

BIO 226N - STUDY GUIDE

BACTERIAL GENETICS

- I. GENETIC INFORMATION - STORAGE & USE
- A. GENES: DNA - Chromosome, nucleotide, sequence in
AGCT: gene products, enzymes, function
 - B. REPLICATION - synthesis of DNA (chromosome)
origin, replication form, terminus;
semiconservative replication - complementary
daughter strand synthesized from each parent
template - so DNA contains one
parental strand and one new strand
 - C. TRANSCRIPTION - copying information from DNA (one coding strand) into mRNA
(messenger RNA), mRNA synthesis. PROMOTER, TERMINATOR,
mRNA - single stranded RNA
 - D. TRANSLATION - use of mRNA to synthesize proteins.
codons (Triplets). Reading frame. Start, stop
ribosomes; Amino Acids + tRNA + ATP.
INITIATION CODON = METHIONINE - AUG
STOP CODON, NONSENSE CODON - UAA, UAG, UGA
 - E. MUTATION - change in nucleotide sequence of DNA results in change in mRNA,
results in change in amino acid sequence of protein, subsequent loss of
enzyme function, altered 3D structure - usually has no enzyme activity.
wild type - mutant
genotype - gene sequence in nucleotides
phenotype - property one can see, observe,
mutagen - mutagenic
 - F. INFORMATION FLOW:

DNA c RNA c PROTEIN
REPLICATION c DNA c DNA
TRANSCRIPTION c DNA c RNA
TRANSLATION c RNA c PROTEIN
- II. DNA EXCHANGES
- A. TRANSFORMATION:
Streptococcus pneumoniae, smooth colonies; forms capsule,
wild type, causes disease:
rough colonies, no capsule, nonpathogenic; recombination
 - B. CONJUGATION: PLASMID, MALE, F-FACTOR, R-FACTOR,
TRANSPOSONS.
Contact between male and female bacteria, conjugation bridge,
TRANSFER DNA from donor to recipient.
 - C. RECOMBINATION: BREAKING AND REJOINING STRANDS OF DNA
Transformation and Conjugation
 - D. PLASMID DNA TRANSFER BY TRANSFORMATION *IN VITRO*
 - E. RECOMBINANT DNA: Restriction enzymes, Target DNA,
vector DNA; hybrid plasmid use