Molecular Biology: Basic Notions

- cell
- prokaryote and eukaryote organisms
- nucleus and cytoplasma; membrane
- DNA, RNA, proteins; basis/residues
- nucleic acids (A,C,G,T/U), complementary pairs; amino acids
- DNA double helix (J.Watson, F.Crick, 1952); DNA replication
- Central Dogma in molecular biology: DNA -> RNA -> proteins
- transcription, translation;
  RNA polymerase, ribosome (G. Palade, 1957)
- the (basic) genetic code; codons
- chromosomes; genes; gene expression
- exons, introns; splicing, alternative splicing
- an exception to Central Dogma: RNA interference
- model organisms:

  Escherichia coli (*E. Coli*), a prokaryote bacterium
  Saccharomyces cerevisiae (*S. cerevisiae*) – baker's yeast, a microscopic fungus
  Arabidopsis thaliana (*A. thaliana*) – mouse-ear cress, thale cress
  Caenorhabditis elegans (*C. elegans*) – round worm
  Drosophila melanogaster (*D. melanogaster*) – fruit fly
  Mus musculusi — mouse

- genome sequentialisation (F. Sanger, 1977)
- The Human Genome Project (2003)
- examples of genetic diseases:

  Thalassemia
  Cystic Fibrosis
  Hemophilia
  Wolf-Hirschhorn syndrome

- Recommended readings:

  Alberts et al. Ch. 1, 5–7 of "Essential Cell Biology", 2010 N. Cristianini & M. Hahn, Ch. 2 & 3 of "Computational Genomics", 2007 N. Jones & P. Pevzner, Ch. 3 of "Bioinformatic Algorithms", 2004
  P. Pevzner, Ch. 13 of "Computational Molecular Biology", 2000