

BICH/GENE 431 KNOWLEDGE OBJECTIVES

Chapter 11 – Site-specific Recombination and Transposition of DNA

Know difference between CSSR (conservative site-specific recombination) and transposition

3 possible outcomes of CSSR: insertion, deletion, inversion

direct repeats on ends of element means insertion/deletion

inverted repeats on ends of element means inversion

recombination sites on ends of element are recognized by recombinase enzyme

properties of recombinases:

- two types of recombinases: serine and tyrosine
- covalent intermediates between recombinase and cut ends
- different mechanisms used for serine and tyrosine classes

several examples of CSSR:

- bacteriophage lambda insertion/excision to make prophage (lysogeny pathway)
lambda integrase (tyrosine family recombinase), attP and attB sites
- bacteriophage P1 circularization using Cre recombinase and loxP sites
used to make conditional knockouts in mice; what is utility of this?
- Salmonella flagellar switching: two types of flagellin (H1, H2): why?
Hin recombinase

Understand how switching of element regulates expression of H1 vs. H2 flagellins.

Relative amounts of transposons in various genomes

3 classes of transposons: know basic outline of each

- DNA transposons
- Virus-like retrotransposons
- Poly-A retrotransposons

Understand basic mechanisms of DNA transposition (both cut-and-paste and replicative); examples of each type

Understand basic mechanism of transposition by virus-like retrotransposons and example

Understand basic mechanism of transposition by poly-A retrotransposon

Examples are mammalian LINEs and SINEs; what is difference between autonomous and nonautonomous transposon?