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Department of Medicine
Channing Division of Network Medicine

Channing Network Science Seminar

Dec 12, 2014, 11am @ 5th-floor Conference Room

Speaker: Megha Padi, Ph.D



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Title: **Single-cell p53 dynamics in response to oncogenic activation**

Abstract: Cellular heterogeneity is a key factor in many biological contexts like stem cell differentiation or drug resistance. In addition, single-cell measurements can reveal insights into molecular networks and pathways that would not be evident from population-averaged data. For instance, p53 is an important tumor suppressor that counteracts cellular stresses like DNA damage and oncogenic activation. Using single-cell data, it has been shown that double-stranded breaks in DNA cause low-amplitude pulses of p53, reflecting the fact that a negative feedback loop lies at the core of the p53 pathway. However, the response of p53 to oncogenes has not been studied at the single-cell level. Using fluorescent reporters and time-lapse microscopy, we have measured the dynamics of p53 after oncogenic activation in live single cells. We observe a variety of responses, including high-amplitude increasing pulses, depending on the amount of oncogene in each cell. I will present a simple mathematical model of the p53 pathway, and discuss how different aspects of the model correspond to the behaviors we see. I will describe how this line of investigation led us to design further experiments using different reporters and perturbations, and outline our goals for future work.

hosted by: Kimbie Glass