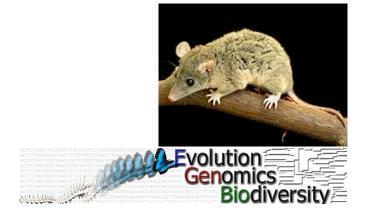


# Sequence Assembly and Next Generation Sequencing

#### BIOL 7711 Computational Bioscience

Biochemistry and Molecular Genetics Computational Bioscience Program Consortium for Comparative Genomics University of Colorado School of Medicine

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#### Computation on Nucleotides

- Alignment--generally more uncertain than amino acids
  - Occasionally provides a more correct answer
- Sequence Assembly
- Sequence Annotation
  - Genes, splice sites
  - Regulatory regions, TFBS
  - Chromatin binding
- Mutation processes
- Route to information much faster, cheaper

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  - High-throughput next-generation sequencing

## The Evolution of Sequencing

- Sanger sequencing
  - Gels
  - Cycle sequencing
  - Fluorescence
  - Capillary electrophoresis
- Sequencing, the "Next Generation"
  - "Sequencing by synthesis"
    - Pyrosequencing (Roche/454)
    - Cluster sequencing (Illumina/Solexa)
  - Sequencing by ligation (ABI/SOLiD)