

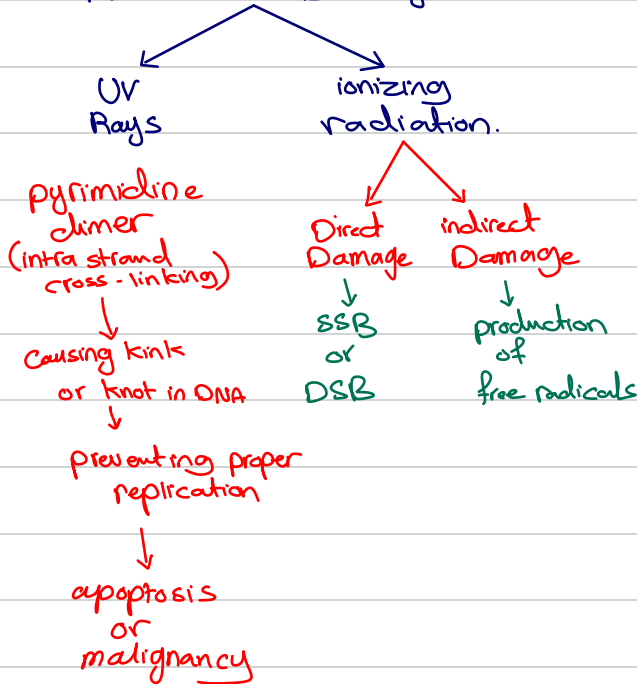
DNA Damage, Mutations and repair mechanisms:

* Endogenous DNA damage:

- ① Deamination \Rightarrow Base pair substitution.
- ② Depurination \Rightarrow Base pair Deletion.
- ③ Replication errors \Rightarrow Substitution, Deletion, Insertion.
- ④ Oxidative damage of DNA \Rightarrow chemical modification of nitrogenous Bases and mispairing

* Exogenous DNA damage:

A- Radiation Damage

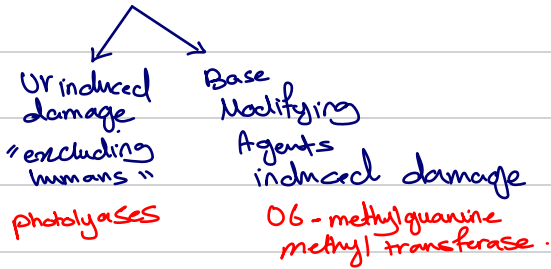


B- chemical mutagens :-

- ① Base Modifying Agents \Rightarrow Base pair substitution.
- ② Base analogs \Rightarrow Base pair substitution.
- ③ Intercalating Agents \Rightarrow Insertion or Deletion \rightarrow frameshift mutation.

* DNA Repair mechanisms :-

① Direct repair mechanisms



② Base excision repair

\rightarrow example : repairing Deamination

- * Glycosylase
- * Ap endonuclease
- * DNA polymerase
- * DNA ligase

③ Nucleotide excision repair

\rightarrow Corrects bulk distortions in DNA
"UV induced pyrimidine dimers"

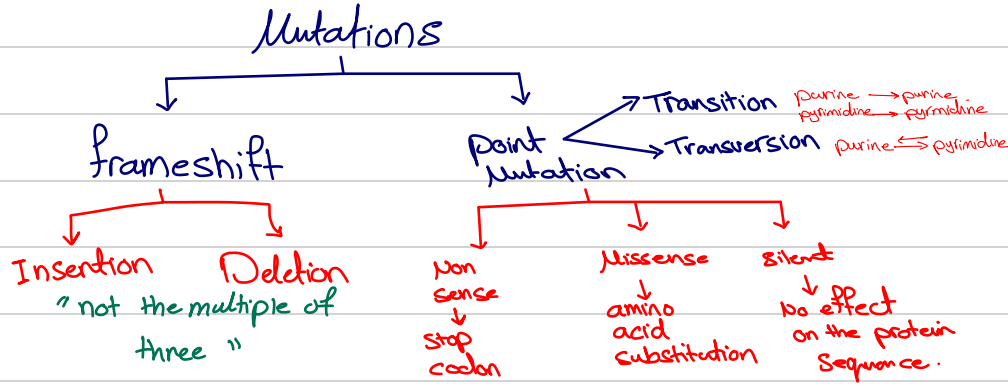
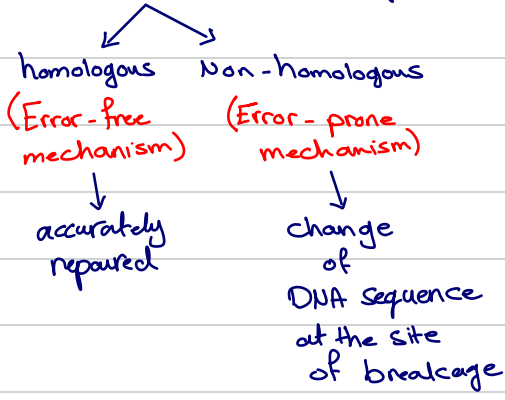
- * endonuclease
- * DNA polymerase
- * DNA ligase.

④ Strand-directed mismatch repair

\rightarrow corrects replication errors

"Deletion, Substitution, Insertion"

⑤ Double strand breaks repair



* Missense → Conservative "new amino acid chemically similar"
* Missense → Non-conservative "Dissimilar"