

Microbial Genetics

Chapter 8

- I. Overview
 - A.Genome
 - B.Chromosome
 - C.Gene
 - 1. functional units
 - a. mRNA
 - b. tRNA
 - c. rRNA
 - d. others
 - D.Central dogma of molecular biology
 - E.Genotype
 - F.Phenotype
- II.DNA
 - A.Location
 - B.Structure review
 - 1. nucleotide
 - a. deoxyribose
 - b. phosphate group
 - c. base
 - 2. double helix
 - a. complementary base paring
 - C.Strand orientation
 - 1. antiparallel
 - D.Replication
 - 1. helicase
 - 2. DNA polymerase
 - 3. bidirectional
 - 4. DNA ligase
 - 5. semiconservative replication
 - 6. accuracy
- III.Gene Expression
 - A.Transcription
 - a. RNA review
 - 1. Steps of Transcription
 - a. Initiation
 - 1)RNA polymerase
 - a)promoter
 - b. Elongation
 - c. Termination
 - 1)terminator
 - 2. Differences
 - a. gene organization
 - a)operon
 - b)polycistronic
 - b. location

B. Translation

1. components
2. mRNA
3. Ribosomes
4. tRNA
 - a. folding
 - 1) cloverleaf
 - b. charging
5. Genetic code
 - a. codons
 - b. anticodon
6. Steps of Translation
 - a. Initiation
 - 1) ribosome-binding site
 - 2) AUG
 - b. Elongation
 - 1) P-site and the A-site
 - 2) E-site
 - c. Termination
 - 1) stop codon
 - 2) UGA, UAG, UAA

IV. Genetic Recombination

A. Conjugation

1. F factor

B. Transformation

1. Frederick Griffith

C. Transduction

D. Transposons

1. Barbara McClintock

V. Mutation

A. Types

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

B. Causes

1. spontaneous
2. induced
 - a. mutagens

C. Repair

VI. Genetic Engineering = Recombinant DNA Technology

A. Manipulating genes

B. Restriction enzymes

1. ligase

C. PCR

1. Components
2. Uses