

Introduction to microarray technology

Lecture 17, Statistics 246

March 18, 2004

Outline

A little background

Types of microarrays

cDNA arrays

Affymetrix GeneChips

Uses and types of microarrays

Microarrays are currently used to do many different things: to detect and measure gene expression at the mRNA or protein level; to find mutations and to genotype; to (re)sequence DNA; to locate chromosomal changes (CGH = comparative genomic hybridization), and more. There are many different ways to do these things without microarrays, but microarrays promise a high-throughput approach to the tasks.

There are many different types of microarrays (called **platforms**) in use, but all have a high density and number of biomolecules fixed onto a well-defined surface. Low density means 100s (e.g. protein antibodies), medium density would be 1000s to 10s of 1000s (e.g. cDNA arrays), and high-density is 100s to 1000s of 1000s, i.e. millions (e.g. short oligonucleotide arrays).

In general there are five **basic aspects** of microarrays: a) coupling biomolecules to a platform; b) preparing samples for detection; c) hybridization; d) scanning; and e) analyzing the data.

Obviously we're interested in e), but without some knowledge of a) to d), we'd be dangerous.