Govindan Rangarajan, J Tissue Sci Eng 2014, 5:3
http://dx.doi.org/10.4172/2157-7552.S1.014

OMICS Group Conferences
Accelerating Scientific Discovery

3rd International Conference on
Tissue Science & Regenerative Medicine
September 24-26, 2014 Valencia Convention Centre, Spain

Critical thresholds in cell fate determination

Govindan Rangarajan
Indian Institute of Science, India

It is well known that cell fate depends on a variety of complex interacting factors. Nevertheless it is important to have simple mathematical models that capture the essential features involved in cell fate determination. We hypothesize that there are critical thresholds for expression levels of key genes (such as Myc) involved in the process. Below the critical threshold, the cell has a particular phenotype (say, normal) and above the threshold, the cell has a different phenotype (say, cancer or stem cell). Using tools from nonlinear dynamics we show that the above assumption can lead to reversible changes in cell phenotype. In particular, we implement the threshold in terms of coupling coefficients of nonlinear oscillators in the cell and we demonstrate that these oscillators undergo a bifurcation leading to oscillator death (and consequent change in cell fate) once the threshold is crossed.

Biography

Govindan Rangarajan obtained his PhD from University of Maryland, College Park, USA. He was a Staff Scientist at the Lawrence Berkeley National Laboratory, USA before moving to the Indian Institute of Science, Bangalore. He is currently a Professor there. His research interests include nonlinear dynamics, computational neuroscience and mathematical biology.

govindan.rangarajan@gmail.com