411-8 2/2/09

lambda replication minus phage- how grow? In suppressor strain

Go back over rearrangements

Regulation of transposition

A good parasite doesn't kill it's host. Tns are parasites, and many of theserearrangements would be expected to be highly deleterious- if too much tn, host dies and transposon dies with it

So it makes sense- transposition is highly highly regulated

OH write

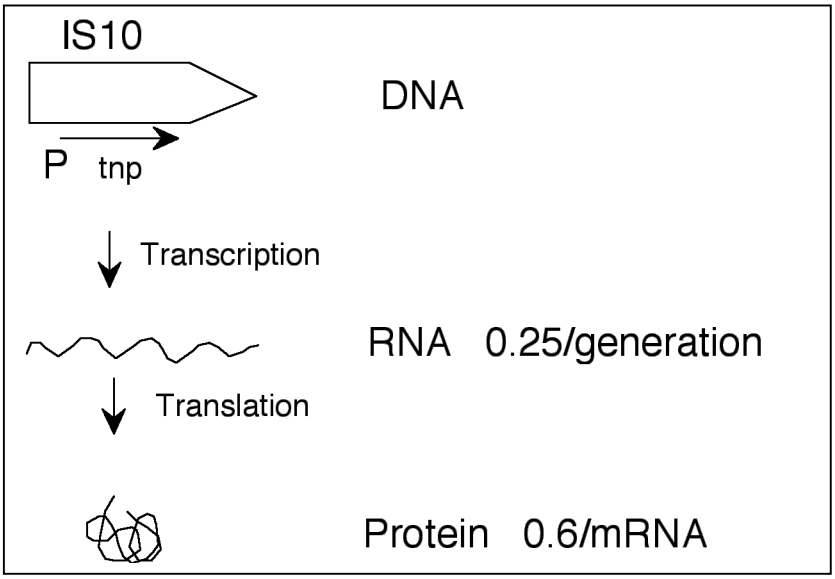
Regulation of transposition:

1. transposase protein level kept low
    a. low basal level transcription and translation
    b. Protect against outside promoters
2. transposition itself coupled to replication

PP-Focus on IS10-

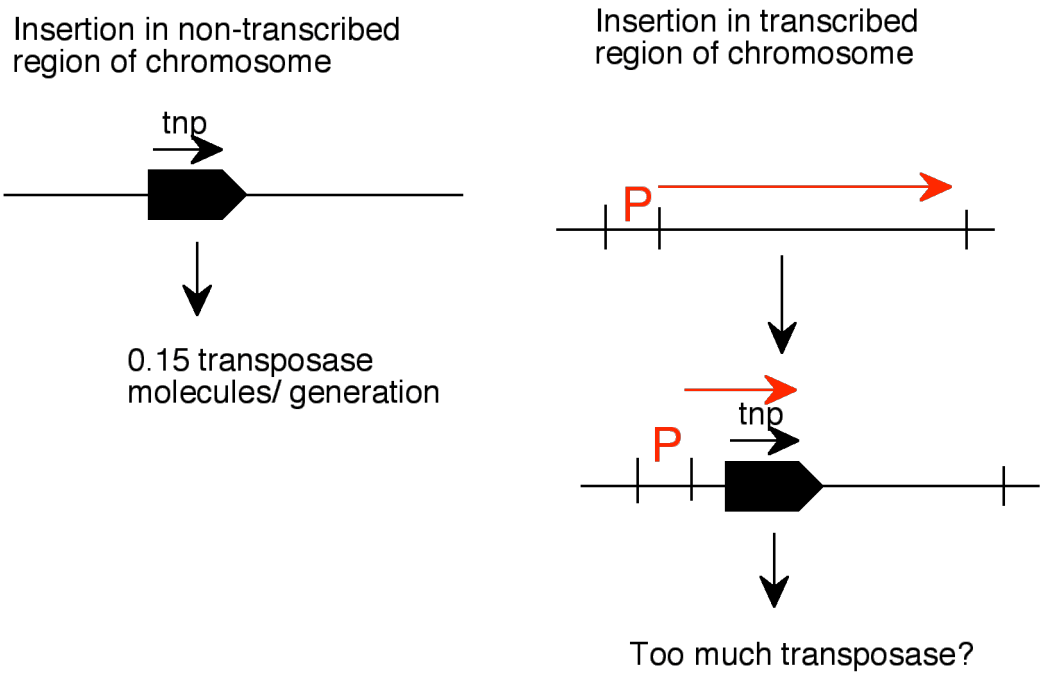
<u>Keeping transposase levels low:</u>

1. IS10-Basal transcription and translation low (0.15 protein per generation!)

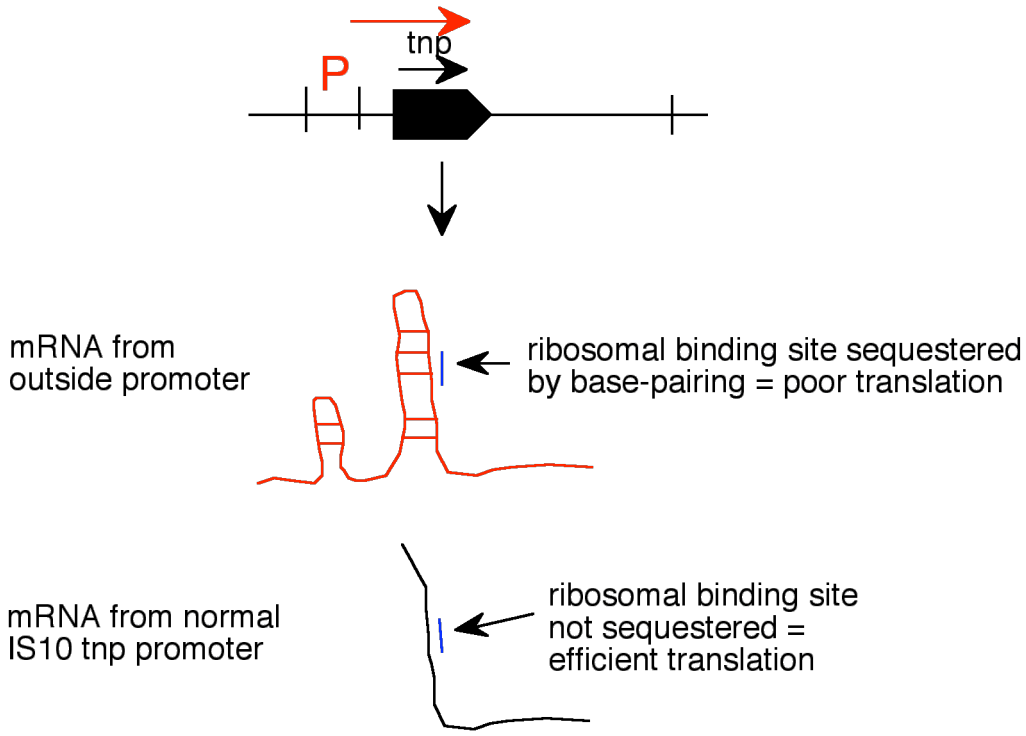


Other transposons have different ways of keeping transposase levels low:
2. IS903- transposase is very sensitive to cell proteases
3. IS1- need spontaneous ribosomal frameshift to get full-length protein!

<u>Protection against outside promoters</u>



Transposon has evolved a clever way to prevent too much transposase from being synthesized when this happens

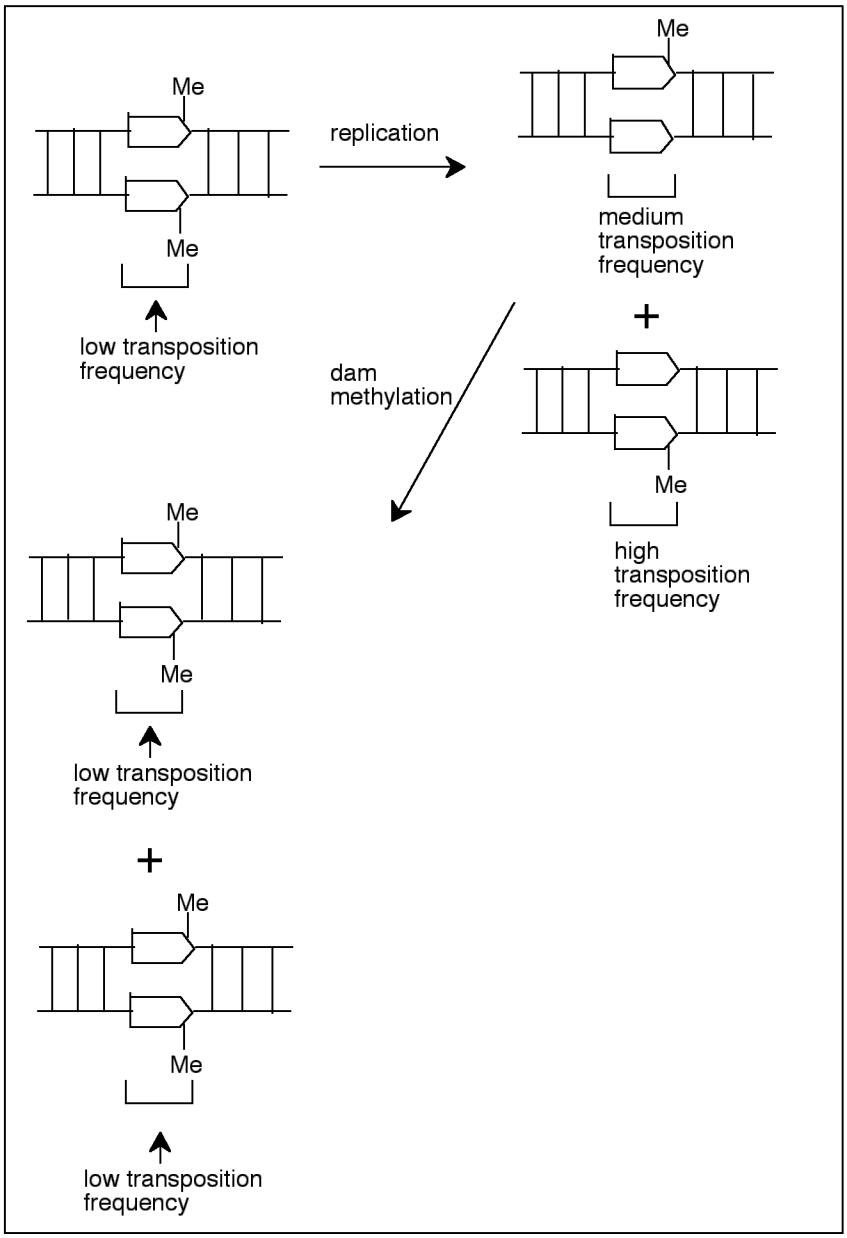


PP shows sequence of RNA from outside promoter- contributes very little to amount protein made because ribosomal binding site base-paired

<u>Control of transposition reaction</u>

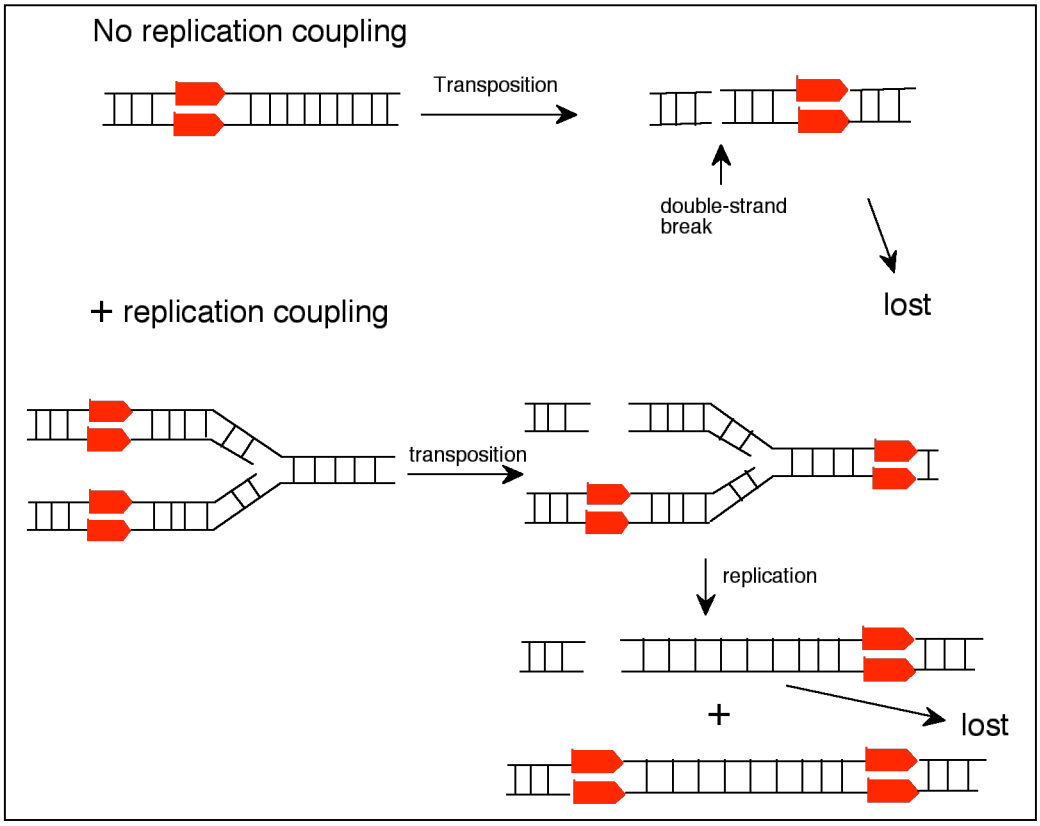
PP- shows dam methylation sites at very end of IS10 (GATC)

PP transposition inhibited if both Dam sites are methylated- on the other hand, both derivatives with one methyated, one unmethylated strands are active



This mechanism couples transposition to replication- get only right after replication fork passes through- about 10% of the division cycle
So this limits amount of transposition, but does something a little more interesting as well- ensures that there is a second copy of site with transposon when transposition occurs- helps prevent death of cell

Are two hemi-methylated forms different? Different strands



Cell survives even though donor chromosome may be lost

IV. Site-specific recombination – distinguish from homologous recombination-

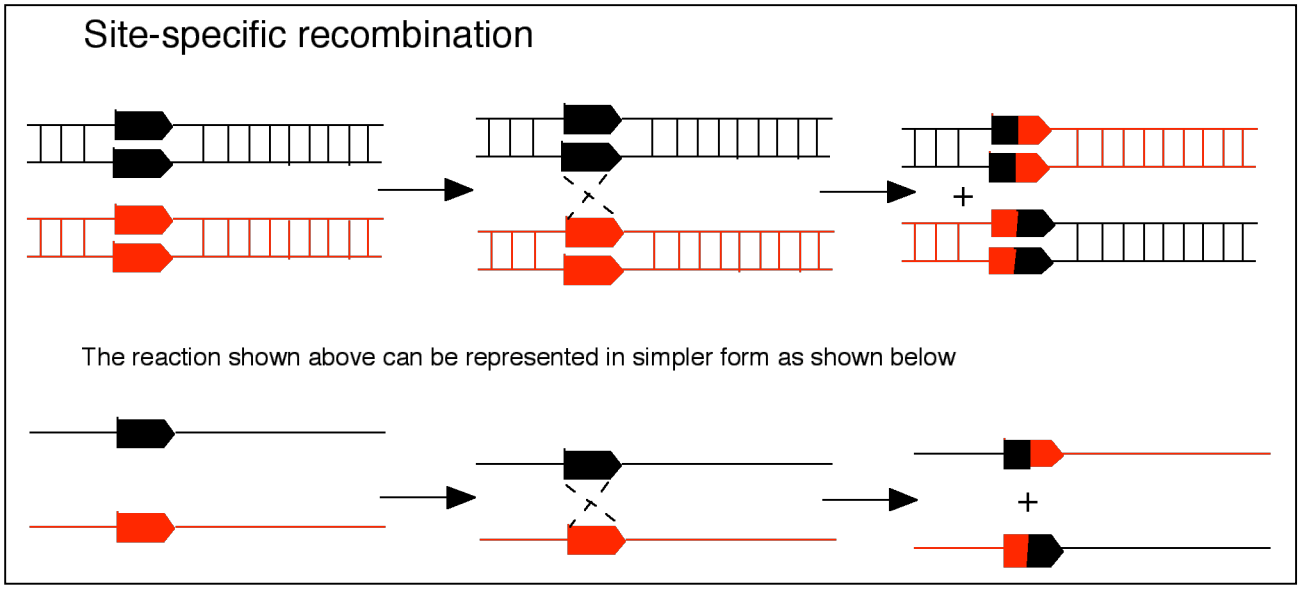
OH- Site-specific recombination

-recombination at <u>specific</u> sequence rather than <u>any</u> homologous sequence. Sequences typically 30-40 bp long

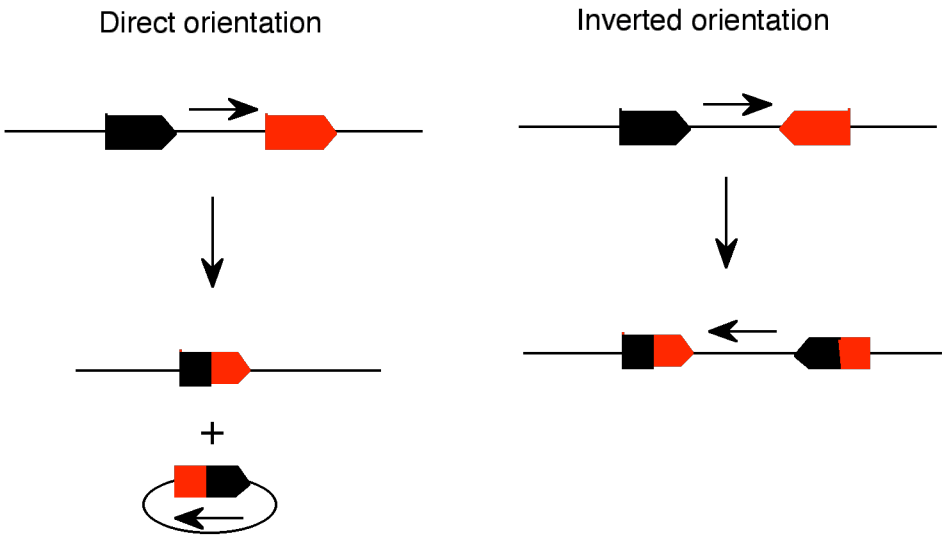
site-specific recombination- covered in today's reading assignment

General representation of process- sites typically 30-40 bp

-sites can be on same or different DNA molecules



Genetic consequences of site-specific recombination depend on orientation of recombining sites and whether one or two DNA molecules involved



BOARD: Examples:

1. Tn3 transposition
2. phage lambda lysogeny and induction
3. Hin inversion-**PP**
4. Phage Mu tail fiber-**PP**
5. Genomic islands-PPs
6. Integron formation