

Lysis or Lysogeny, how is the decision made?

- In a healthy host, proteases will overtake protection of CII by CIII

- Degradation of CII will stop txn from P_{RE} , P_I , P_{anti-Q}



- Genes for lysis and head and tail proteins will be expressed by P_R' to t_R'

How is the decision made? continued...

- In an unhealthy cell, not enough proteases to overtake protection of CII by CIII

- CII will activate txn from P_{RE} , P_I , P_{anti-Q}

- ↳

- ↳ Cro will be diminished due to RNA from P_{RE}

- ↳

- ↳ txn from P_R' will terminate before late genes due to lack of Q

- Integrase will insert λ DNA into host genome

-

B Early after infection

Delayed early

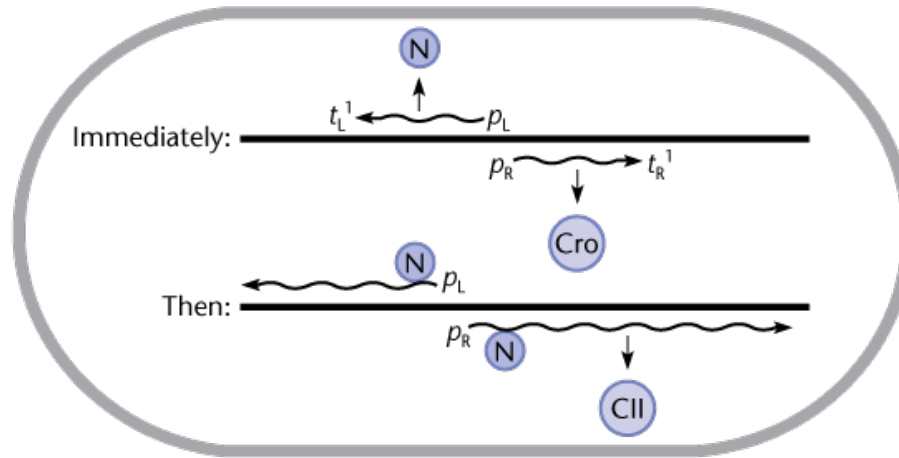
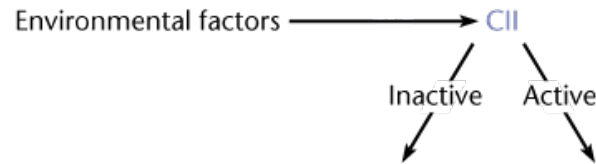
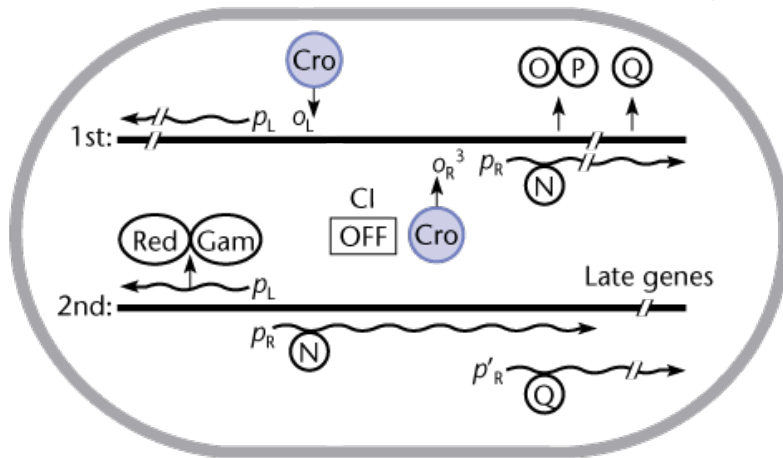


Fig. 8.13

C Decision

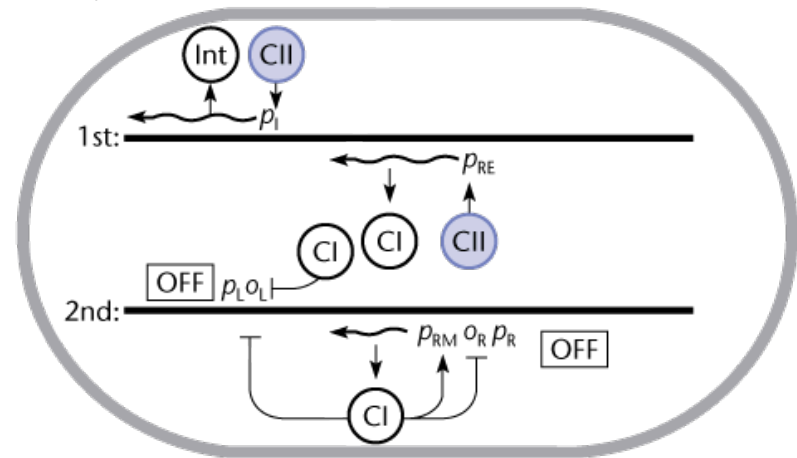


D Lytic cycle



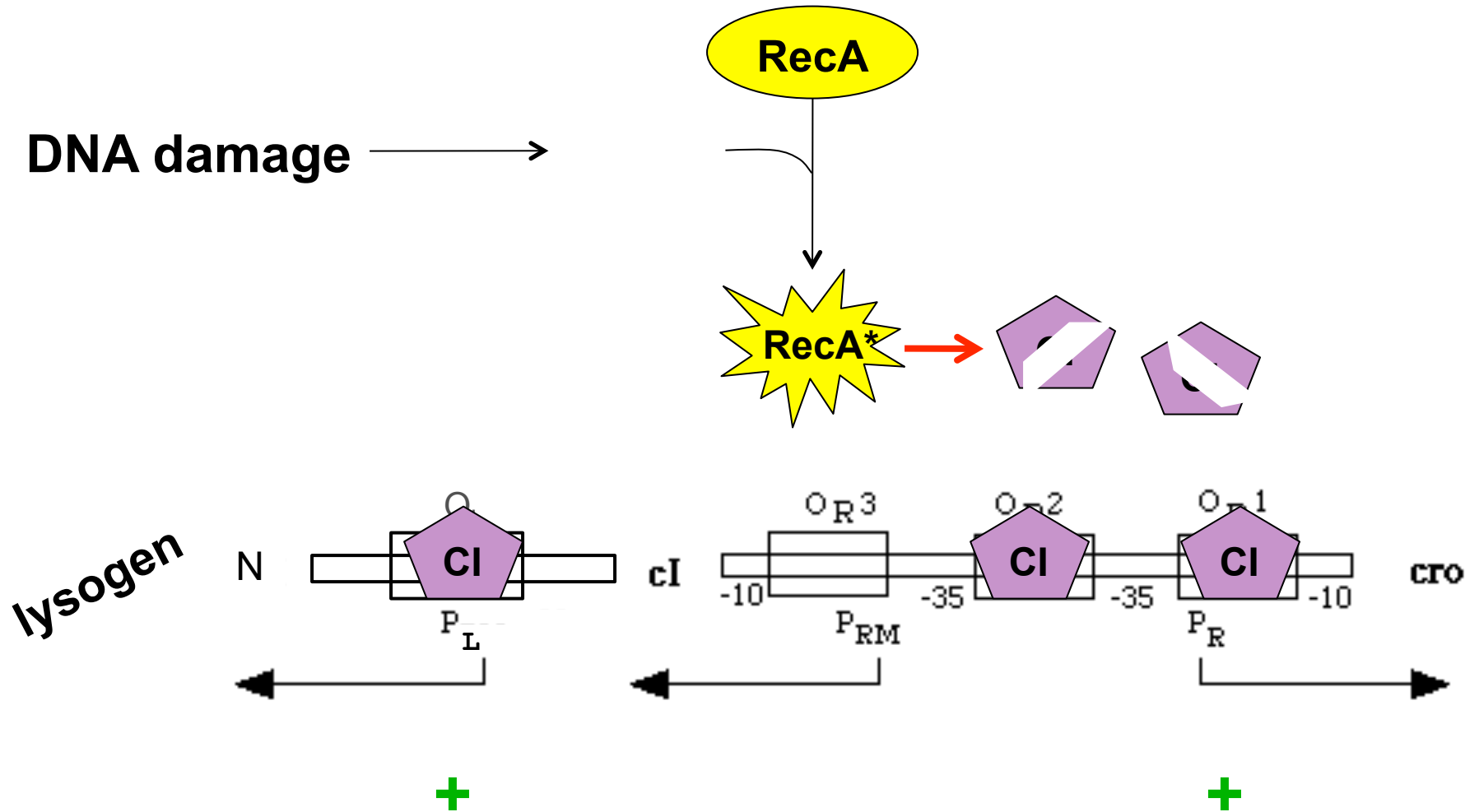
Replication
↓
Phage production and lysis

E Lysogeny



Phage DNA integration
↓
Maintenance of lysogen

Induction of λ



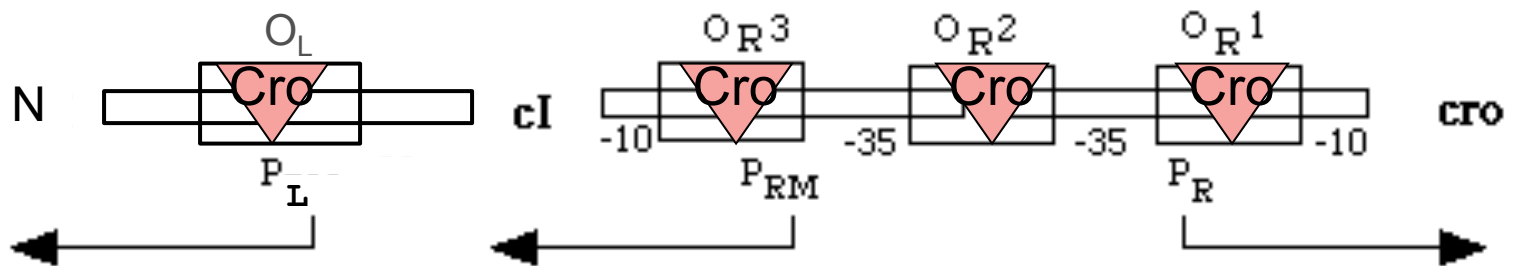
Induction of λ continued

1) RecA* induced degradation of CI, derepresses P_R and P_L

2)

- Cro is made and outcompetes CI, thus preventing synthesis of CI repressor by binding to O_R^3 with high affinity

Cro affinity: $O_R^3 > O_L > O_R^2 = O_R^1$



No Cro

Low [Cro]

Med [Cro]

High [Cro]

+

+

+

-

Induction of λ continued

3) Before Cro levels build up, txn from P_L to t_R^2 yields mRNA with both *xis* and *int*

- While CII is not being degraded by proteases (cell is unhealthy), [Cro] overtakes the [CI]

4)

- Due to the hybrid nature of the *att* sites, both Xis and Int are needed for site-specific recombination

5)

6) Before Cro reaches high concentrations, the late lysis phase occurs

- Txn of lysis and head and tail genes from P_R' to t_R' due to antitermination by Q

Induction of λ continued

Excision of λ DNA

