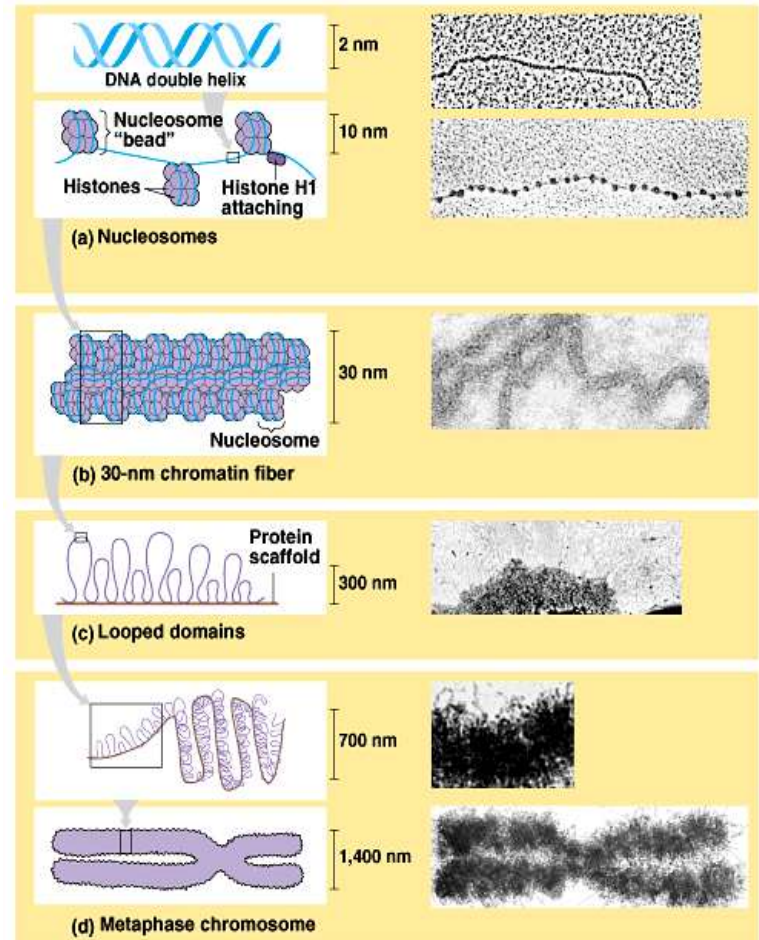


- Chapter 16~ *Control of Gene Expression*

Chromatin

- ▶ complex of DNA and proteins
- ▶ DNA Packing
 - histone protein (+ charged amino acids ~ phosphates of DNA are - charged)
- ▶ Nucleosome
 - "beads on a string"; basic unit of DNA packing
- ▶ Heterochromatin
 - highly condensed interphase DNA (can not be transcribed)
- ▶ Euchromatin
 - less compacted interphase DNA (can be transcribed)



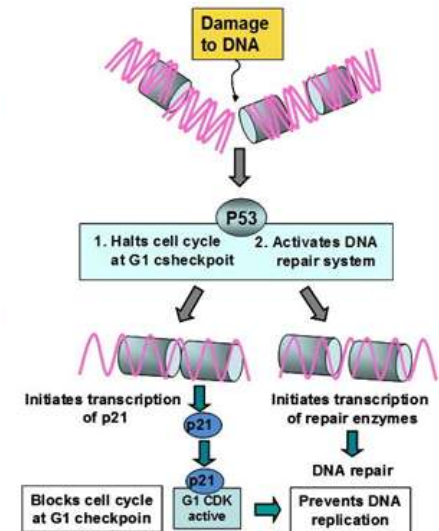
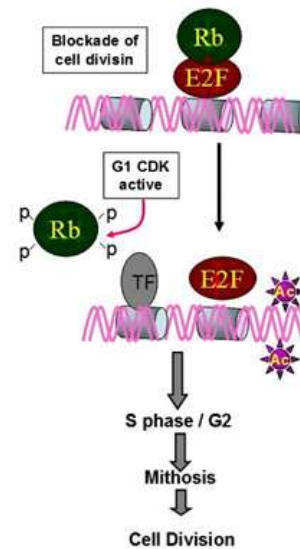
DNA Packing

- <http://www.dnalc.org/resources/3d/07-how-dna-is-packaged-basic.html>

QuickTime™ and a
Cinepak decompressor
are needed to see this picture.

Molecular Biology of Cancer

- ▶ Oncogene
 - cancer-causing genes
- ▶ Proto-oncogene
 - normal cellular genes
- ▶ *How?*
 - 1- movement of DNA; chromosome fragments that have rejoined incorrectly
 - 2- amplification; increases the number of copies of proto-oncogenes
 - 3- proto-oncogene point mutation; protein product more active or more resistant to degradation
- ▶ Tumor-suppressor genes
 - changes in genes that prevent uncontrolled cell growth (cancer growth stimulated by the absence of suppression)



Phenotypic Variation

Genotype isn't everything



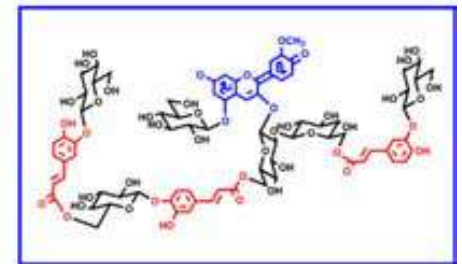
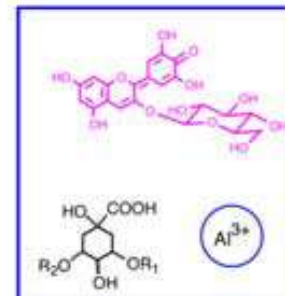
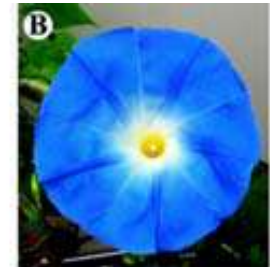
Arctic Fox - (*Lepus lagopus*)



Hydrangea Color

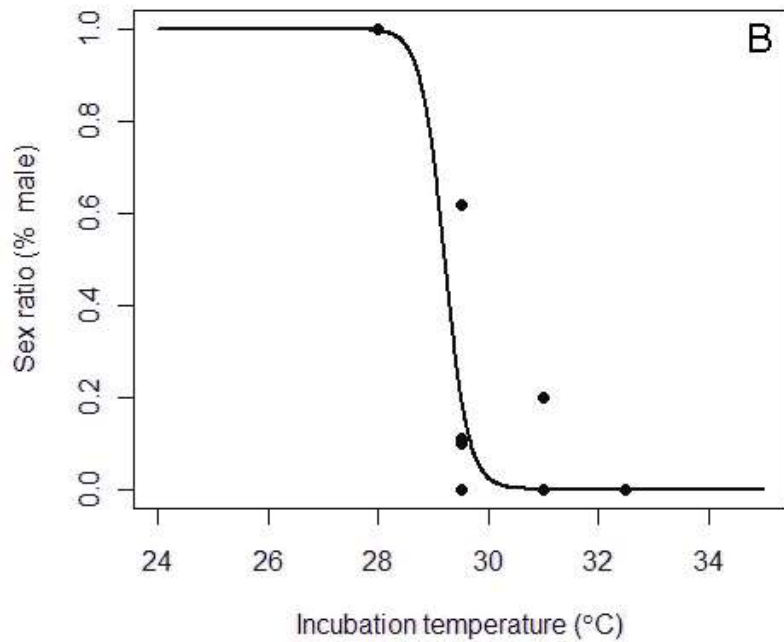
- Depends on the pH of the soil in which it is grown

pH	Flower Color
4.5	deep, vivid blue
5.0	medium blue
5.5	lavender-purple
6.0	purplish-pink
6.5	mauve-pink
6.8	medium pink
7.0	deep, vivid pink



Turtle Gender

- Depends on incubation temperature



Arctic Fox

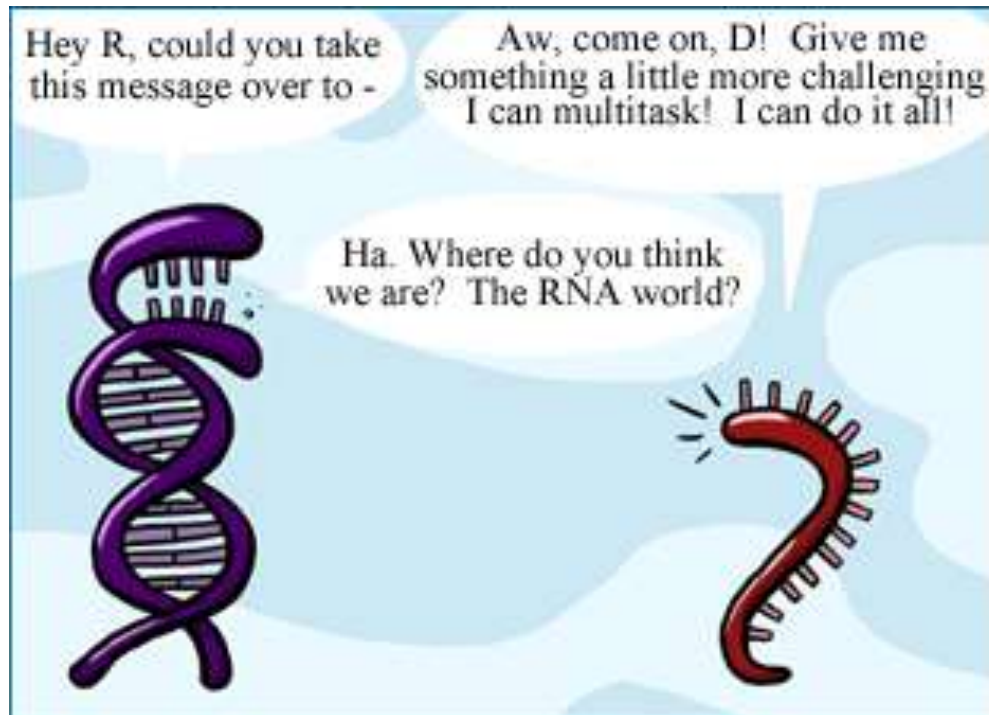
- Fur color changes with season



Evolutionary Significance?

- What is the advantage of variability in phenotype

RNA World Hypothesis



Three basic types of RNA

- mRNA – carries message from DNA
- tRNA – carries amino acid to mRNA
- rRNA – makes up the ribosome

- snRNA (small nuclear RNA) –make up spliceosomes that cut introns out of pre-mRNA this enzymatic activity leads us to believe RNA came before DNA and proteins
- snoRNA (small nucleolar RNA) – direct nucleotide modifications