Analysis and Application of DNA Microarrays

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Bio 210
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Class Information WWW

http://www.soe.ucsc.edu/~lowe/courses/MicroarrayW03/
(corrected)

Also, will be a link from my lab website:
http://lowelab.ucsc.edu/

Syllabus & reading list posted by monday
Lectures will be posted by morning of lecture
Structure of Course

• Structure of Course
  – Mondays: Lecture
  – Wednesdays: Guest speakers in Microarray Club
  – Friday: Lab
Survey

- For lab, who has a conflict 11-12:30 Fridays?
(Supplementary) Textbook for Course


• Reading: Chapter 1
Introductory Review


(link posted on class website)
Teams

• Groups of 2-3 for “for-credit” students assigned by me next week for labs & problem sets
Grading

Project Course:

• 50% Problem sets
• 50% Final project write-up (analysis of your own dataset)
Getting more background…

- If a method or algorithm is cited & you need to know more about it, look it up at PubMed:
- search “PubMed” database (not “protein” or “nucleic acid”), use AND / OR / NOT between keywords
  (will put a link from class web page)

**Example**: “cluster AND analysis AND microarray” gives 180 references – you can read abstracts, and usually get full text on-line from .ucsc.edu domain
Molecular Biology Reference

- Current Protocols in Molecular Biology – a good reference if you are new to experimental genetics: [www.wiley.com/legacy/cp/cpmb/](www.wiley.com/legacy/cp/cpmb/)
- Follow link “Click here for access to current protocols online”
- Select “Current Protocols in Molecular Biology”
- Read “Introduction” sections, and go from there (will put a link from class web page)
The Goal

“Big Picture” Cell biology –
  – What are all the components & processes taking place in a cell?
  – How do these components & processes interact to sustain life?

• Functional Genomics – figuring out cellular functions & relationships between all genes in a genome
Genome Sequence Flood

• Typical results from initial analysis of a new genome by the best computational methods:

  For 1/3 of the genes we have a “good” idea what they are doing (high similarity to exp. studied genes)
  For 1/3 of the genes, we have a guess at what they are doing (some similarity to previously seen genes)
  For 1/3 of genes, we have no idea what they are doing (no similarity to studied genes)
Large Scale Approaches

• Geneticists used to study only one (or a few) genes at a time
• Now, thousands of identified genes to assign biological function to
• Microarrays allow massively parallel measurements in one experiment
Microarrays Becoming Mainstream

• A “PubMed” search of keyword “microarray”
  – One year ago: 1177 references
  – Today: 2701 references

• variable *quality*, huge *quantity* and *complexity* of the data makes correct interpretation non-trivial

• An understanding of the technology will allow you to:
  – Be critical of published work
  – Recognize opportunities to employ the technology yourself