Biochemistry

DNA MUTATION & REPAIR

What can go wrong with the DNA? Why does DNA need to be repaired?

- Errors during DNA synthesis (incorrect base-pairing, insertion of extra nucleotides, etc.)
- Radiation (non-ionizing ultraviolet light, high-energy ionizing radiation)
- Chemical exposure (nitrous acid)
- Spontaneous loss and alteration of bases

Mutations can lead to different kinds of diseases and can also cause abnormalities in the newborn.

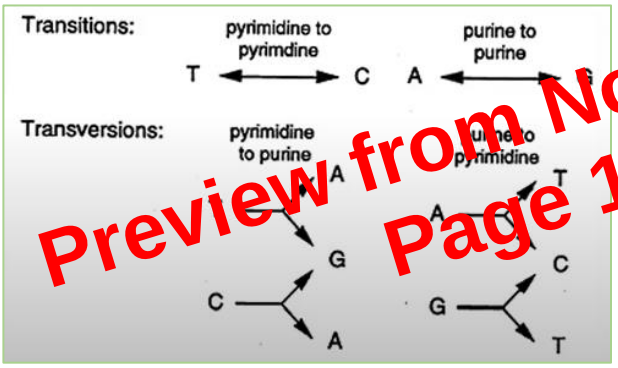
DNA MUTATION

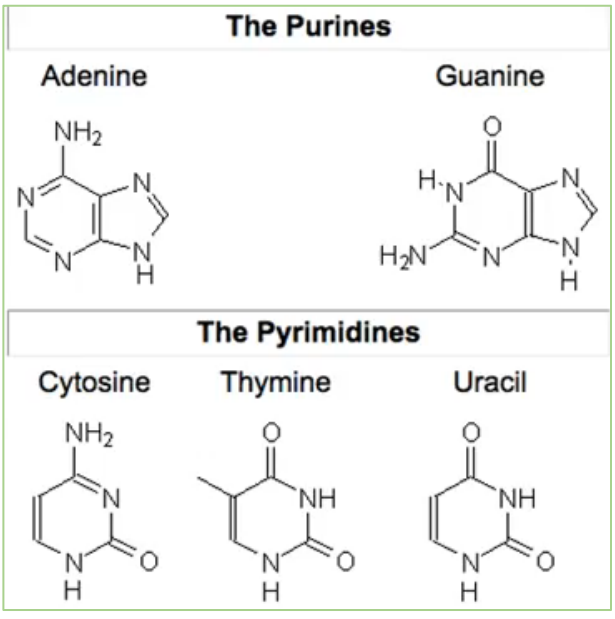
It can be classified:

- **Based on substitution**
  - Transition
  - Transversion
- **Based on size/position**
  - Point mutation
    - Silent
    - Missense
    - Nonsense
  - Deletion
  - Insertion

DNA MUTATION BASED ON SUBSTITUTION

Transition	Change to same kind
Transversion	Change to another kind

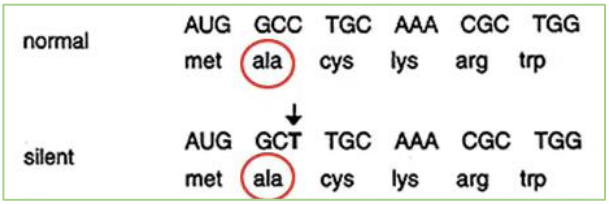




DNA MUTATION BASED ON SIZE/POSITION

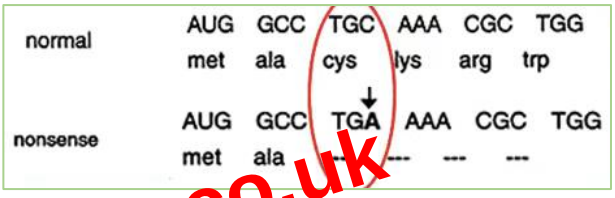
Point mutation happens when there is only 1 nucleotide that replaces another

A. **Silent mutation** happens when the mutation has very little to no effect to the body. Despite the point mutation, there is **production of the same protein**

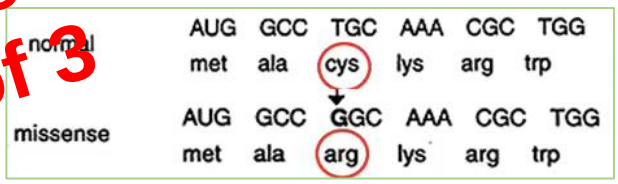


B. **Nonsense mutation** happens when point mutation results in the **production of a stop codon**

DNA STOP CODONS	TAA, TAG, TGA
mRNA STOP CODONS	UAG, UGA, UAA

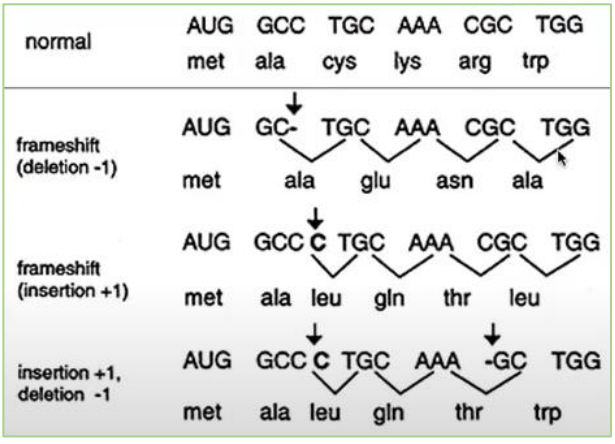


C. **Missense mutation** happens when point mutation results in the **production of a different protein**



DELETION & INSERTION

Deletion	1 nucleotide is deleted or is gone
Insertion	Addition of an extra nucleotide along the line



In **deletion**, there is a **frameshift to the right** because they keep on borrowing or robbing from their neighbour codons

In **insertion**, there is a **frameshift to the left** because of the addition of an extra nucleotide