



THE CHINESE UNIVERSITY OF HONG KONG

Department of Physics

SEMINAR

Oscillation Patterns in Genetic Feed-Back Signalling

by

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Date: ~~November 17, 2008 (Monday)~~

Time: 4:00 - 5:00 p.m.

Place: 128, Science Centre, CUHK

ALL INTERESTED ARE WELCOME

Abstract

We model oscillation patterns in four different eucaryotic systems: Hes1, p53-mdm2, NF-kB and Wnt-Notch. In each of the systems we identify the feed-back loops for the genetic regulations. Oscillations are possible when time delays are present, either by directly introducing a delay, by many steps in the loops or by saturated degradation. The oscillations are important for cell apoptosis and the control of inflammation. The Wnt-Notch system is essential in embryo segmentation. We further identify the feed-back dynamics by means of symbolic dynamic and derive general symbolic rules for the oscillatory patterns.

S. Krishna, M.H. Jensen and K. Sneppen, "Spiky oscillations in NF-kappaB signalling", Proc.Nat.Acad.Sci. 103, 10840-10845 (2006).

S. Pigolotti, S. Krishna and M.H. Jensen, "Oscillation patterns in negative feedback loops", Proc.Nat.Acad.Sci. 104, 6533-6537 (2007).

G. Tiana, S. Krishna, S. Pigolotti, M.H. Jensen and K. Sneppen, "Oscillations and temporal signalling in cells", Physical Biology 4, R1-R17 (2007).

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