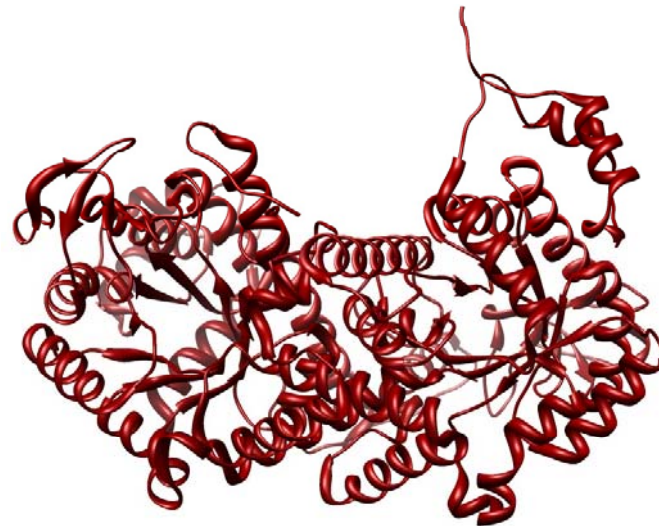




GENOMICS, PROTEOMICS & BIOINFORMATICS

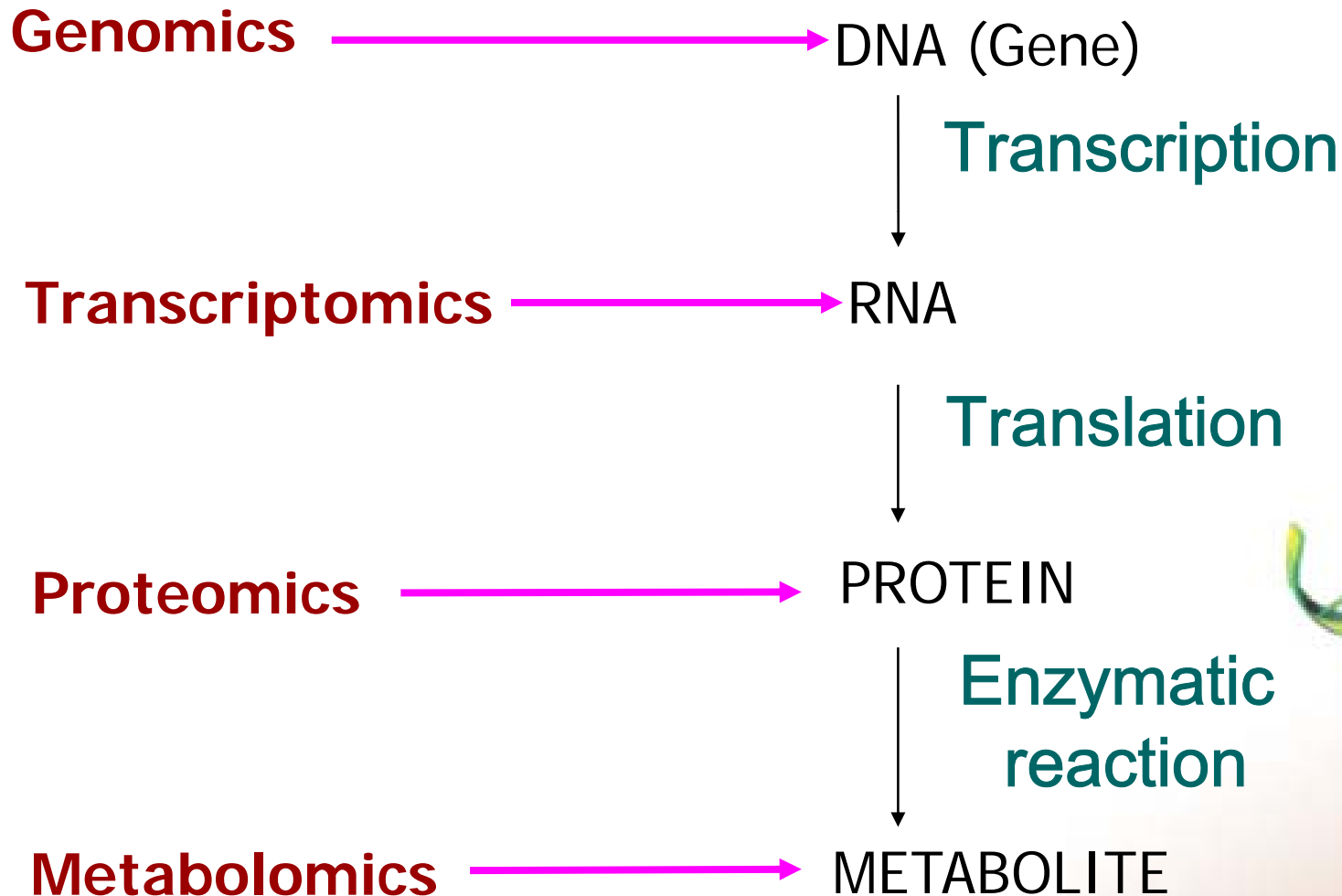


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Terminologies

The “omics” nomenclature...





Genomics

What is genomics?

Genomics: The large scale sequencing and subsequent functional analysis of an organism's total DNA, or "genome". Common elements of a genomics program include DNA sequencing, transcriptional profiling and bioinformatics.

The definition can be expanded to include proteomics and metabolic profiling.

The common feature of all of these studies is the focus on a systems-level view of organismal structure and function. The interrelationships between genes, proteins, metabolites, etc. is expected to reveal functional and structural hierarchies that would otherwise be obscure.





Some Definitions

Definitions

Expressed Sequence Tags (ESTs): An inventory of partial mRNA sequences, often representative of specific physiological or developmental states.

Transcriptional profiling: Massively parallel analysis of gene expression. Provide clues to the physiological and metabolic state of an organism under various conditions.

Proteomics: The use of protein separation and analysis tools to analyze the protein complement of an organism under specific conditions. Can focus on specific issues, such as subcellular compartments, protein-small molecule interactions, post-translational modifications such as phosphorylation or myristylation.





Some Definitions

Definitions

Metabolic profiling: The use of chemical separation methods to characterize the small-molecule complement of an organism under specific conditions, e.g. fruit development.

Bioinformatics: The use of computational tools and relational databases to analyze, annotate, compare and de-convolute large data sets generated in the process of DNA sequencing, transcriptional profiling, proteomics, metabolic profiling, etc.





Need of Genomics

Q: Why genomics?

A: Gene regulation and structural diversity are the basis of phenotypes.

- **Deep sequencing yields an inventory of genes and gene forms.**
- **Transcriptional profiling, proteomics and metabolic profiling develop *correlations* between physiological conditions (e.g. biotic or abiotic stress, fruit development, etc.) and gene regulons and metabolic pathways.**



