CONCEPT: SPONTANEOUS MUTATIONS

● The majority of DNA mutations are _____

□ **Luria** and **Delbrünk fluctuation test** proved that the majority of mutations are spontaneous

- Tested two bacterial cultures for their ability to develop resistance to a bacteriophage

1. 20 small cultures that were grown in the presence of the phage

2. One large culture that wasn't grown in the presence of the phage

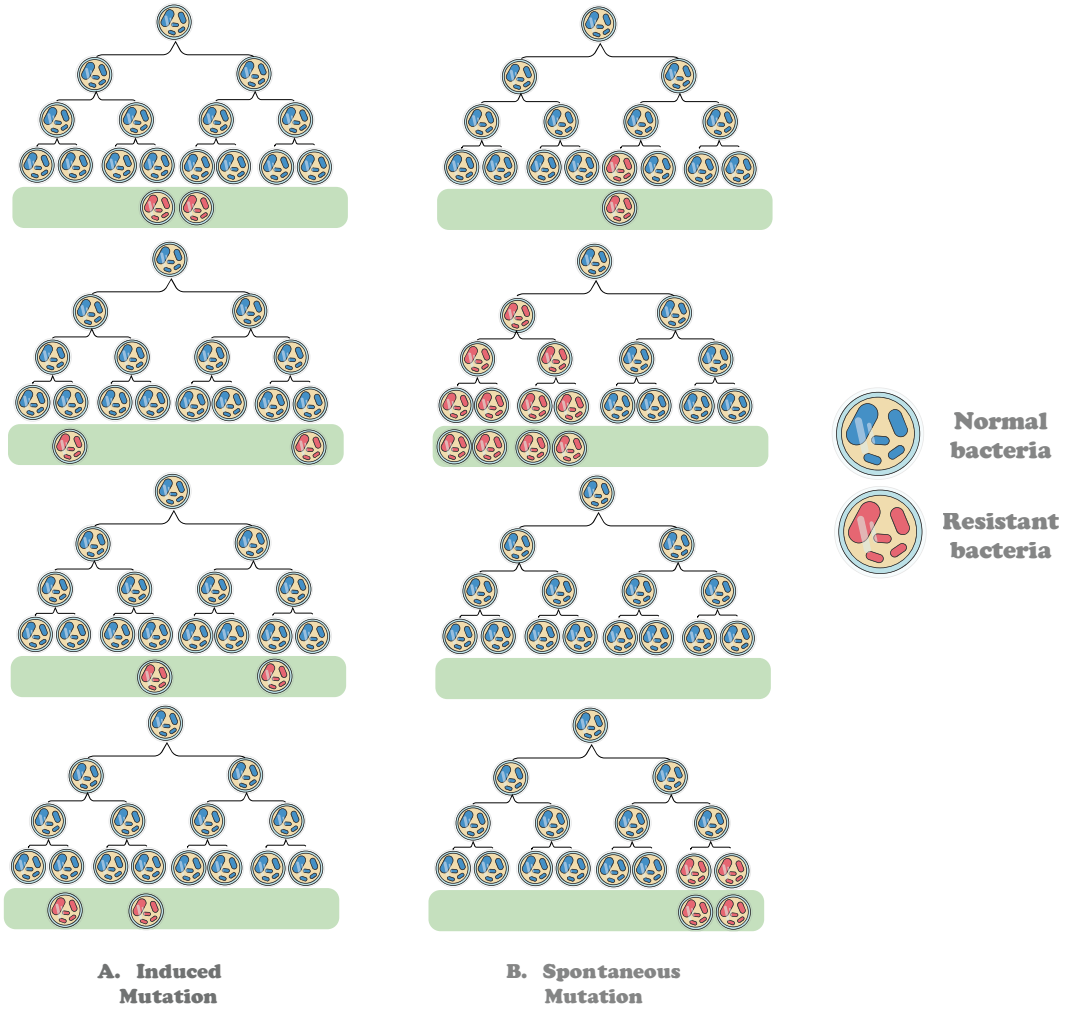
- A small amount of each culture was plated in the presence of the bacteriophage

- They found that resistance was not dependent on previous exposure to the phage

1. Each culture had a range of 1-107 resistant colonies per plate

2. The large culture had a range of 14-26 resistant colonies per plate

EXAMPLE:



● There are many different _____ that lead to spontaneous mutation

□ Errors in DNA replication can cause mutations

- Including: transitions, transversions, frameshift, indel, etc…

□ Naturally occurring DNA damage

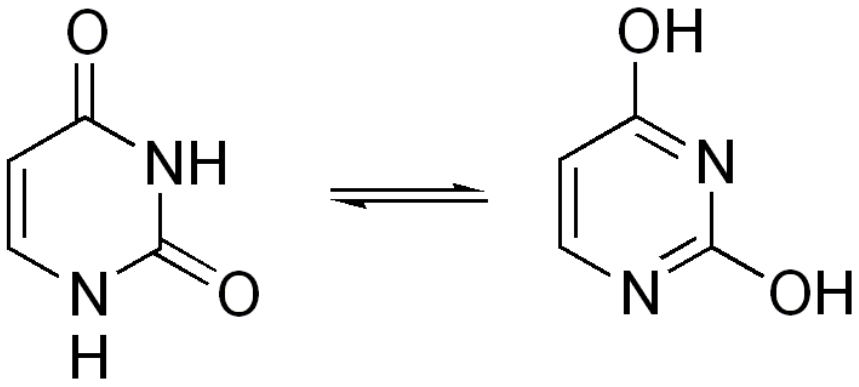
- Including: depurination, deaminiation, oxidatively damaged bases

□ *Tautomeric shifts* occurs when different *tautomers* are used

- **Tautomers** are different forms of the bases which differ by positions of protons in the base

- Tautomers can form base pairings outside of A/T and C/G

EXAMPLE: Uracil tautomers



● **Tri-nucleotide repeat** diseases results from the addition of many nucleotide _____

□ Normal individuals contain a certain number of repeats, while diseased individuals contain many more

Ex: Fragile X: No disease = 6-54 CGG repeats, while diseased = 200-1300 CGG repeats

□ Strand slippage can cause insertions of DNA

- When the DNA is copied the nucleotides form a small loop by binding to repetitive regions

- This allows the DNA polymerase to replicate the looped regions twice

EXAMPLE: