

Mechanisms of Genetic Regulation and λ

Transcriptional regulation: prevents or activates txn

- **Repression:**

- **Negative autoregulation:**

Transcriptional regulation continued....

- **Activation:**

- **Positive autoregulation:**

- **Antitermination:**

Translational regulation: acts on RNA and affects tln

- **Antisense RNA:**

TNL regulation continued....

- mRNA degradation:

***sib* and transcript from P_L to t_L^2**

- *sib* is a sequence that causes a stem-loop to form in the 3' end of the mRNA

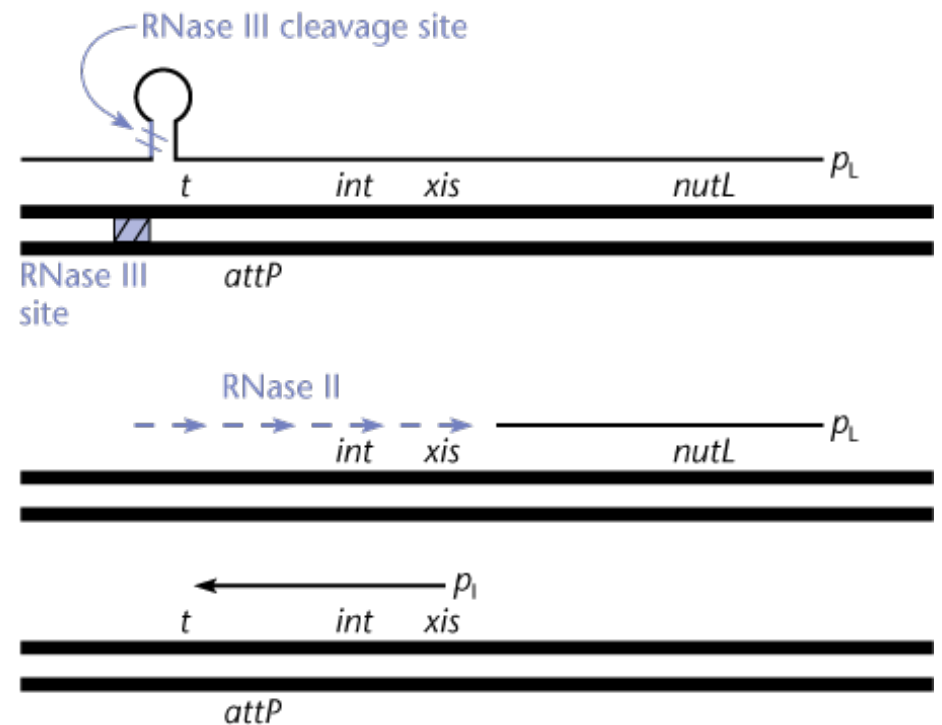
- *int* and *xis* portions of mRNA from P_L are degraded in both lytic and lysogenic cycles

- During lytic phase, no Int or Xis is needed.

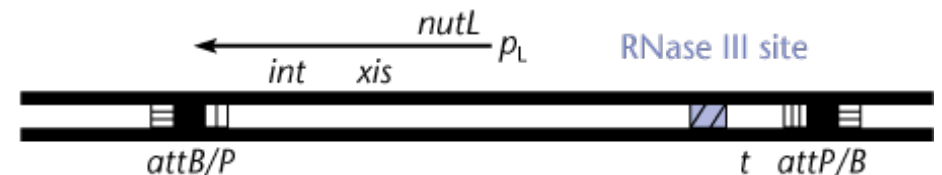
- Do not want Xis produced during late lysogeny, or λ will not be integrated

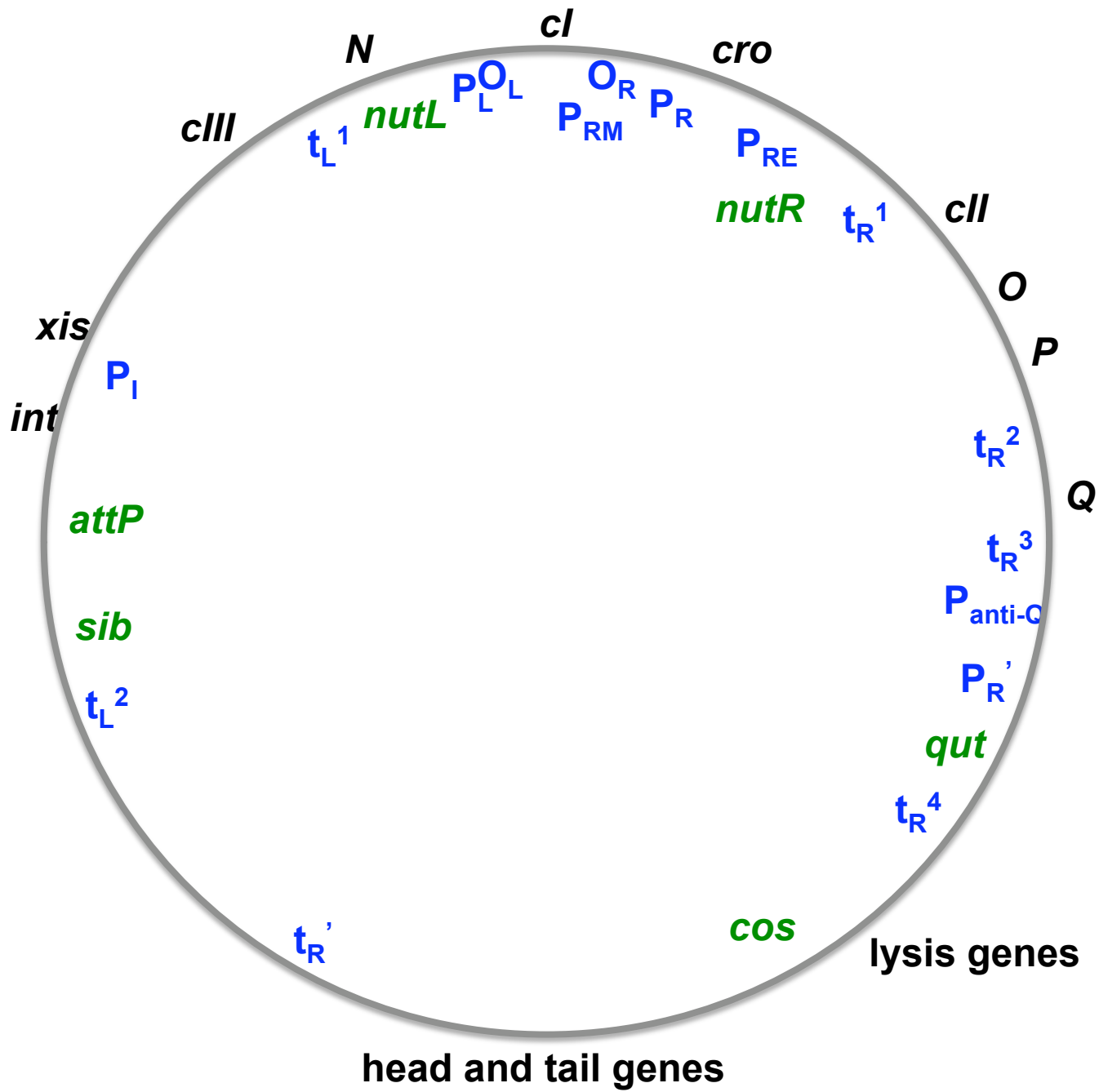
- During induction, *sib* is not in the proximity of *int* or *xis*

A After λ infection, *int* expressed only from p_i



B After λ induction, *int* and *xis* expressed from p_L

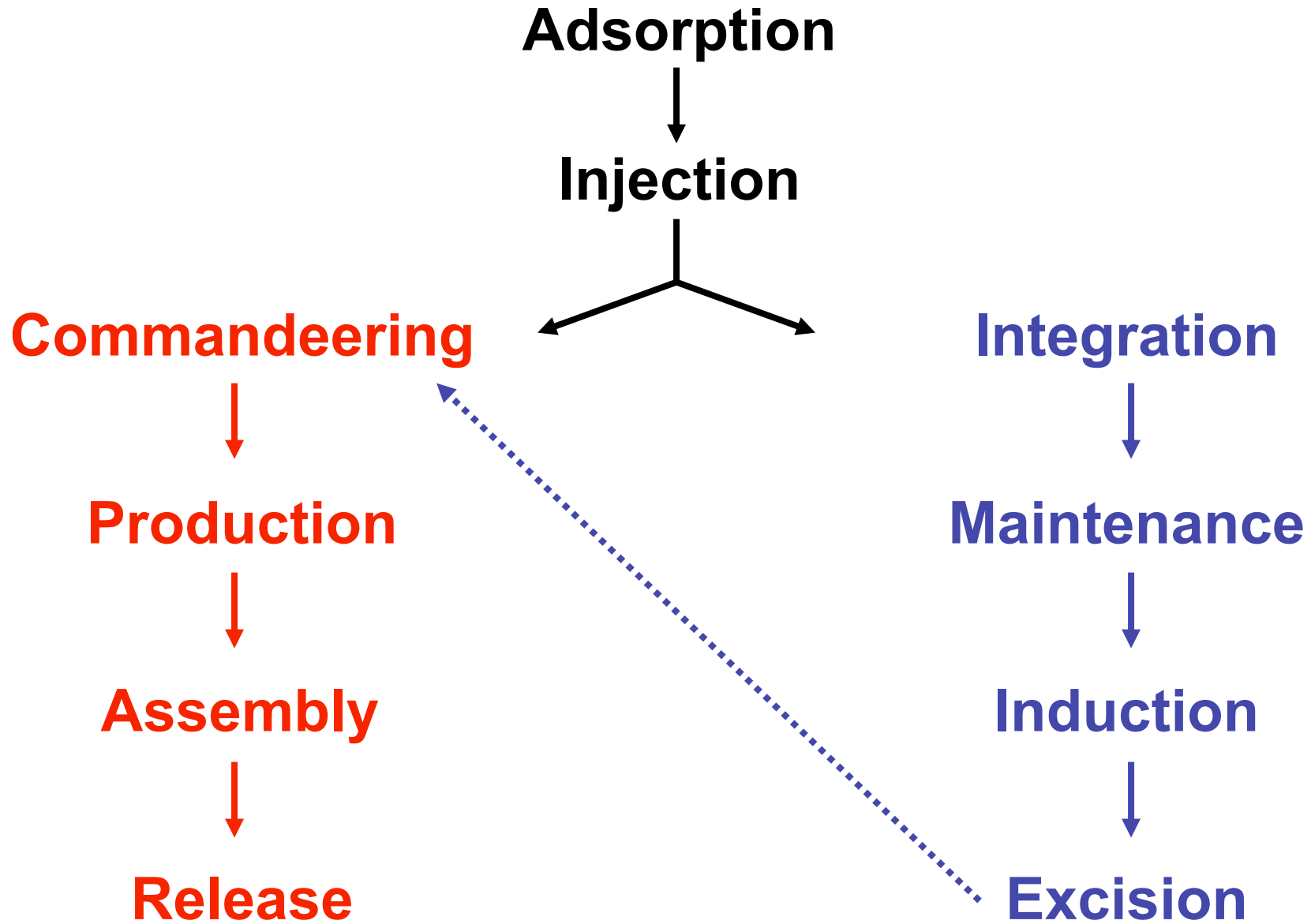




Post-translational regulation: affects protein

- **Protein degradation:**

Lambda Overview



Overview

What happens in a healthy cell?

Overview

What happens in an unhealthy cell?

unhealthy cell continued....

Overview

What happens in if a lysogen encounters severe DNA damage? ---> **Induction**

Induction continued.....

Overview

Questions to ponder

What would be the consequence of a mutation that rendered CII non-functional?

Questions continued.....

What would be the consequence of a mutation that rendered CIII non-functional?

You have isolated a λ phage that contains a conditional *cro* mutation. When the host is grown at 37°C, the Cro protein functions normally. However, when the host is grown at 42°C, a mutant Cro protein is produced that has equal affinities for O_R1 , O_R2 and O_R3 , even at very low mutant Cro concentrations. What will happen if this λ phage is allowed to infect a healthy bacterial cell at 37°C and the temperature is shifted to 42°C after delayed early infection has begun?

