

Microbial Genetics

Chapter 8

I. Overview

- A.Genome
- B.Chromosome
- C.Gene
 - 1. functional units
 - a. mRNA
 - b. tRNA
 - c. rRNA
- D.Central dogma of molecular biology
- E.Genotype
- F.Phenotype

II. DNA

- A.Location
- B.Composition
- C.Structure review
 - 1. nucleotide
 - a. deoxyribose
 - b. phosphate group
 - c. base
 - 2. double helix
- D.Replication
 - 1. helicase
 - 2. DNA polymerase
 - 3. bidirectional
 - 1)antiparallel
 - 4. DNA ligase
 - 5. semiconservative replication
 - 6. accuracy

III. Gene Expression

- A.Transcription
 - a. RNA review
 - 1. The hows of Transcription
 - a. Initiation
 - 1)RNA polymerase
 - a)promoter
 - 2)gene structure
 - operon
 - polycistronic
 - b. Elongation
 - c. Termination
 - 1)terminator

B. Translation

1. components
2. ribosomes
3. tRNA
 - a. folding
 - 1) cloverleaf
 - b. charging
4. Genetic code
 - a. codons
5. How Translation is done
 - a. Initiation
 - 1) ribosome-binding site
 - 2) AUG
 - b. Elongation
 - 1) P-site
 - 2) A-site
 - 3) E-site
 - c. Termination
 - 1) stop codon
 - 2) UGA, UAG, UAA

IV. Mutation

A. Types

1. point mutation
 - a. silent
 - b. neutral
 - c. missense
 - d. nonsense
2. frameshift

B. Causes

1. spontaneous
2. mutagens
 - 1) thymine dimer

C. Identifying mutants

1. positive (direct) selection
2. negative (indirect) selection
 - a. auxotroph
3. Ames test

V. Genetic Recombination

A. Transformation

1. Frederick Griffith

B. Conjugation

C. Transduction