

COLLOQUIUM

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Identification of a core set of signature cell cycle genes whose relative order of time to peak expression is conserved across species

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A405 Wells Hall

10:20 a.m. - 11:10 a.m.

Refreshments: 10:00 a.m.

Abstract

Cell cycle in eukaryotes is a well-coordinated process with cells going through four distinct phases before dividing. Genes with periodic expression are known as cell-cycle genes. To discover evolutionarily conserved cell-cycle genes, biologists are often interested in identifying genes that are periodic in multiple organisms. Since cell cycle is a carefully orchestrated process, one may hypothesize that the relative order of time to peak expression among the core set of cell-cycle genes is conserved evolutionarily. In this talk we introduce a novel statistical methodology by formulating the problem of interest as an order restricted inference problem on a unit circle. Standard order restricted inference methods do not directly apply here due to the geometry of the circle. We introduce a simple conditional test, whose null distribution can be approximated by central chi-square distribution, to test the hypothesis of interest. Using the proposed statistical methodology, we discover six cell-cycle genes whose relative order is potentially conserved evolutionarily. Methodology described in this talk could help biologists formulate and test other similar hypotheses.

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