



Hamilton Institute

Differentiation and Integration by cells:

The Cellular Calculus

Professor Phil Hodgkin

Head, Immunology Division

The Walter and Eliza Hall Institute of Medical Research

Victoria, Australia

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Abstract:

There are many regulators of lymphocytes that alter the rates of proliferation and affect differentiation, the change of cells from one type to another. In this talk I will explore more closely how differentiation of lymphocytes is regulated by signals added alone and together.

Key findings include:

- Lymphocytes operate as if composed of a series of independent machines governing times to divide, die and differentiate.
- These machines are 'stochastic' making each cell slightly different.
- Changes in the likelihood of differentiation are often linked to progressive cell division.
- Regulatory signals affect the mean and possibly the variance of the probability distributions governing the internal machinery.
- The extreme heterogeneity in fate of individual cells following stimulation of a population can be described accurately by interleaving independent probability distributions governing times to divide, die as well as the divisions at which differentiation occurs.
- Conflicting decisions of fate taken at the same time are often resolved with a hierarchy of priority.

It is possible to incorporate these experimental rules into models that provide an accurate, quantitative and internally regulable simulation of lymphocyte growth and regulation.

Venue: Seminar Room, Hamilton Institute, Rye Hall, NUI Maynooth

Time: 1.30 - 2.30pm (followed by tea/coffee)

Travel directions are available at www.hamilton.ie

