

errors in DNA replication or Protein Synthesis  
 environmental factors  
 ex) sun, x ray

Caused by

Mutations

gene mutations

Chromosomal mutations

Def.

Change in 1 or a few nucleotides

also called

Point mutations

Types

Substitution  
 swap 1 base for another  
 ATC → AAC

only changes 1 amino acid

Insertion  
 added in a base  
 ATC → AATC

Can Create

Frameshift mutations  
 shifts codon reading frame from point of mutation on.

Deletion  
 remove a base  
 ATC → AC

Silent mutation  
 DNA changed but gives same amino acid  
 UAU → UAC  
 both give Tyrosine

May Be

Types

Whole Chromosome

Caused by

Nondisjunction during meiosis

MONOSOMY = 1 instead of a pair  
 TRISOMY = 3 instead of a pair

Portions of Chromosome

Includes

deletion - part is missing  
 duplication - copy of 1 part added  
 inversion - chromosome parts in wrong order  
 translocation - 2 chromosomes incorrectly swap DNA pieces