

# Molecular Biology, part 2

- | Junk DNA
- Reading frames, open reading frames
- Splicing and number of chromosomes per (somatic) cell
- Prokaryotes vs. eukaryotes
- Diplois and haploid cells
- Different tissues express different sets of genes

# Number of chromosomes

Common Name	Species	Diploid number	Common Name	Species	Diploid number
<b>Animals (2n)</b>			<b>Plants (2n)</b>		
Human	<i>Homo sapiens</i>	46	Corn	<i>Zea mays</i>	20
Monkey	<i>Macaca mulatta</i>	42	Potato	<i>S. tuberosum</i>	48
Dog	<i>Canis familiaris</i>	78	Green algae	<i>A. mediterranea</i>	20
Cat	<i>Felis domesticus</i>	38			
Mouse	<i>Mus musculus</i>	40	<b>Fungi (2n)</b>		
Frog	<i>Rana pipiens</i>	26	Yeast	<i>S. cerevisiae</i>	32
Fruit fly	<i>Drosophila melanogaster</i>	8	<b>Fungi (1n)</b>		<b>Haploid number</b>
Flatworm	<i>Planaria torva</i>	16	Mold	<i>Penicillium species</i>	4

# Sequencing DNA

- Length of read:  $10^2$ - $10^3$
- Length of chromosome:  $10^7$ - $10^8$
- Maps:
  - Genetic maps: markers are genes with “visible” effects
  - Physical maps: markers are “lab detectable” loci such as SSR and SNP
  - Sequence: the ultimate map

# DNA Techniques

- Cloning
- Cut, break, glue
- Copying DNA:
- Plasmid
- Phage
- BAC
- Electrophoresis
- Next generation sequencing

# Complete genomes

- Eukaryotes: 1,939
- Prokaryotes: 31,611
- Viruses: 4,487
- Plasmids: 5,677
- Organelles: 6,368
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- Source: NCBI, 2015-02-22

# Databases

- NCBI
- GenBank
- OMIM
- SNP
- Taxonomy
- Epigenomics
- UniProt
- KEGG
- EMBL-EBI
- Ensemble