Colloquium

The Institute Colloquium

Erik van Nimwegen
University of Basel

Host:

Although it is often tacitly assumed that gene regulatory interactions are finely tuned, how accurate gene regulation could evolve from a state without regulation is unclear. Moreover, gene expression noise would seem to impede the evolution of accurate gene regulation, and previous investigations have provided circumstantial evidence that natural selection has acted to lower noise levels. I will discuss how, by evolving a large library of synthetic E. coli promoters de novo, and comparing the noise properties of these synthetic promoters with those of native E. coli promoters, we found that, contrary to expectations, synthetic promoters naturally exhibit low noise.
That is, low noise is the default state of E. coli promoters, implying that selection must have acted to increase the noise levels of a subset of E. coli promoters that are characterized by large expression plasticity and large numbers of regulatory sites. I will present a general theory of the interplay between gene expression noise and gene regulation that explains these observations. The theory shows that propagation of expression noise from regulators to their targets is not an unwanted side-effect of regulation, but rather acts as a rudimentary form of regulation that facilitates the evolution of more accurate regulation.

Monday, November 23, 2015 12:45pm - 02:00pm
Raiffeisen Lecture Hall, Central Building

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