

# DNA Mutations

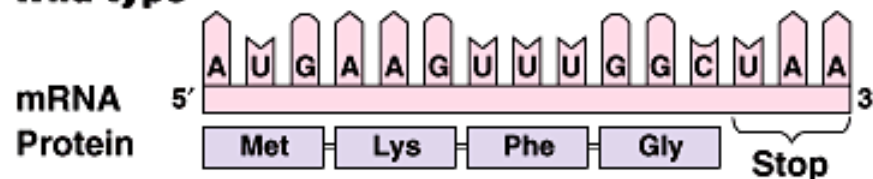
# DNA Mutation

- Occurs on the gene level
- Not as dramatic as chromosomal mutations
- Can be silent (think wobble and third base pair)
- Can be negative (think disease)
- Can be positive (think evolution)

# Base Pair Substitution

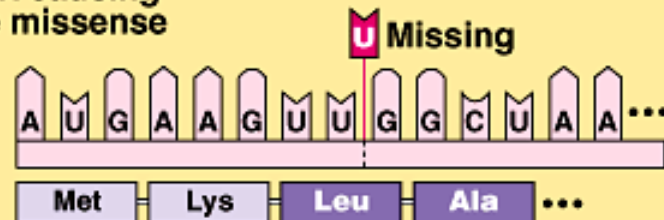
- A letter is substituted or switched with original code.
- Silent-if the nucleotide substitution is the last pair on a triplet (i.e. CCG to CCA) or if it codes for a similar a.a.
- Missense mutation- If a different amino acid is coded for (may or may not cause trouble)
- Nonsense mutation- if it codes for a STOP codon it will disrupt the entire polypeptide.

## Wild type



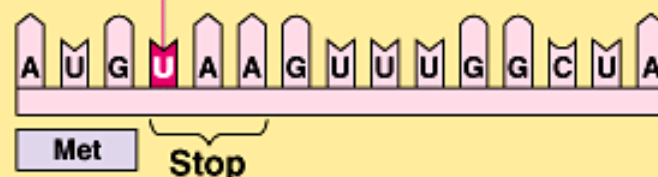
## Base-pair insertion or deletion

### Frameshift causing extensive missense

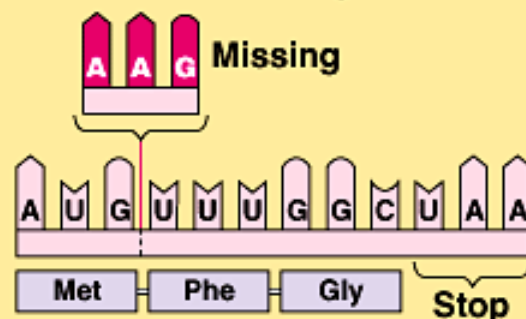


### Frameshift causing immediate nonsense

Extra U



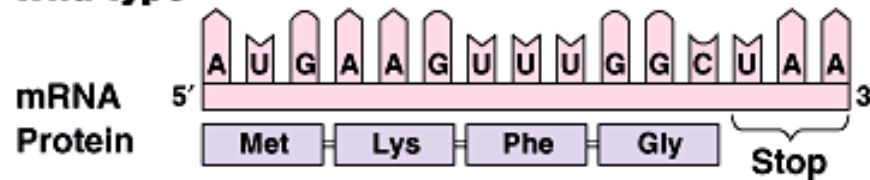
### Insertion or deletion of 3 nucleotides: no frameshift; extra or missing amino acid



# Base-Pair Insertion or Deletion

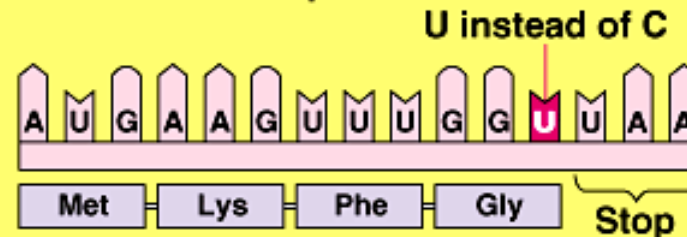
- The addition or deletion (between existing bases) of a nucleotide pair can shift the reading frame of the DNA (called a frameshift mutation). Usually more problematic than base-pair substitution.
- \*ALWAYS causes missense
- \*CAN cause nonsense if a STOP codon is created
- \* mutagens are agents that cause DNA mutation (usually carcinogenic).

### Wild type

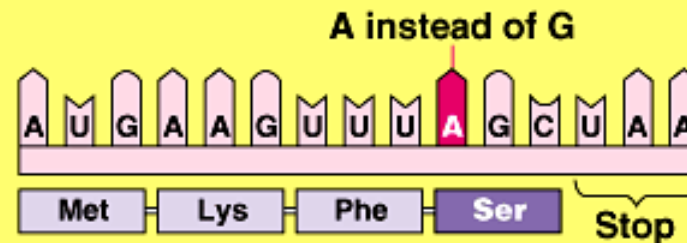


### Base-pair substitution

#### No effect on amino acid sequence



#### Missense



#### Nonsense

