

Abstract Submitted  
for the MAR07 Meeting of  
The American Physical Society

**Fine tuning by miRNAs in development** PETER MCHALE, EREL LEVINE, HERBERT LEVINE, UCSD — The unique role played by microRNA in a developing embryo is a topic of much current research interest. One possibility is that microRNA diffuse within a developing tissue, acting as communicators between different cells. Here we pursue this possibility in two different contexts. The first case occurs when the transcription profiles of the microRNA and its target are spatially anticorrelated, as for example is the case in the *iab4-Ubx* system in fly. Conversely, in the second context the two transcription profiles are correlated in space, as may be the case for the *mir10-Hoxb4* system in mouse. In each context we identify a major function for a mobile miRNA. In the first, miRNA serve to induce an all-or-nothing response of the mRNA profile to its morphogen by generating a sharp boundary between domains of high and (ultimately) low target expression. In the second, miRNA amplify polarity in the target expression pattern by removing residual mRNAs. Importantly, our model predicts that these two functions require very different type of diffusion. While our results are highly quantitative, we propose ways of realizing them in experiments, taking into account limitations of standard experimental techniques.

Peter McHale  
UCSD

Date submitted: 20 Nov 2006

Electronic form version 1.4