CONCEPT: GENETIC CODE

● Nucleotides and amino acids are _____ translated in a 1 to 1 method

□ The **triplet code** states that three nucleotides codes for one amino acid

- A **codon** is a term for the three nucleotides

- The **reading frame** determines the nucleotide in which the codons should be read

□ The triplet code is:

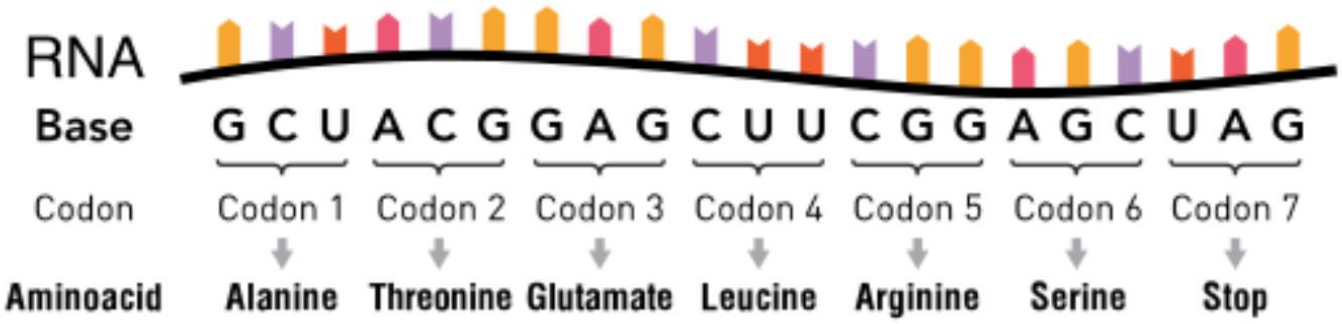
- **Nonoverlapping**, meaning that the three nucleotides represent one single codon, not multiple codons

- **Degenerate**, meaning that some amino acids are coded by more than one codon

- Nearly universal as most organisms use the same code

- Initiated by a **start codon (AUG)** and terminated by **stop codons (UAA, UAG, UGA)**

EXAMPLE:



● The triplet code was discovered by many different _____

□ The bacteriophage r11 locus studied by Brenner

- Two phages, each infected and lysed a different strain of *E.coli* (B or K12)

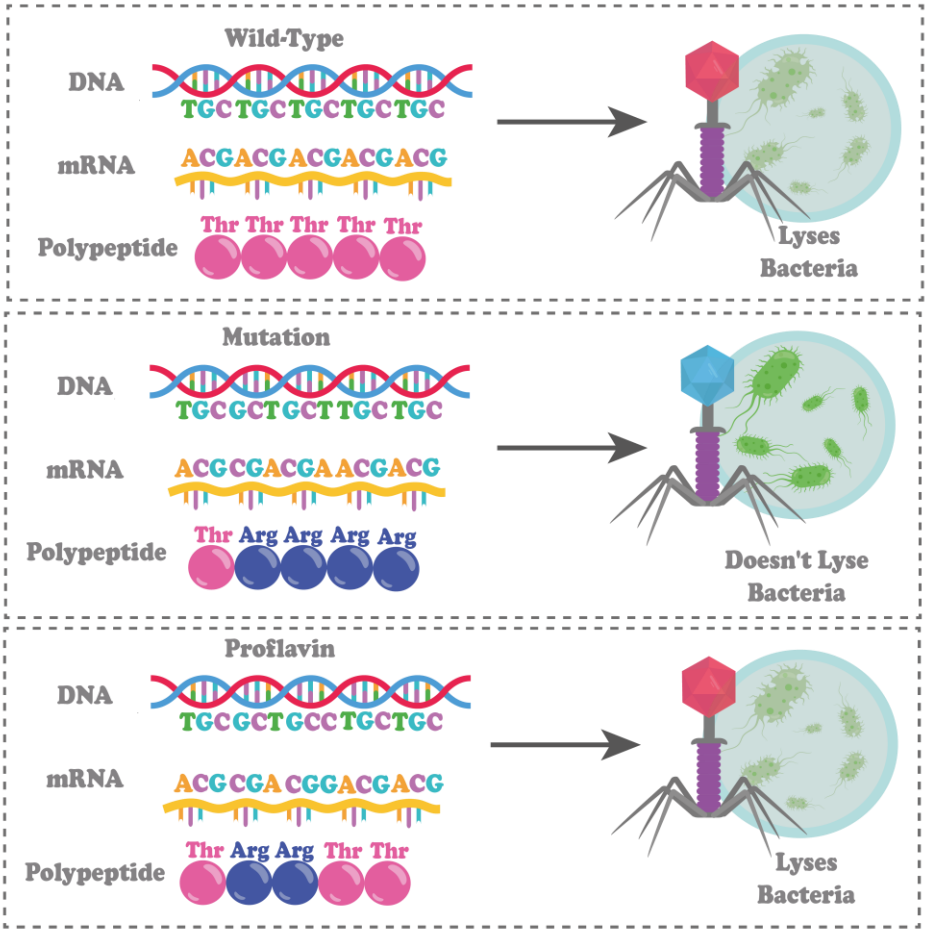
- Certain mutations prevented lysing

- Brenner added **proflavin**, a chemical that causes a single nucleotide mutation

- These proflavin treated bacteriophages would “revert” and resemble WT

- This was due to the original mutation disturbing the reading frame, and proflavin correcting it

EXAMPLE:



□ The ability to synthesize mRNA allowed for _____ the triplet code

- Nirenberg and Matthaei created **RNA homopolymers,** that repeated only one nucleotide

- Then, they allowed *E. coli* to create a protein using the RNA homopolymers as a template

- Afterwards they used **RNA heteropolymers**, that repeated two or more nucleotides

EXAMPLE:

RNA Homopolymers UUUUUUUUUUUUUUUUUUUUUUUU

Phe Phe Phe Phe Phe Phe Phe Phe Phe Phe