



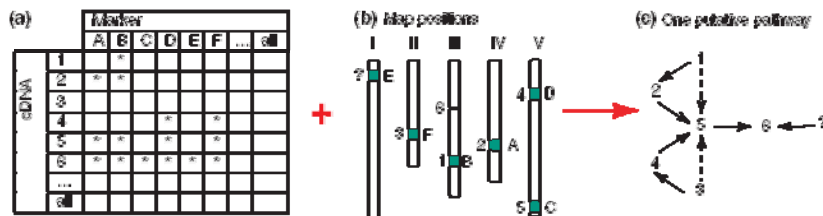
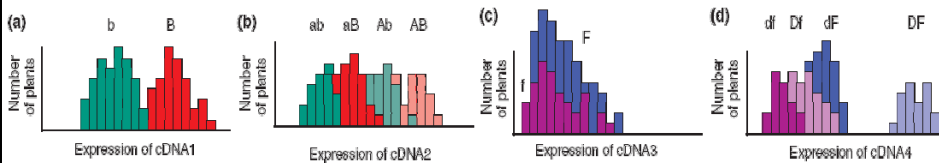
Final Remarks

Genetical Genomics & Systems Biology



Genetical Genomics

Use arrays to identify genes that are DE in relevant tissues of individuals sorted by QTL genotype. If those DE genes map the chromosome region of interest, they would become very strong candidates for QTL.



Source: Jansen and Nap, 2001



Genetical Genomics

Use arrays to identify genes that are DE in relevant tissues of individuals sorted by QTL genotype. If those DE genes map the chromosome region of interest, they would become very strong candidates for QTL.

Never enough! ...not greed but algebra:

.....particularly useful for:

$$V_q = 2pq\alpha^2$$
$$\alpha = a + d(q - p)$$

1. Speed up and enhance power to finding **New QTL**
2. Developing “**Diagnostic Kits**”
3. Deciphering the genetics of **Complex Traits**

A trait that is affected by many, often interacting, environmental and genetic factors such that no factor is completely sufficient nor are all factors necessary. (Andersson and Georges, 2004)

Ability to score individuals rapidly (and cheaply) at a very large number of loci.



Genetical Genomics

Where does this leave **Quantitative Geneticists**?
Where does this leave **Phenotypes** (the need to measure)?

Very well,I’m afraid (can’t retire yet ☹)

Quantitative Geneticists:

- Never enough QTL
- Association studies
- Study of variation
- The individual needs to exist in order to be genotyped. With BLUP a prediction of a non-existent individual can be given

Phenotypes:

- Mutation is continuously generating new variation
- Selective breeding on genotypes reduces effective population size
- **Systems Biology:** Integration of all types of data



Final Remarks

Systems Biology

PNAS, Nov 2005, 102:17296

A data integration methodology for systems biology

Daehee Hwang*, Alistair G. Rust*, Stephen Ramsey*, Jennifer J. Smith*, Deena M. Leslie*, Andrea D. Weston**, Pedro de Atauri*, John D. Aitchison*, Leroy Hood**†, Andrew F. Siegel‡§, and Hamid Bolouri*†‡

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My Own Interpretation

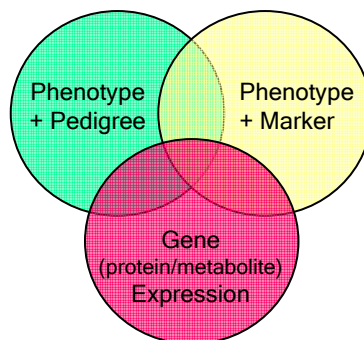
Systems Biology is about integrating data from different sources to provide a more comprehensive answer to a given biological question



Systems Biology

Predict Future Performance

3 Types of Data



How to integrate them?



Systems Biology

Predict Future Performance

