BIOLOGICAL FRAMEWORKS FOR ENGINEERS

Session #8 [nm: Genes, Decoding, and Mutations]

General Objectives:
✓ Introduction to genetic sequencing techniques
✓ Identify and discuss the basis for mutations

Central Framework:
✓ Decoding genetic information is technology driven and advances in understanding of sequences and mutations often come after the discovery of a new approach of technique

Interactive Activity:
✓ Worksheet on mutation

Session Outline:
I. Genes

II. Decoding

A. Restriction endonuclease

B. Sanger Method

C. Electrophoresis
D. Automatic Sequencing

E. Splicing

F. PCR

II. Genetic Mutation

A. Point mutations

B. Rearrangement mutations
**Mutation Exercise**

Fill out the amino acid sequence starting coding strand.

DNA \( (5') \ G \ G \ A \ T \ A \ G \ C \ A \ T \ G \ A \ A \ A \ C \ C \ C \ G \ C \ A \ T \ A \ A \ (3') \)

amino acid

How would the amino acid sequence above change with the following changes (mutations) in the DNA code (changes are marked in **bold-face**):

a. \( (5') \ G \ G \ A \ T \ A \ G \ C \ A \ T \ G \ A \ A \ A \ C \ C \ A \ G \ C \ A \ T \ A \ A \ (3') \) change amino acid

b. \( (5') \ G \ G \ A \ T \ A \ G \ C \ A \ T \ G \ A \ A \ A \ C \ C \ C \ C \ C \ A \ T \ A \ A \ (3') \) change amino acid

c. \( (5') \ G \ G \ A \ T \ A \ G \ C \ A \ T \ G \ A \ A \ A \ - \ C \ C \ G \ C \ A \ T \ A \ A \ (3') \) delete amino acid

d. \( (5') \ G \ G \ A \ T \ A \ G \ C \ A \ T \ G \ T \ A \ A \ C \ C \ C \ G \ C \ A \ T \ A \ A \ (3') \) change amino acid

e. \( (5') \ G \ G \ A \ T \ A \ G \ C \ A \ T \ G \ A \ A \ A \ T \ A \ A \ C \ C \ A \ G \ C \ A \ (3') \) shuffle amino acid