14.5

MUTATION
- change to the genetic information of A cell or virus

Large-scale mutations
- changes to an entire chromosome

Small-scale mutations
↓
changes to one or several nucleotide pairs

example ⇒ **POINT Mutation** is change to A single nucleotide pair

Genetic Disorder or **HEREDITARY Disease**
is when the change has an ADVERSE effect on the phenotype of the organism

Small-scale mutations:

1) single nucleotide-pair substitutions
2) nucleotide-pair INSERTIONS or Deletions (one or more pairs)

Substitutions:

① SILENT MUTATION
- change in just one pair still produces the same amino acid.

② Missense Mutations
- change one AA into another
  a) could have NO effect on the protein
  b) could be detrimental to function of protein — especially if in vital area affecting sec, tert, or quat structure
  c) could improve the protein or lead to novel capabilities

evolution works on this

(3) Non-sense Mutations

- changes A codon for an AA into A "STOP" codon

⇒ translation stops prematurely

⇒ Almost all non-sense mutations lead to A non-functional protein

Question ⇒ what might be an exception?

INSERTIONS & DELETIONS

- DISASTROUS!!

⇒ alters reading frame

⇒ called "Frameshift Mutations"

⇒ everything downstream of mutation gets improperly grouped into codons

MUTAGEN - chemical or physical agents that cause mutations

CARCINOGENS - cancer-causing chemicals
⇒ most are also mutagenic.