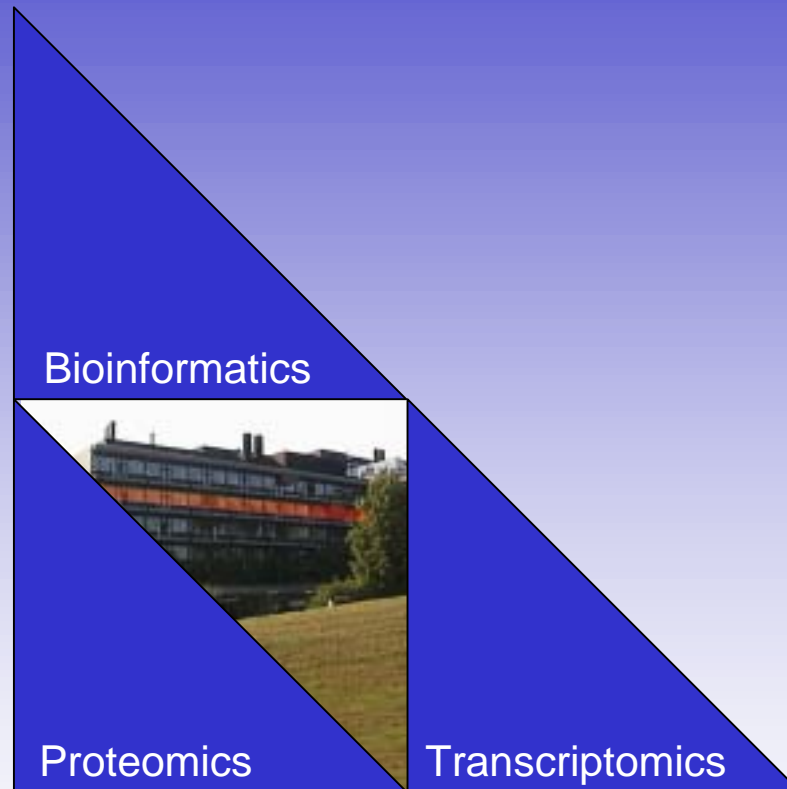
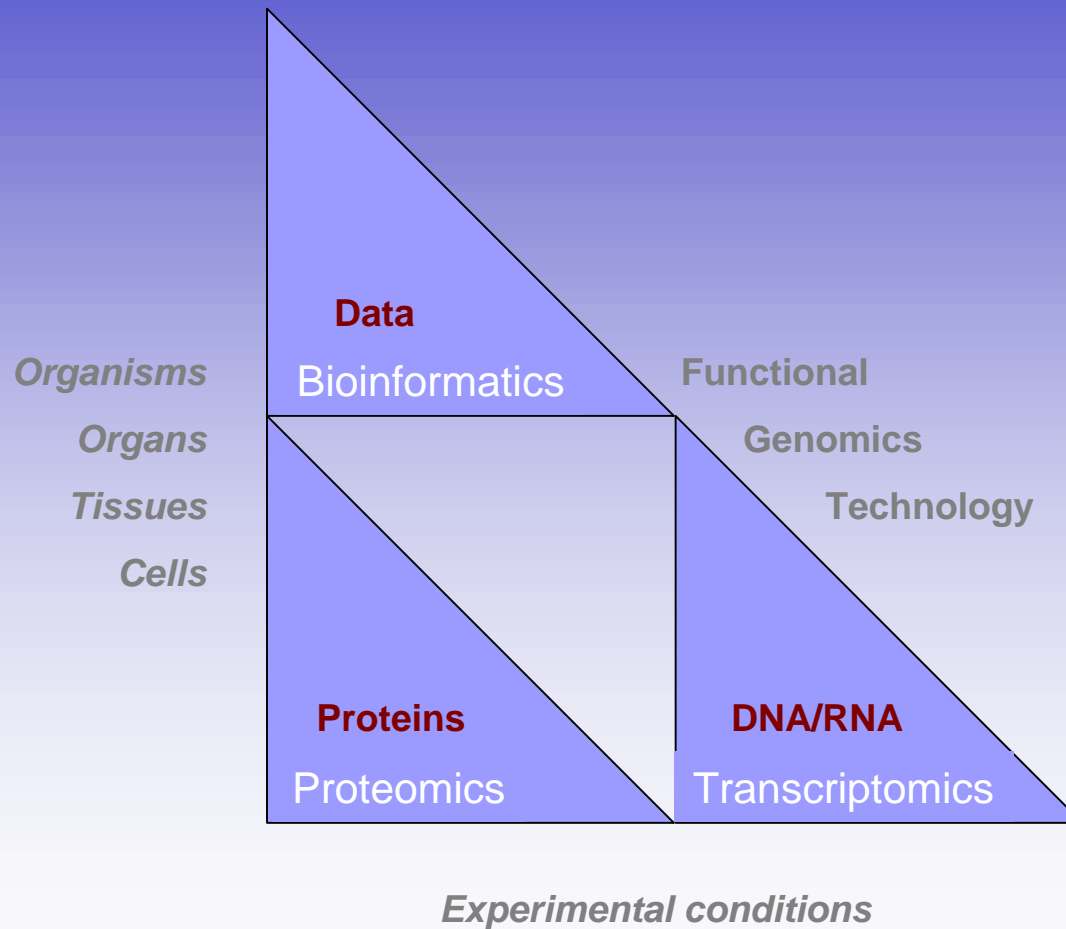


Microarraying in the Context of Functional Genomics

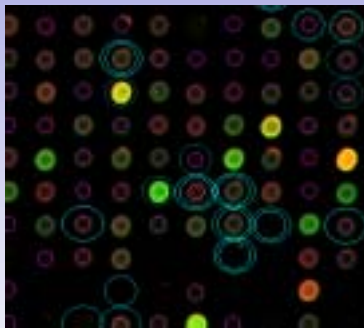
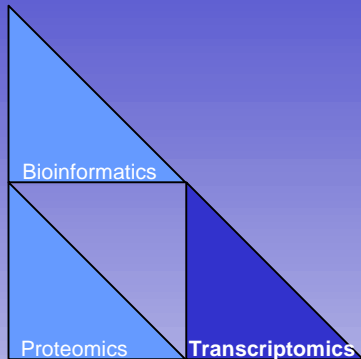
Principle Areas of Research



Principle Areas of Research



Genomics and Transcriptomics



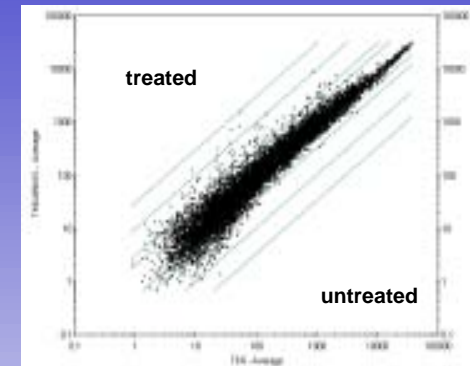
Genomic Applications

- genomic comparisons
- SNP typing
- Sequencing
- ...

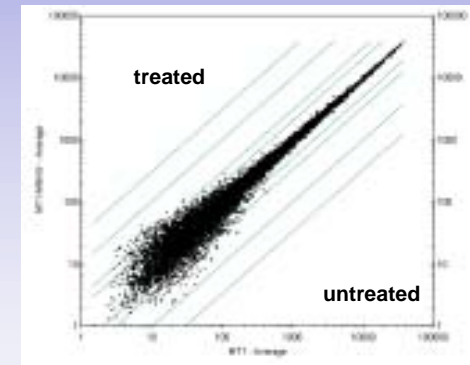
Functional Characterization

- Transcriptome analysis
- Promoter analysis
- Splice variants
- ...

proficient cells



deficient cells



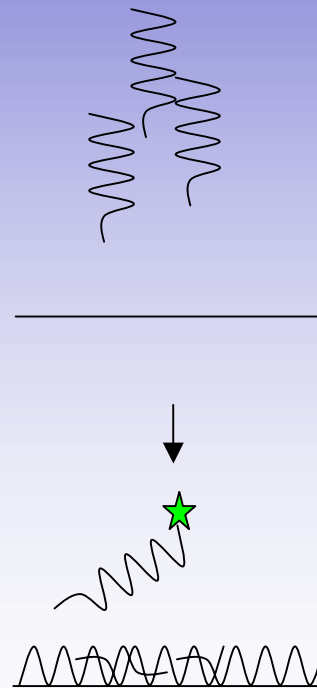
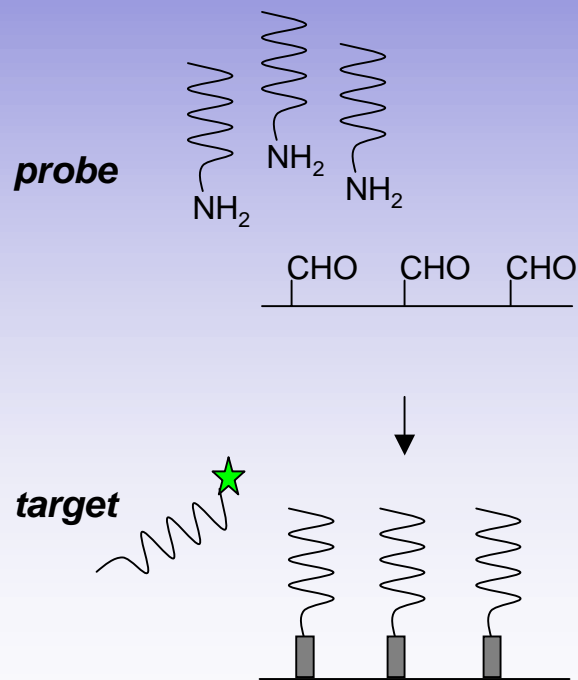
Deposition and *in situ* Arrays

Deposition Arrays

PCR-products / oligonucleotides

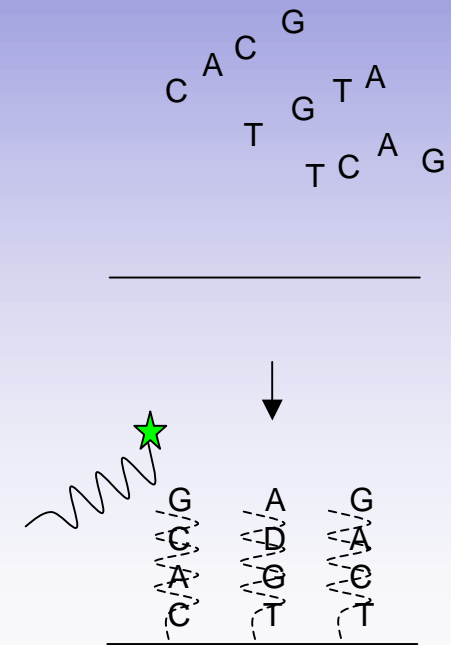
oriented binding

non-oriented binding



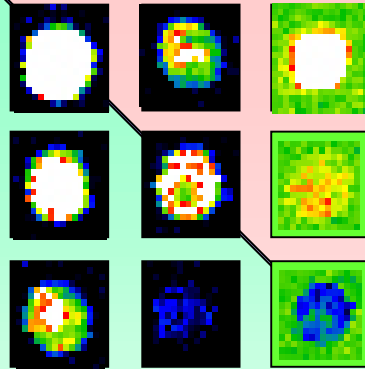
in situ Arrays

nucleotides



cDNA Microarrays

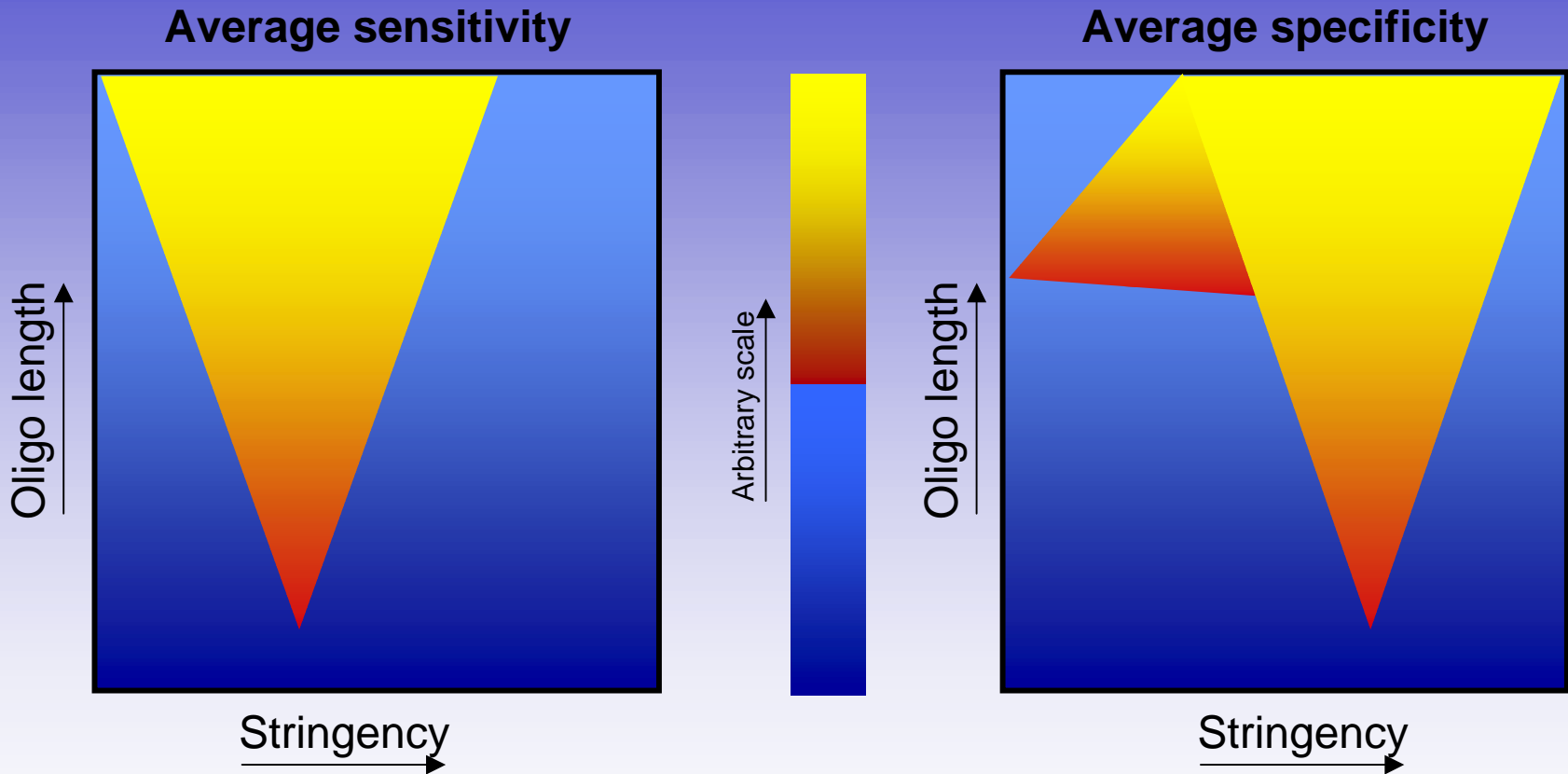
Oligonucleotide Microarrays



- reproducibility
- surface chemistry
- design
- expensive
- *reproducibility*
- *surface chemistry*
- *design*
- *expensive*

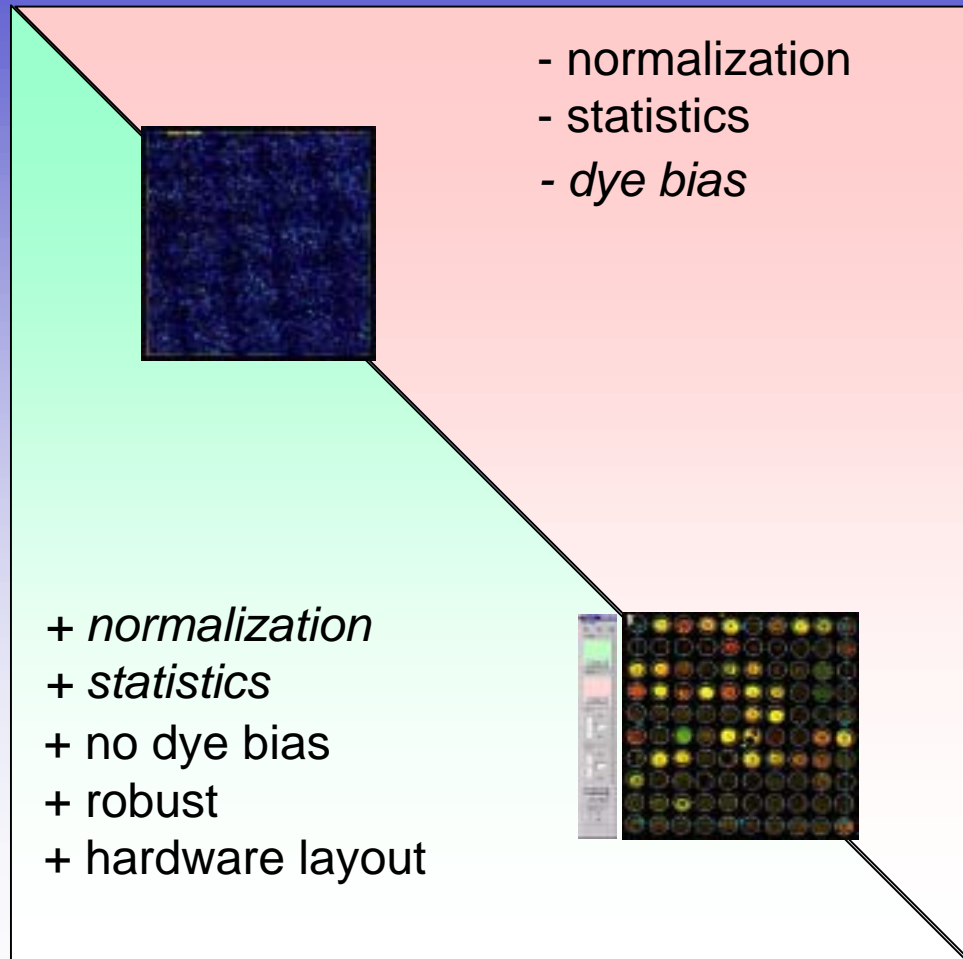
- + *doable*
- + *flexible*
- + *affordable*
- + *hardware choice*
- + easy
- + flexible
- + affordable
- + hardware choice

Selection of Oligonucleotide Length



Single Colour System (absolute)

Dual Colour System (ratio)



Commercial vs. Self-made



- costs (custom)
- rigid design & content
- *quality*
- *logistics*



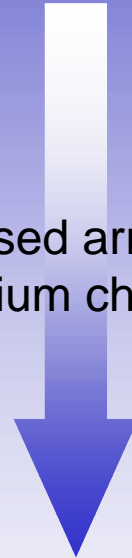
- + *flexibility*
- + *costs*
- + range of densities
- + *quality (in situ)*
- + less logistics



Transcriptomics Screening Strategy



high density arrays
low chip numbers



focused arrays
medium chip numbers



low density arrays
high chip numbers

buy it

make it

sell it

Microarray Manufacturing Considerations

Custom DNA-Microarray manufacturing

Low density Arrays

10 € → 20 €

Medium density Arrays

20 € → 50 €

High density Arrays

50 € → 500 €

High throughput

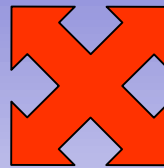
1000 → 100

Medium throughput

100 → 10

Low throughput

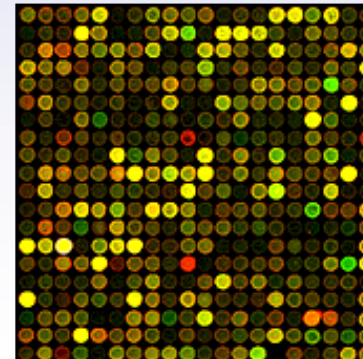
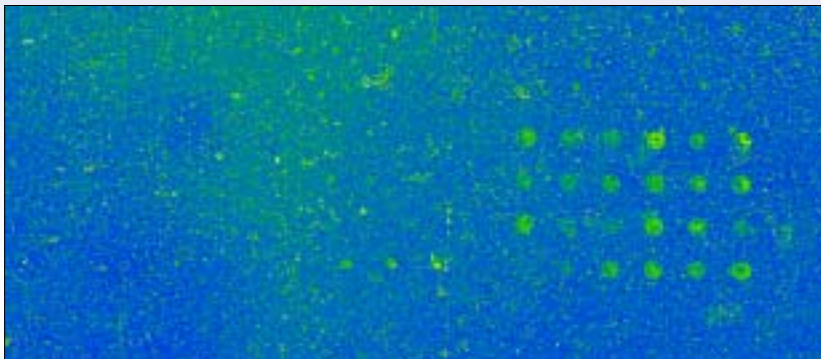
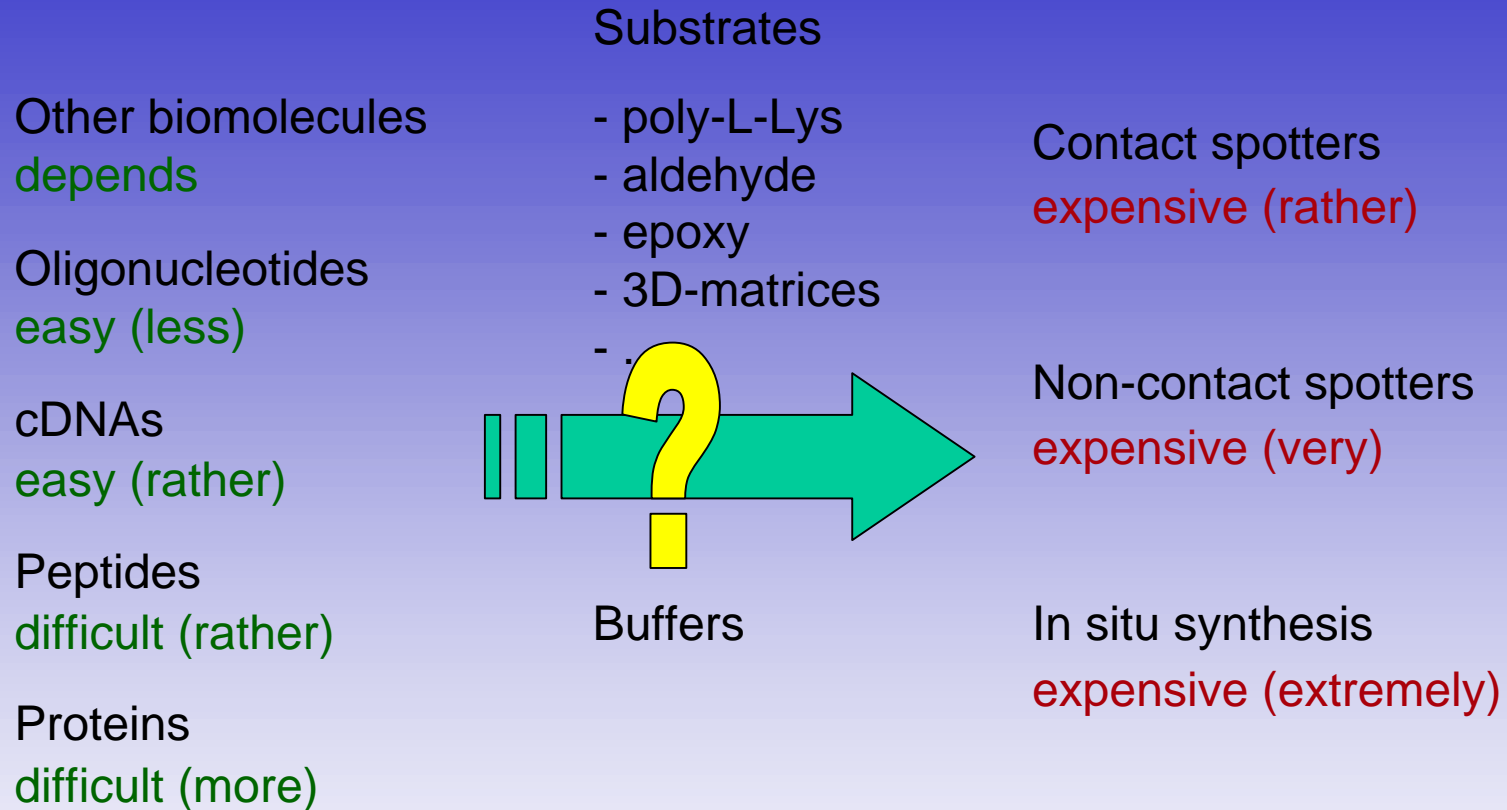
10 → 1



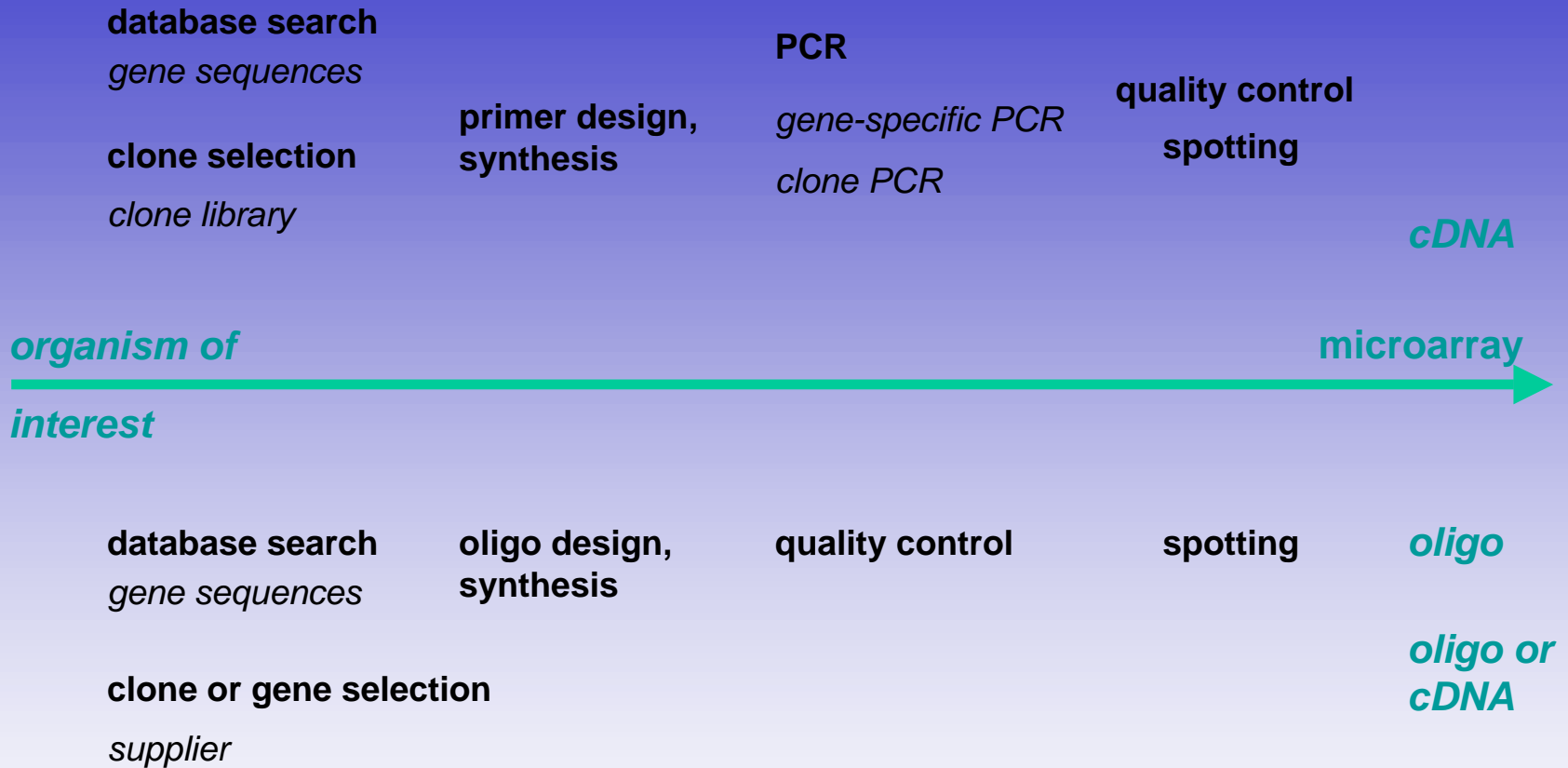
Establishment time

days/weeks → months/years

Microarray Manufacturing Platforms

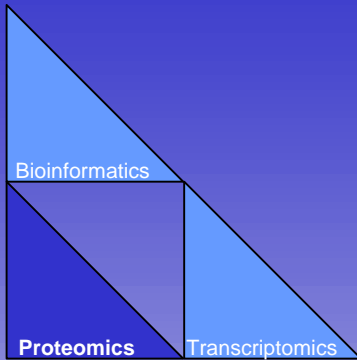


DNA Microarray Design and Production



Experimental Use and Read-out





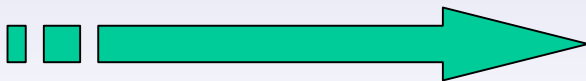
Proteomics

Analysis of the Proteome

no common properties of molecules:

- molecule sizes / molecular mass
- physical/chemical properties
- dynamic range of abundance

- compartmentalization
- posttranslational modifications
- functional protein interactions



no simple solutions for analysis

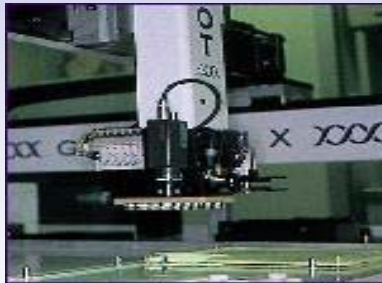
Protein Interaction

Specific & high throughput technologies for

- Protein-Ligand interaction
- Protein-Protein interaction
- Protein-DNA interaction

Protein Microarrays:

pure proteins, native conditions

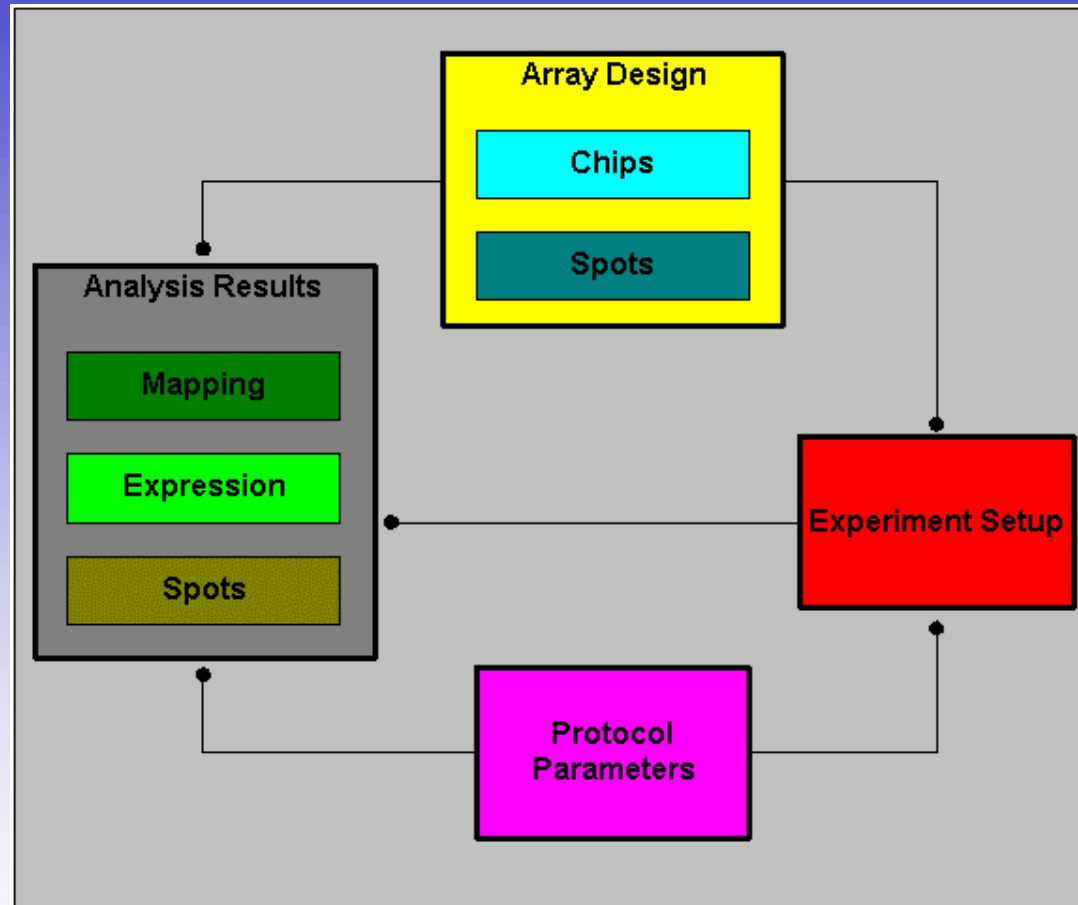


Bioinformatics: Data Models

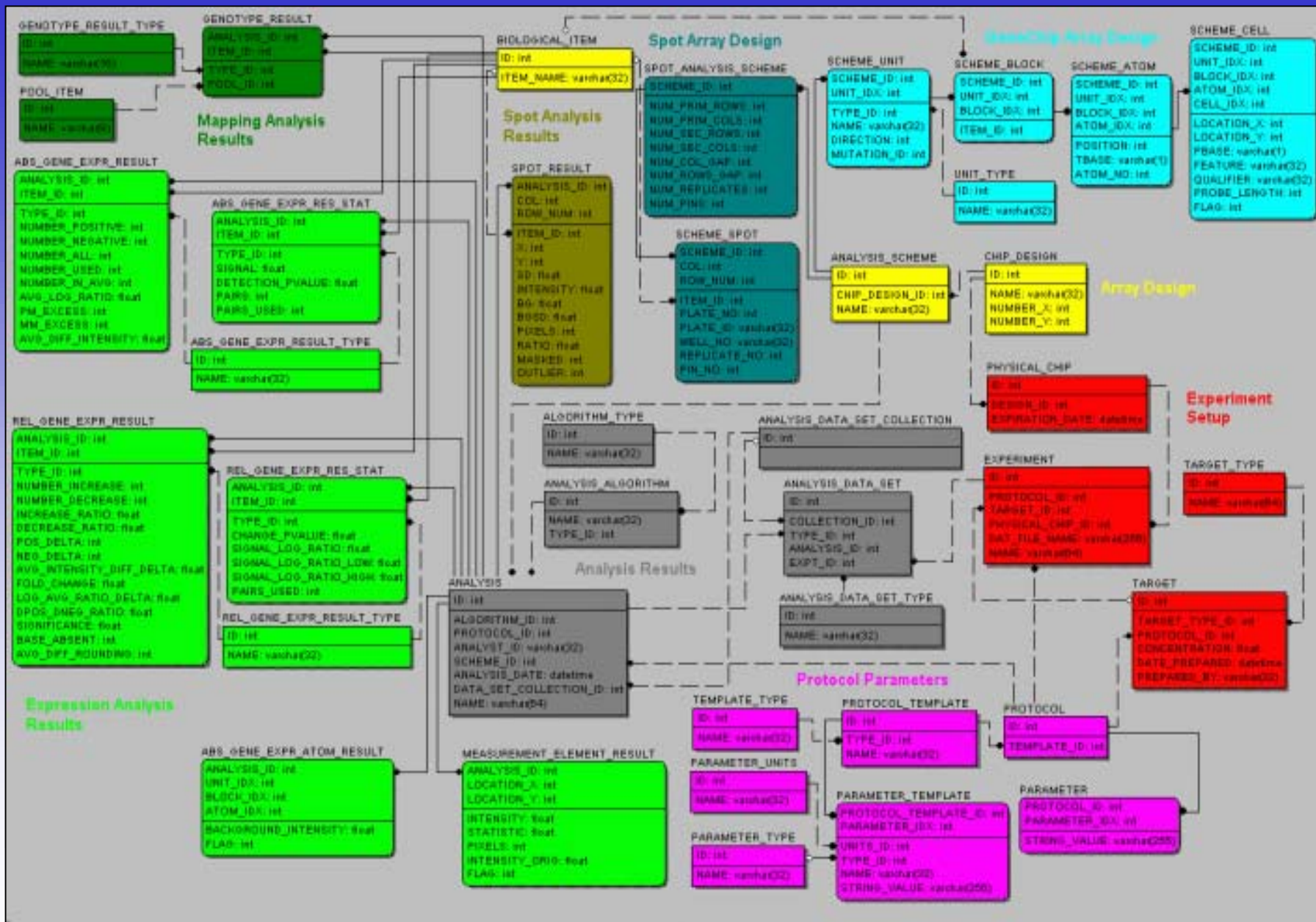
Bioinformatics

Proteomics

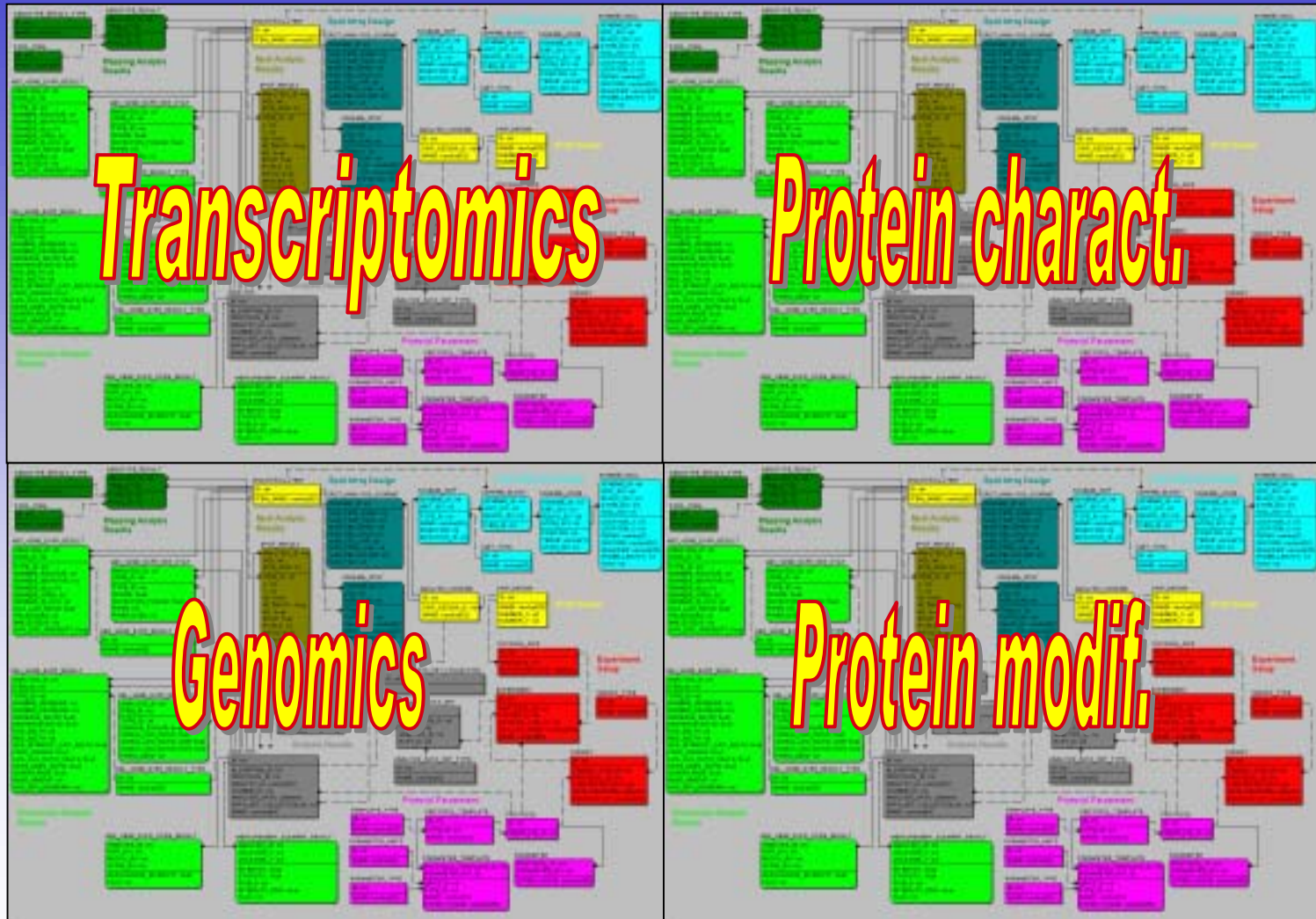
Transcriptomics



AADM



Bioinformatics: Integrated Data Solutions



... inevitably leading to





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