

Introduction to Genomics

Pablo Rabinowicz

Institute for Genome Sciences (IGS)
University of Maryland School of Medicine

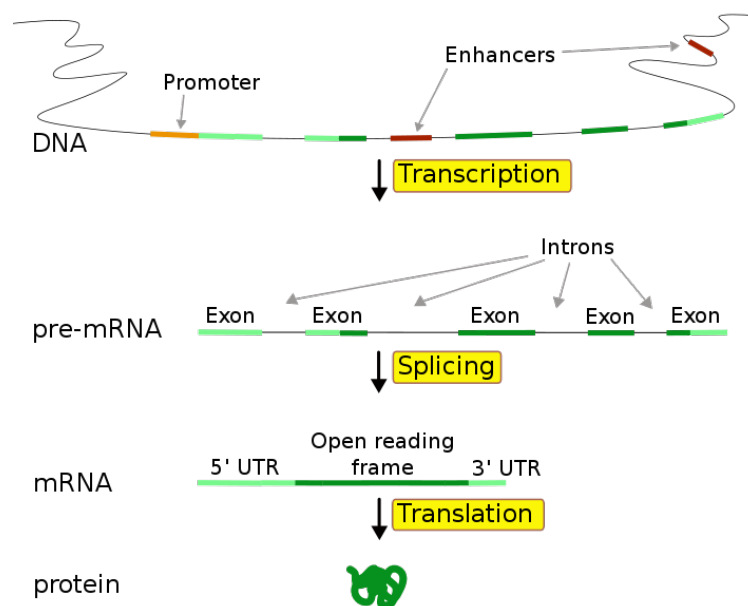
Baltimore, MD

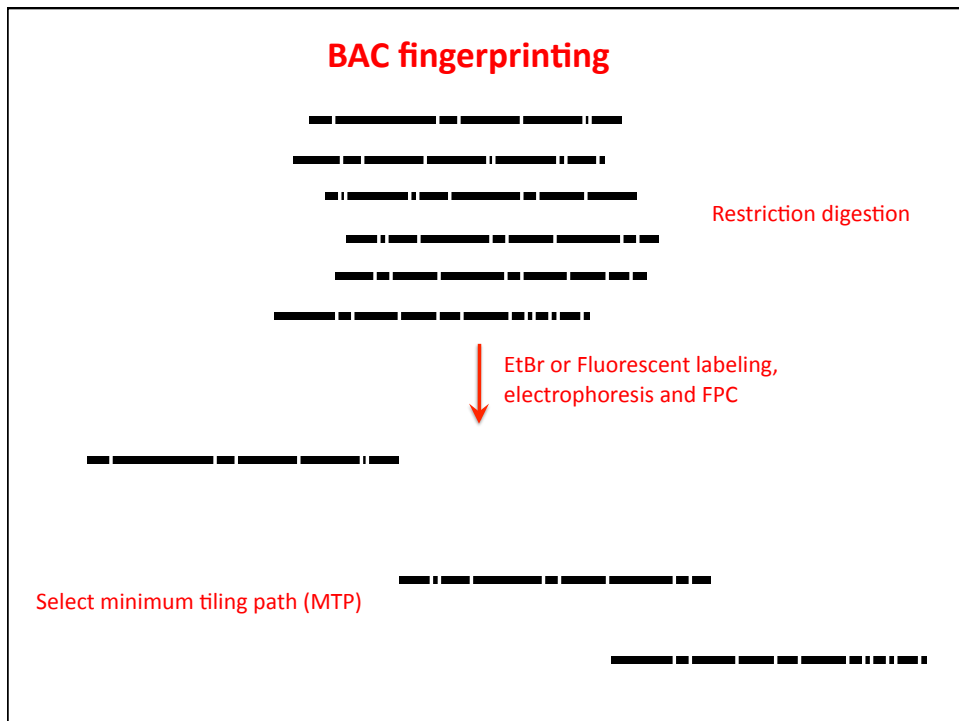
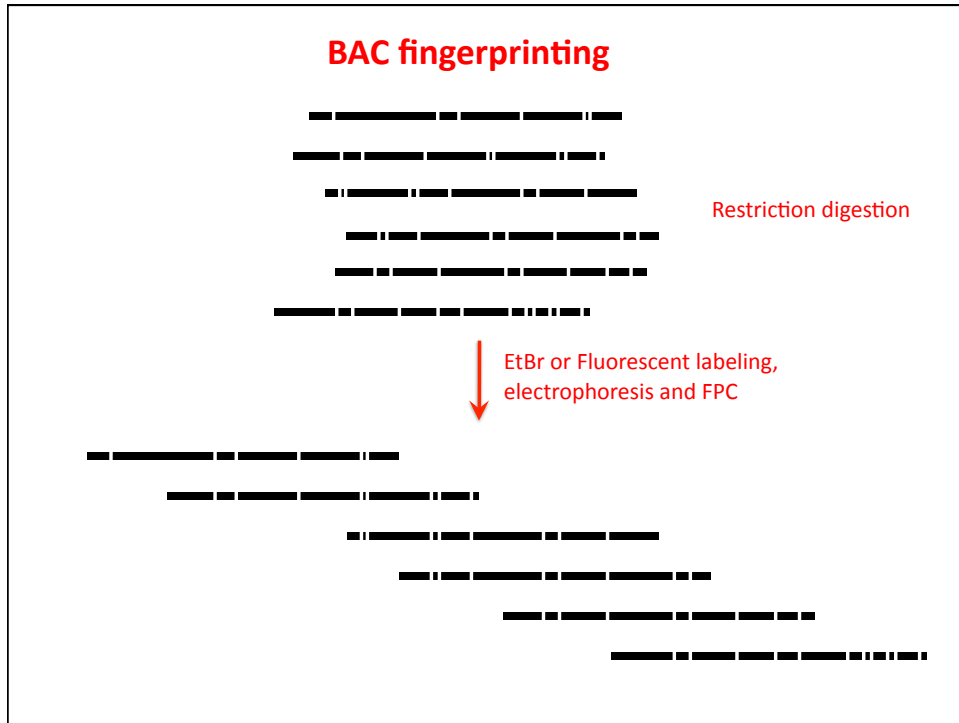
Cassava Genomics & Bioinformatics
Techniques Workshop

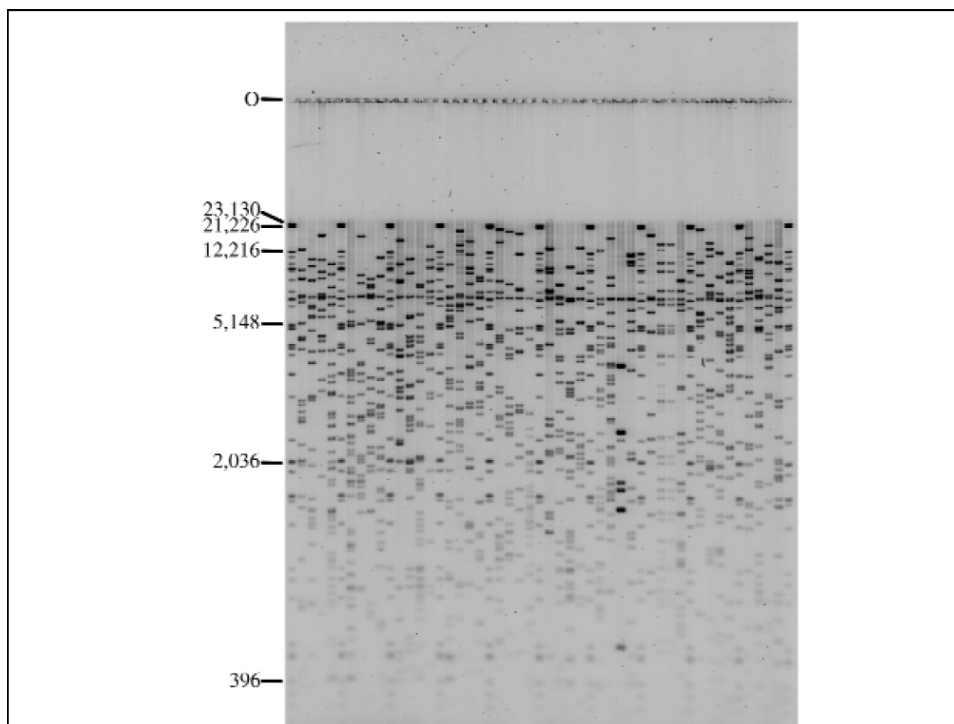


BILL & MELINDA
GATES foundation

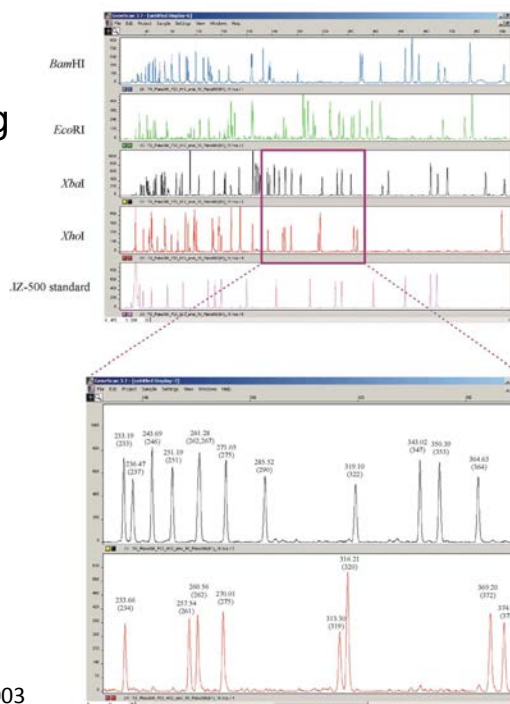
A typical eukaryotic gene







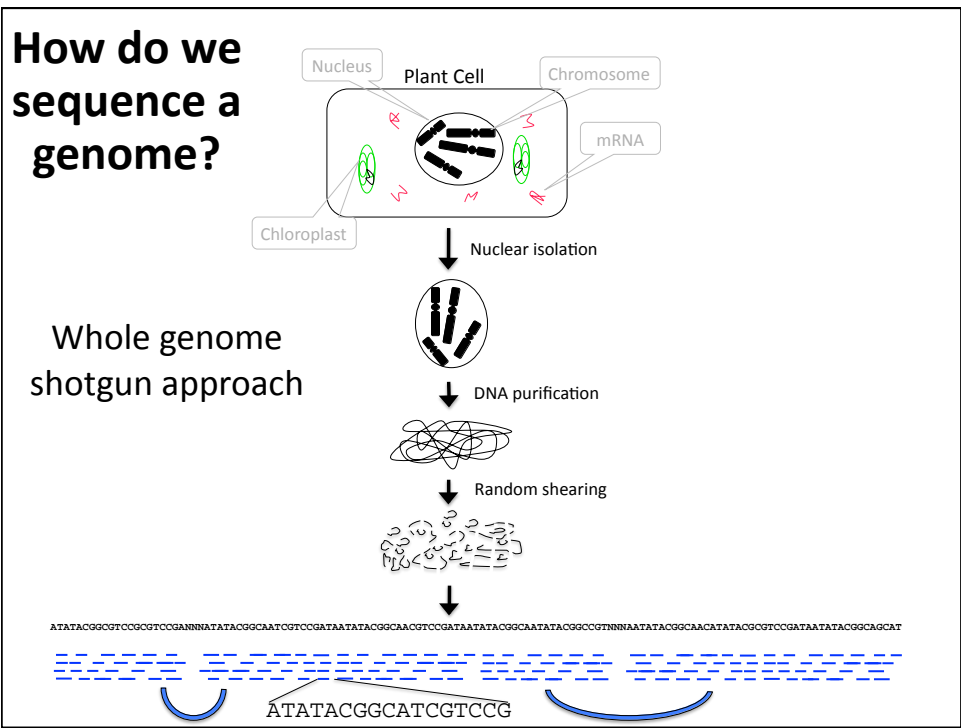
High information content fingerprinting



Luo et al. Genomics 2003

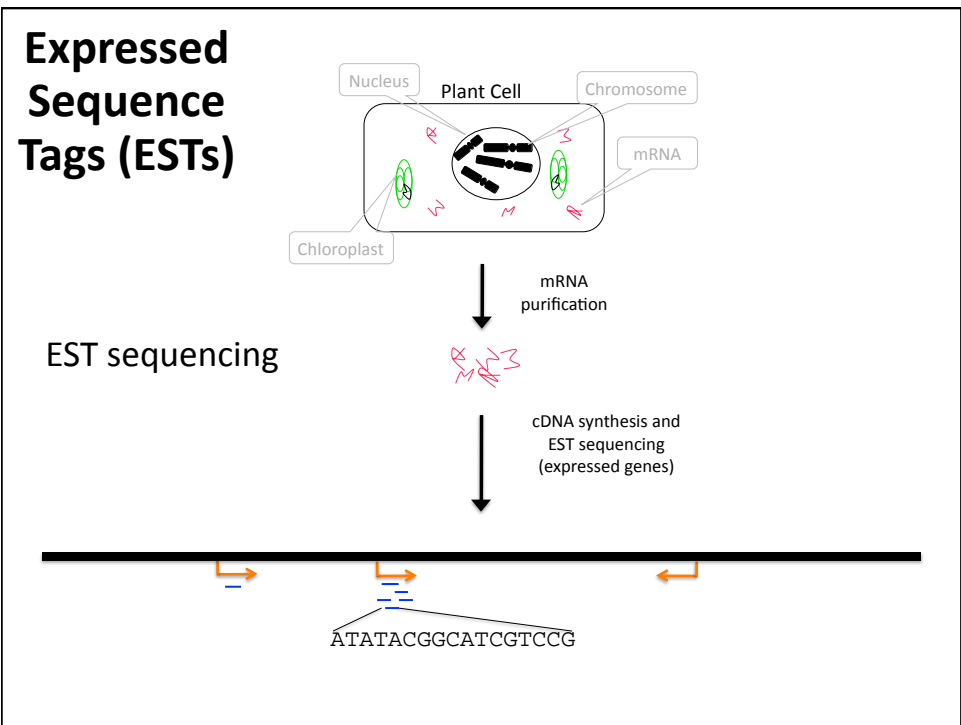
How do we sequence a genome?

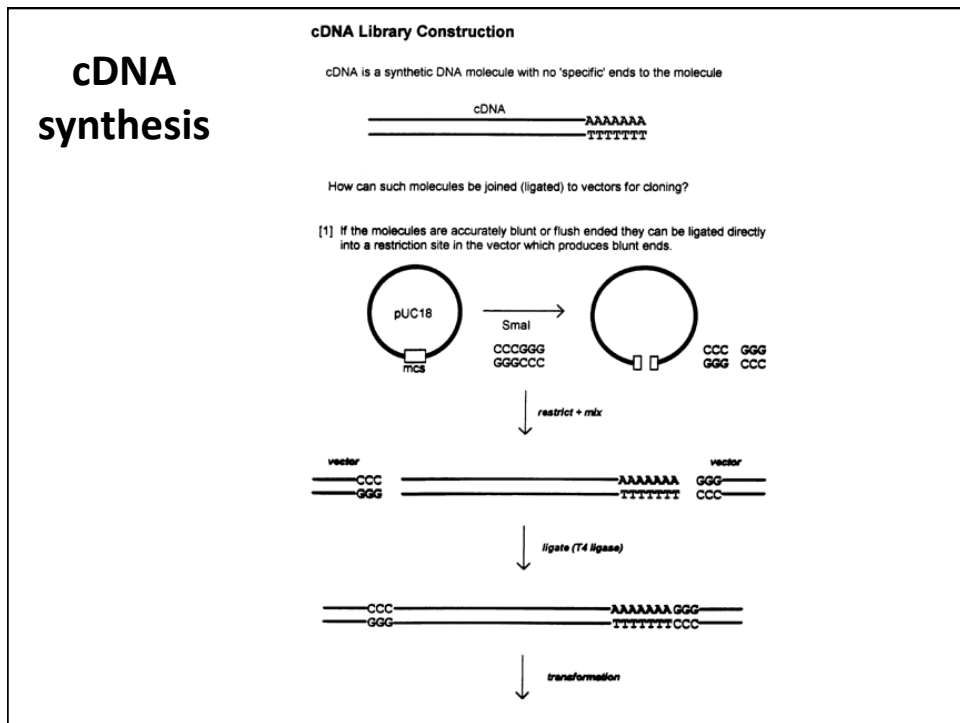
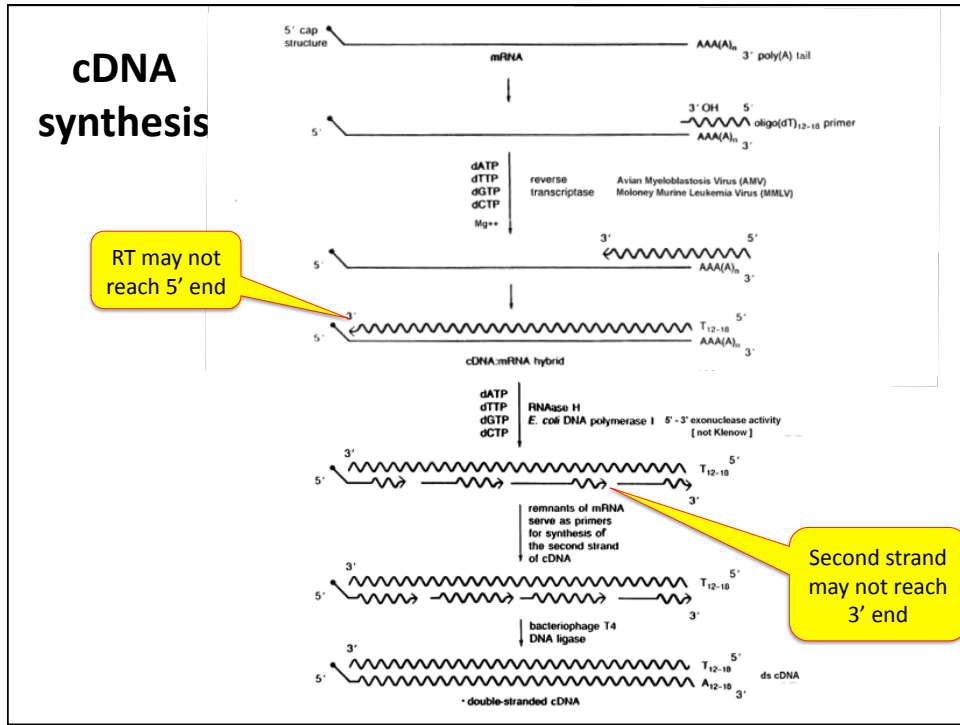
Whole genome shotgun approach

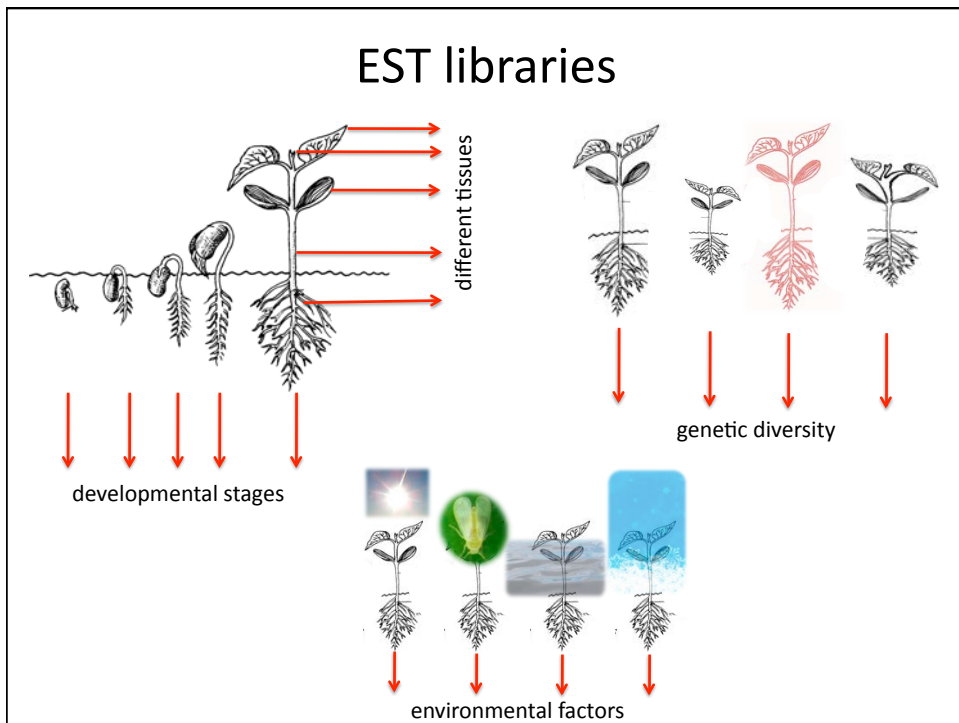
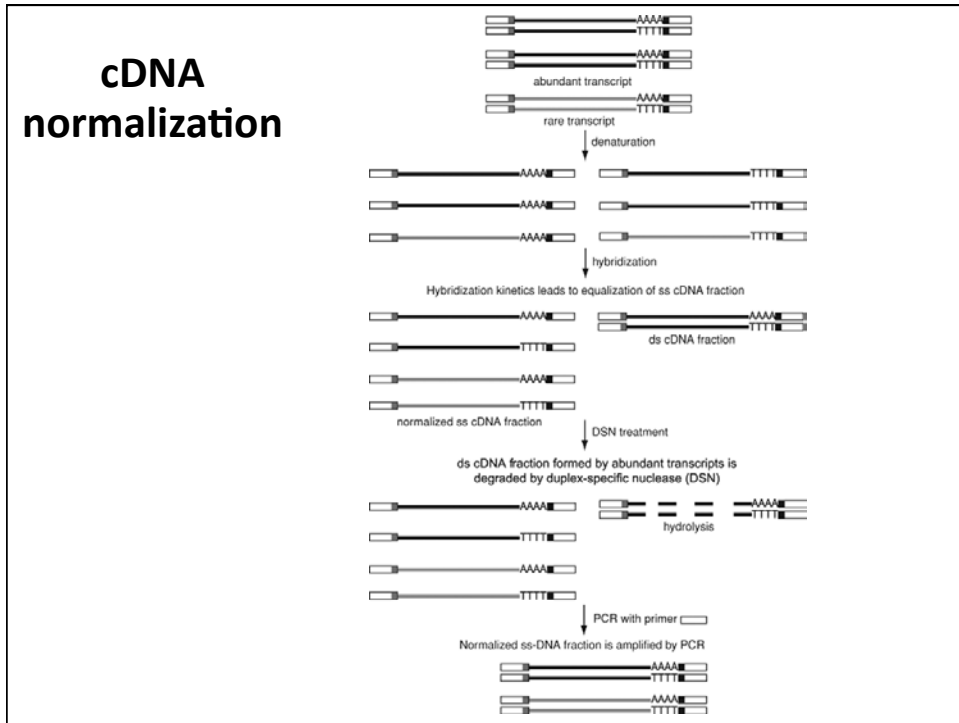


Expressed Sequence Tags (ESTs)

EST sequencing

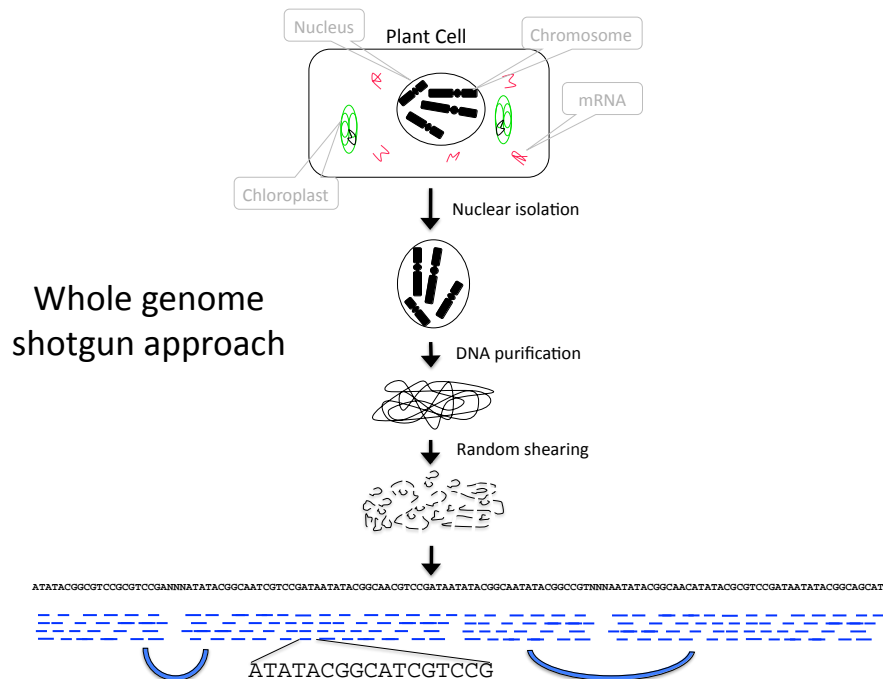


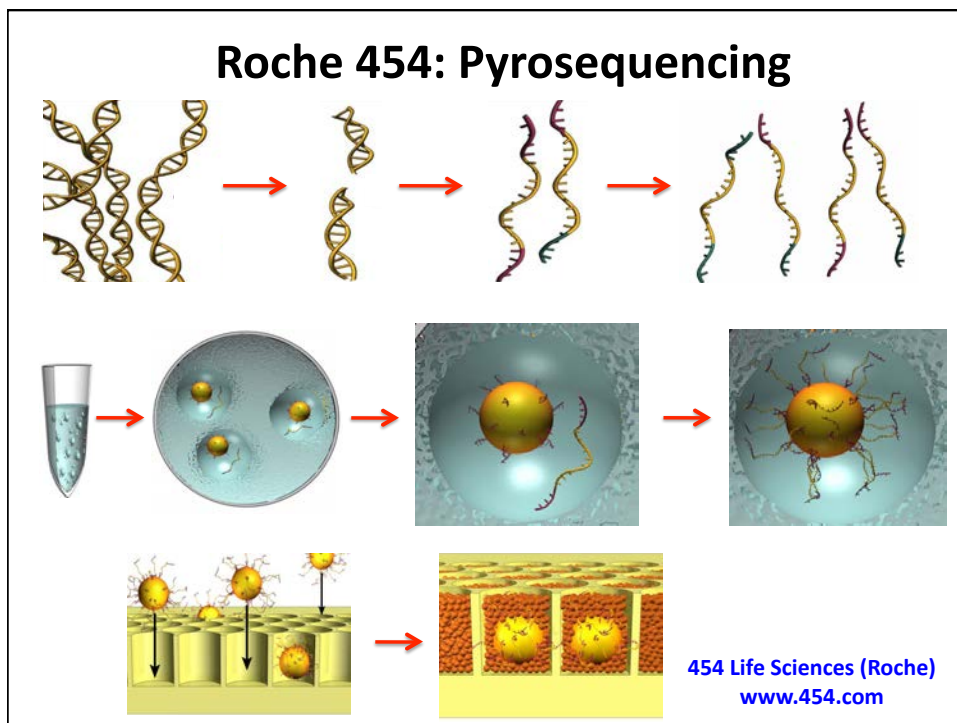
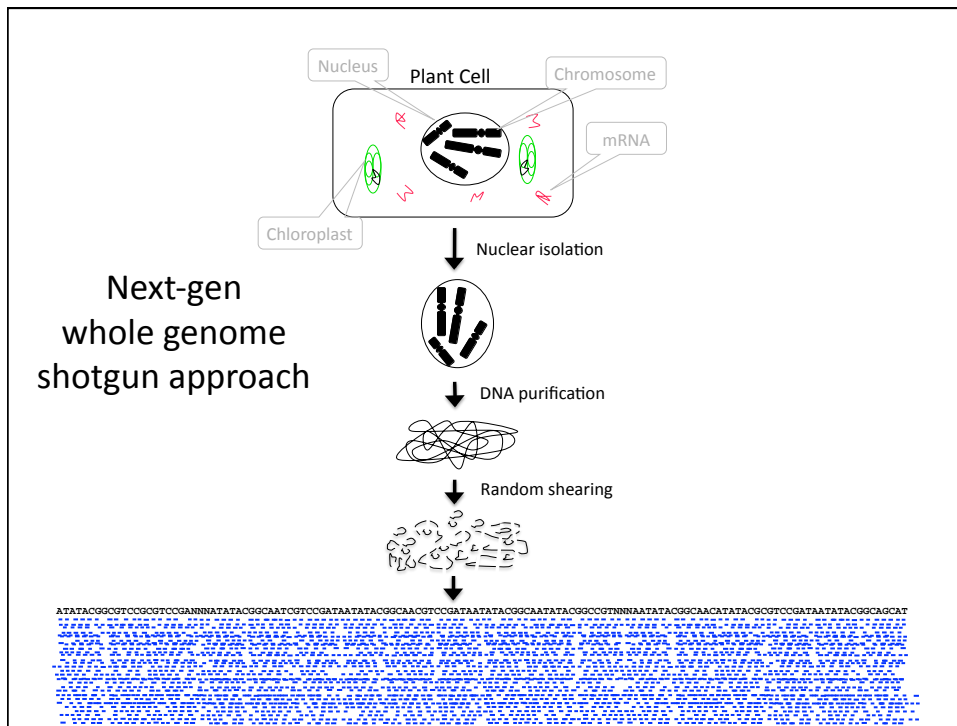


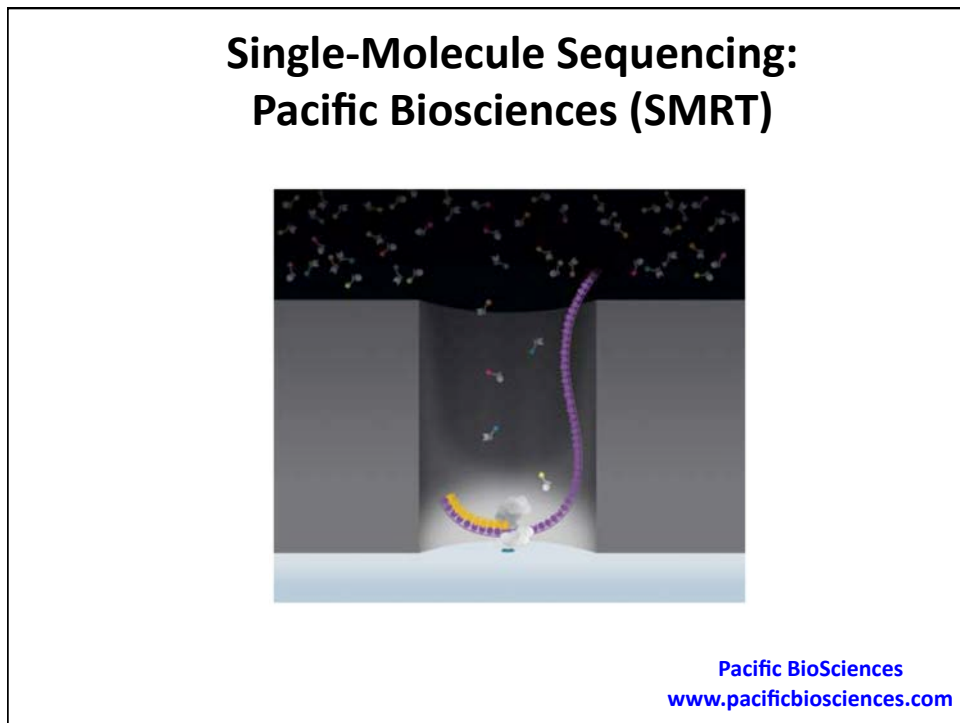
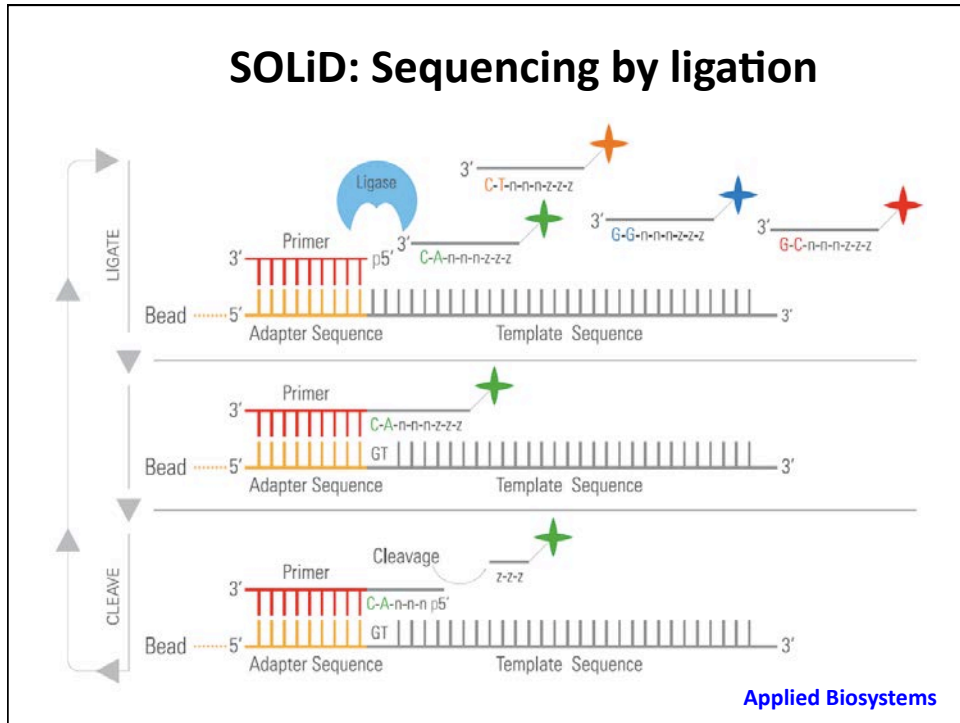


Next-Gen Sequencing

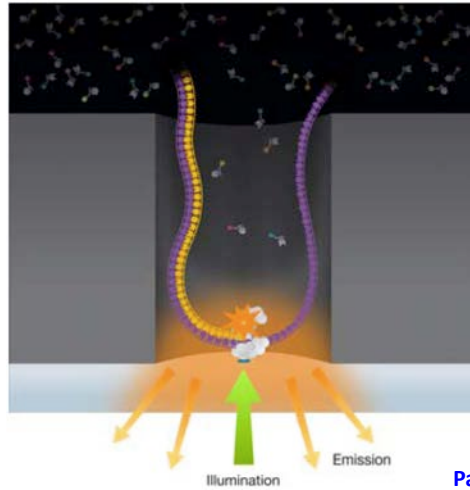
- *De novo* genome sequencing
- Genome re-sequencing
- RNA-seq (Shotgun – DGE)
- Targeted re-sequencing
- Other applications
 - Chromatin immunoprecipitation
 - Bisulfite sequencing
 - Small RNA sequencing







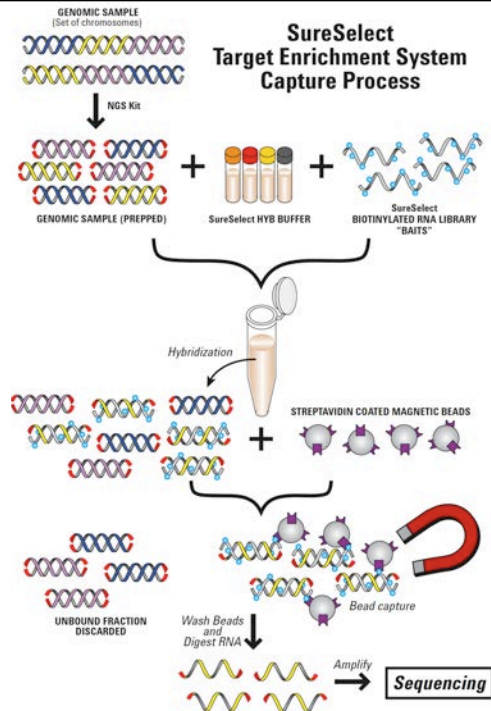
Single-Molecule Sequencing: Pacific Biosciences (SMRT)



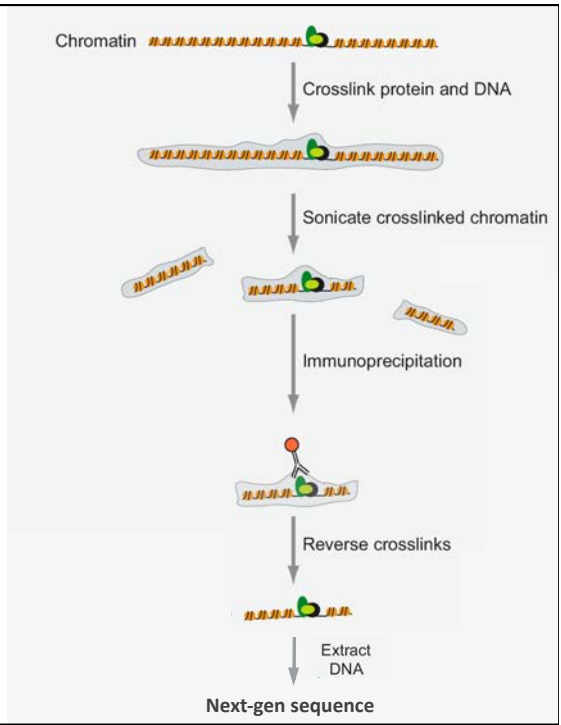
A human genome in minutes for \$100

Pacific BioSciences
www.pacificbiosciences.com

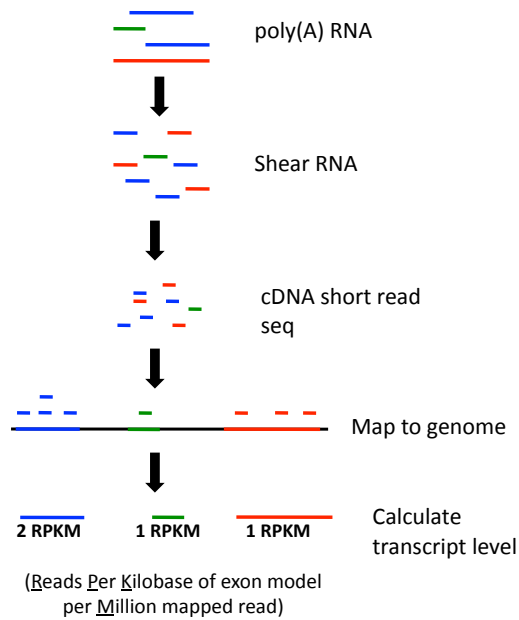
Sequence capture



Other Next-gen applications



Next-gen transcriptome sequencing



Maximize coverage for SNP discovery with normalized cDNA input

Mortazavi *et al.*, *Nat Methods* 2008: