

# Transposition

## I. Transposons

- What (who) are they?
- What do they do?
- Where are they found?
- Gene Structure

## II. Types of Transposons

- Insertion Sequence (IS) Elements
- Composite Transposons
- Outside-end transposition can carry new genes with it
- Inside-end transposition can generate new transposons
- NonComposite Transposons

## III. Detecting Transposition

- Suicide Vectors
- Mating-Out of Transposon Genes

## IV. Models of Transposition Mechanism

### Replicative Transposition

#### Observations:

- 1 short sequence of target DNA is duplicated upon insertion
- 2 cointegrate intermediates are observed
- 3 Cointegrates can be resolved by enzymes called resolvases at *res* sequences
- 4 Donor and Target each have a copy of the transposon after transposition
- 5 The host's homologous recombination proteins are not required (nonhomologous recombination)

### Cut and Paste Transposition

#### Observations:

- 1 short sequence of target DNA is duplicated upon insertion
- 2 but.. no cointegrate intermediates are observed...
- 3 but...no resolvase is required
- 4 but.. Only the Target has a copy of the transposon after transposition
- 5 The host's homologous recombination proteins are not required (nonhomologous recombination)

#### Similarities between the two mechanisms

#### Target site specificity

## V. Site-Specific Recombination

- Integrases
- Resolvases
- Invertases