instability driven patterning, map the dependence of response thresholds on experimentally probed parameters, and discuss the biological implications of model – experiment agreement. Time permitting, we will discuss the more general mathematical and biological structure responsible for this threshold control which is not specific to the proposed biochemical network.