Figure 6.1

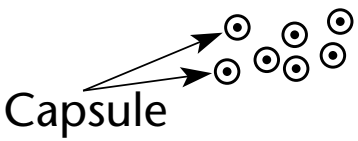
	Bacterial type	Effect in mouse	Bacteria recovered
A	Live type R 	Nonpathogenic	None
B	Live type S 	Pathogenic	Live type S
C	Heat-killed type S 	Nonpathogenic	None
D	Mixture of live type R and  heat-killed type S	Pathogenic	Live type S

Figure 6.2

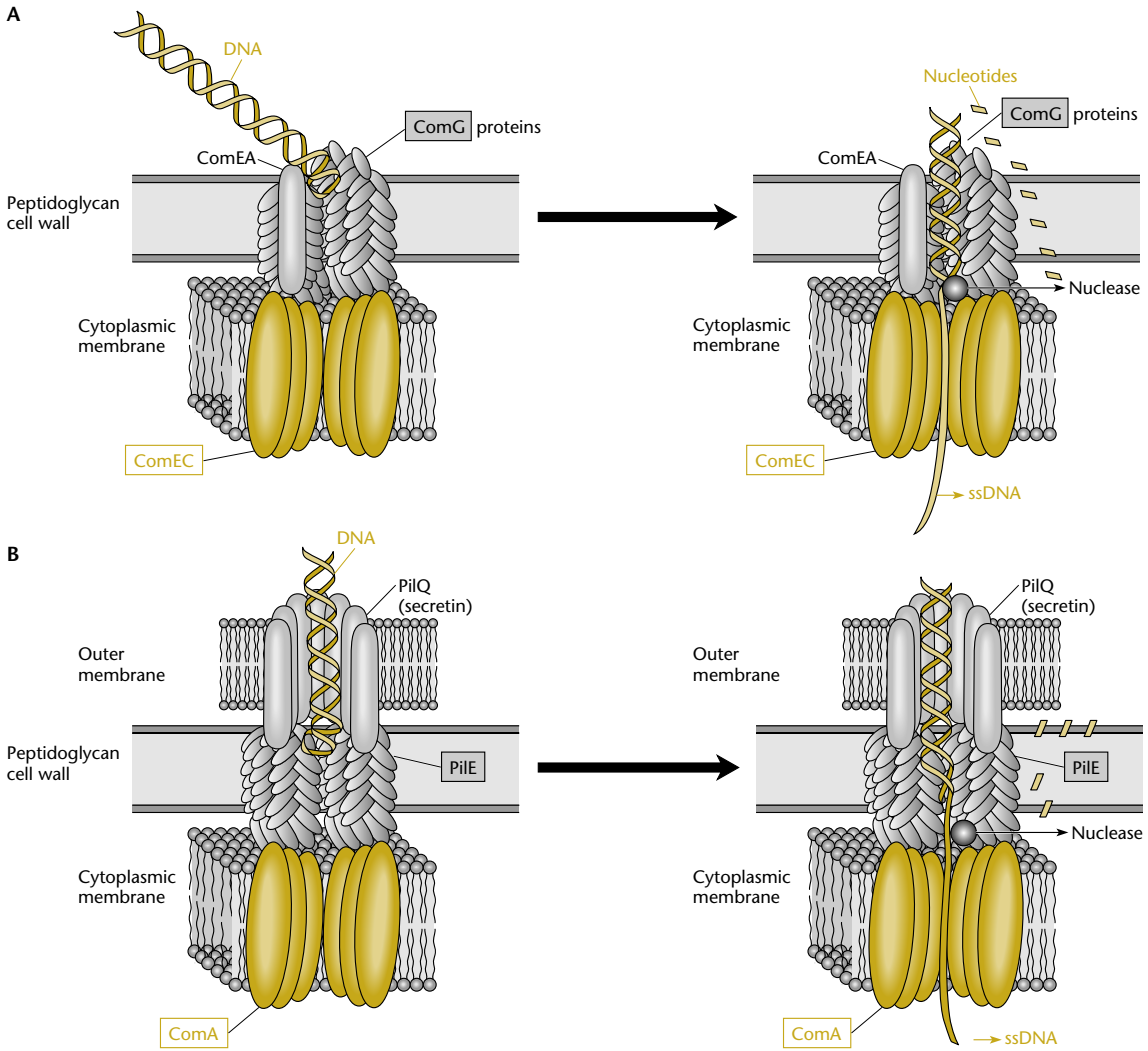

A
DNA
ComG proteins
ComEA
Peptidoglycan cell wall
Cytoplasmic membrane
ComEC
Nucleotides
ComG proteins
ComEA
Nuclease
Cytoplasmic membrane
ComEC
ssDNA
B
DNA
PilQ (secretin)
Outer membrane
Peptidoglycan cell wall
PilE
Cytoplasmic membrane
ComA
PilQ (secretin)
Outer membrane
PilE
Nuclease
Cytoplasmic membrane
ComA
ssDNA

Figure 6.3

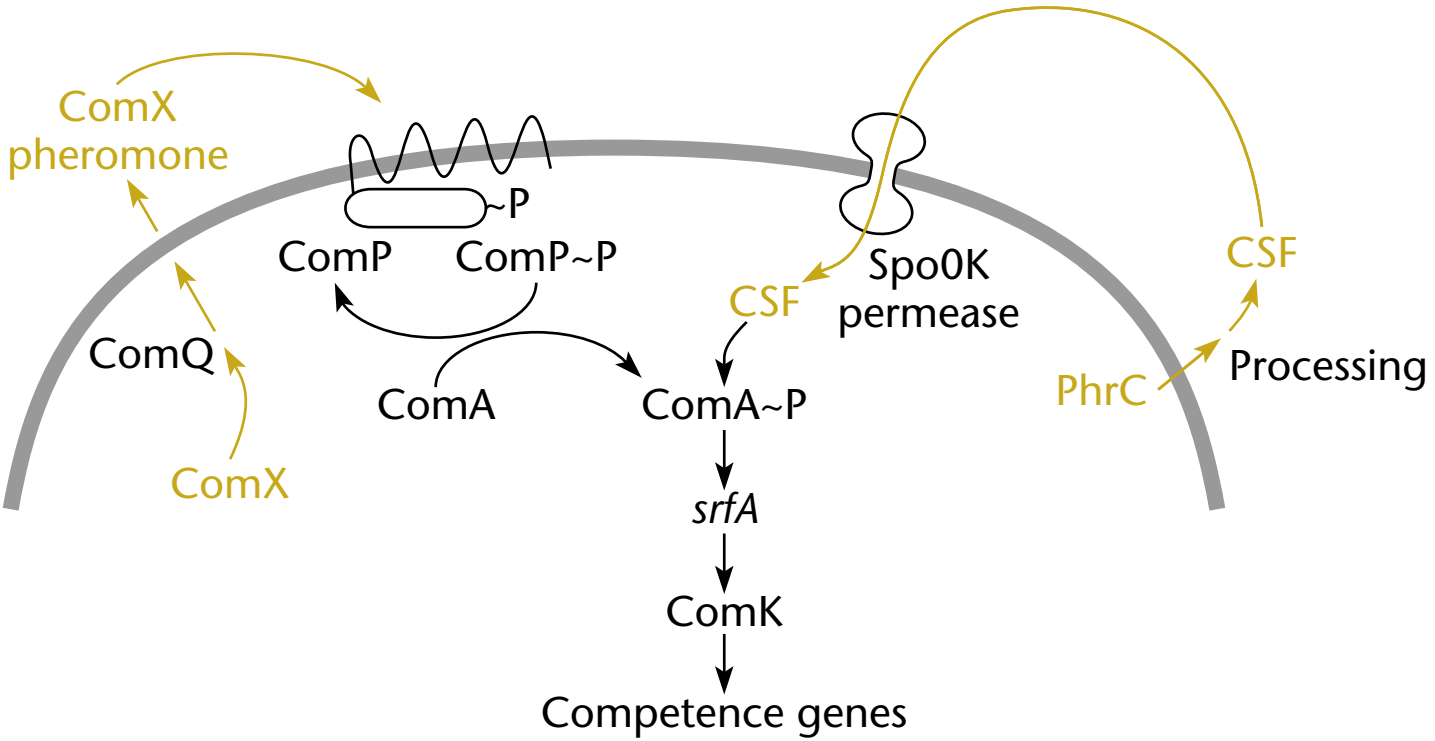

ComX
pheromone
~P
ComP
ComP~P
CSF
Spo0K
permease
CSF
ComQ
ComA
ComA~P
PhrC
Processing
ComX
srfA
ComK
Competence genes

Figure 6.4

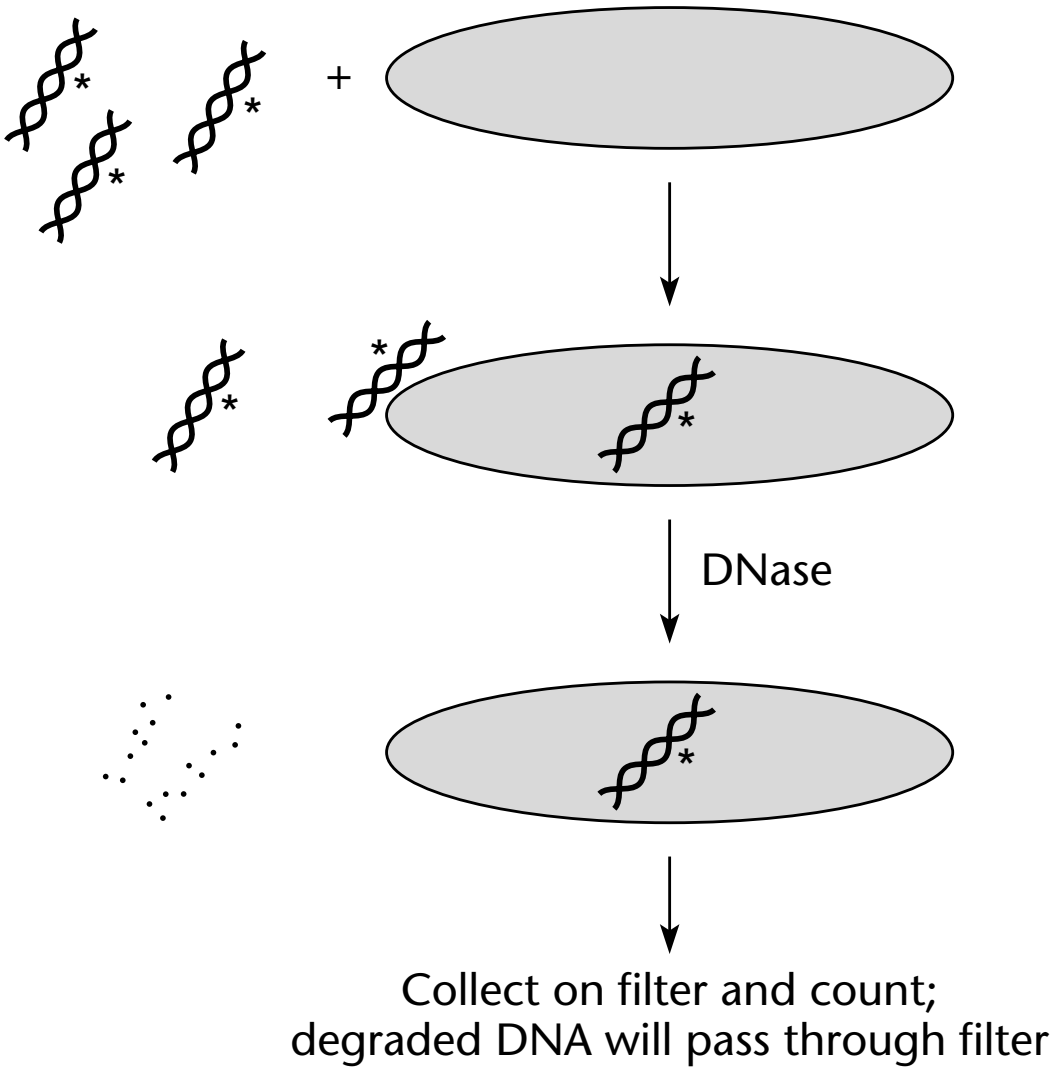

+
DNase
Collect on filter and count;
degraded DNA will pass through filter

Figure 6.5

Haemophilus influenzae 5′ AAGTGCGGTCA 3′

Neisseria gonorrhoeae 5′ GCCGTCTCAA 3′

Figure 6.6

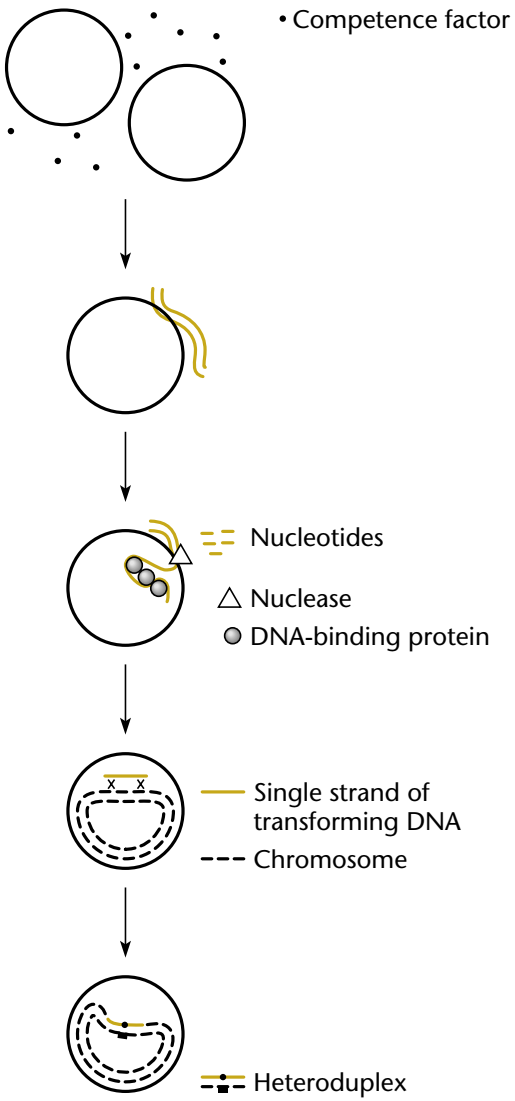

• Competence factor
Nucleotides
Nuclease
DNA-binding protein
Single strand of transforming DNA
Chromosome
Heteroduplex

Figure 6.7

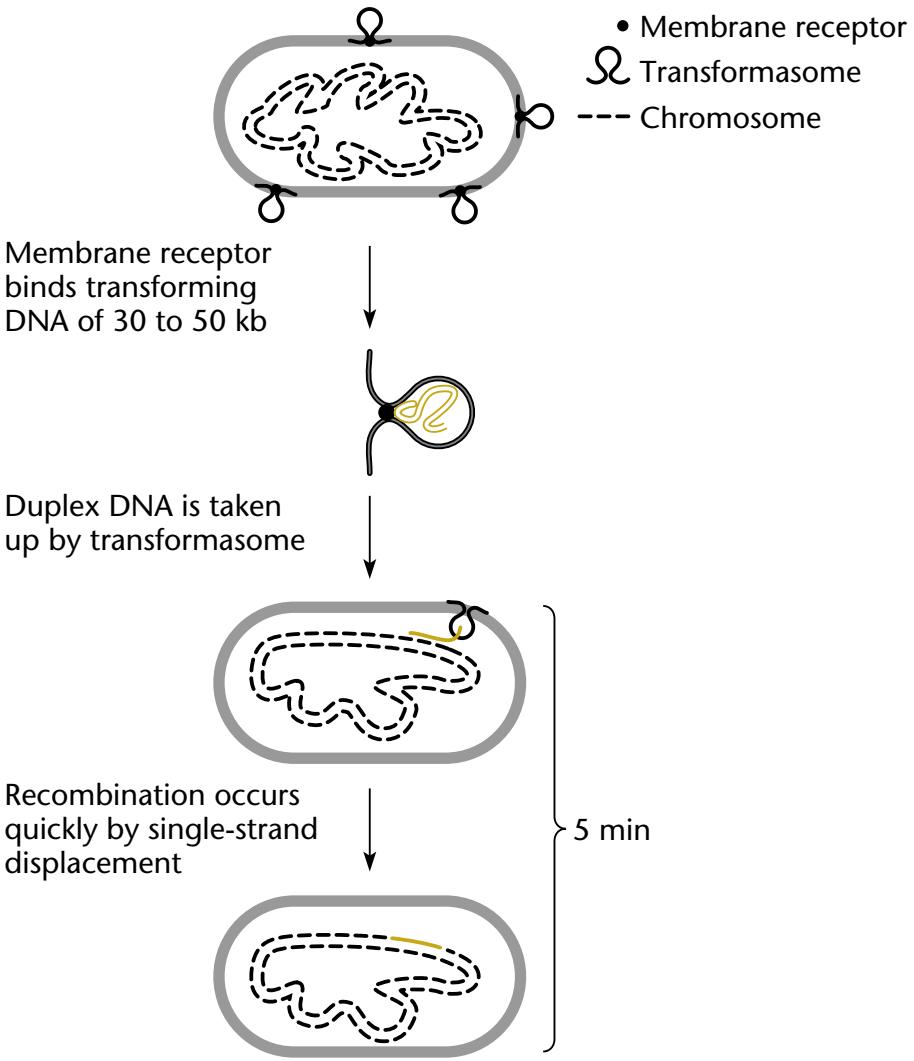

• Membrane receptor
Transformasome
Chromosome
Membrane receptor binds transforming DNA of 30 to 50 kb
Duplex DNA is taken up by transformasome
Recombination occurs quickly by single-strand displacement
5 min

Figure 6.8

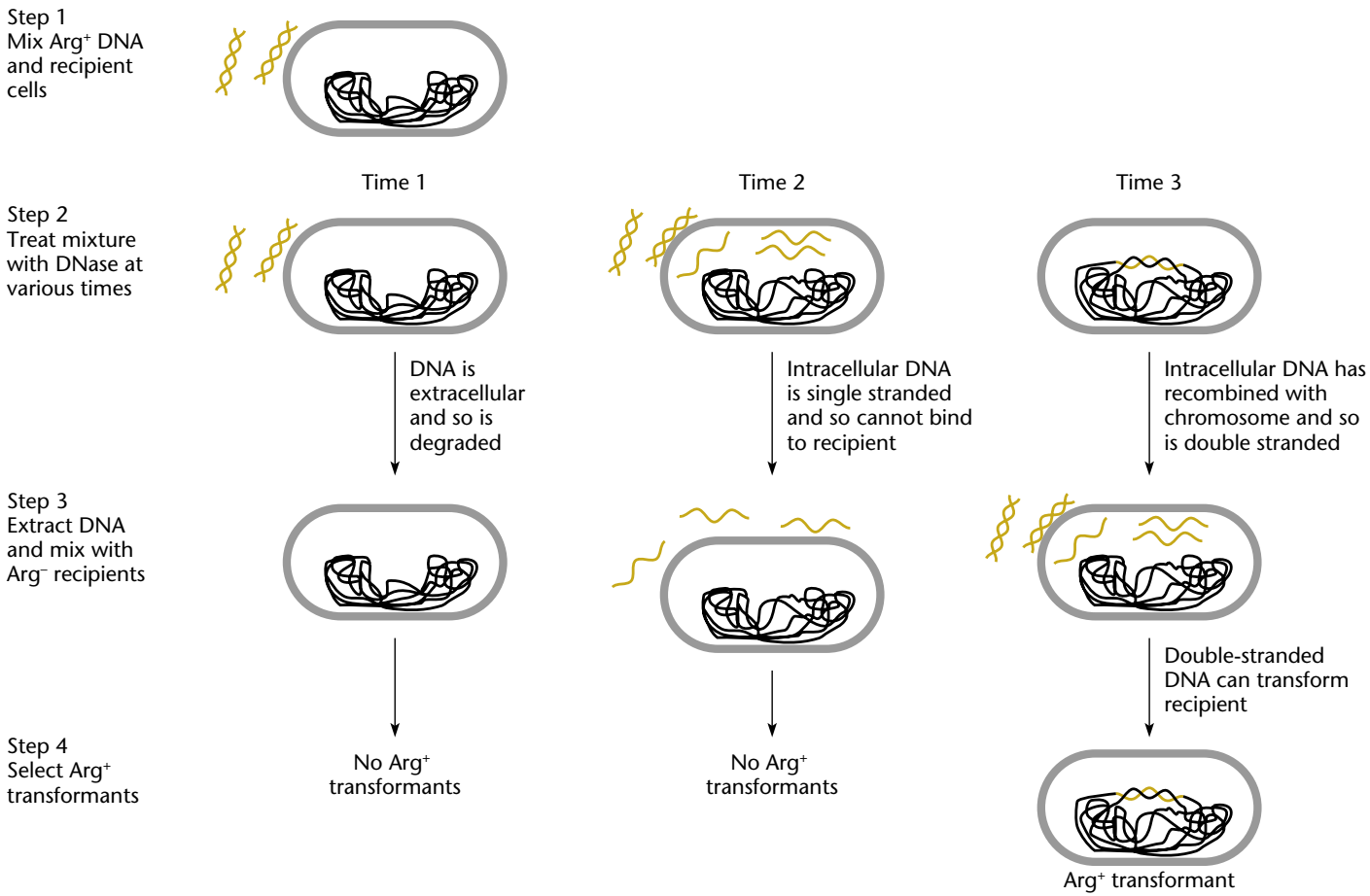

Step 1
Mix Arg+ DNA and recipient cells
Time 1
Time 2
Time 3
Step 2
Treat mixture with DNase at various times
DNA is extracellular and so is degraded
Intracellular DNA is single stranded and so cannot bind to recipient
Intracellular DNA has recombined with chromosome and so is double stranded
Step 3
Extract DNA and mix with Arg− recipients
Double-stranded DNA can transform recipient
Step 4
Select Arg+ transformants
No Arg+ transformants
No Arg+ transformants
Arg+ transformant

Figure 6.9

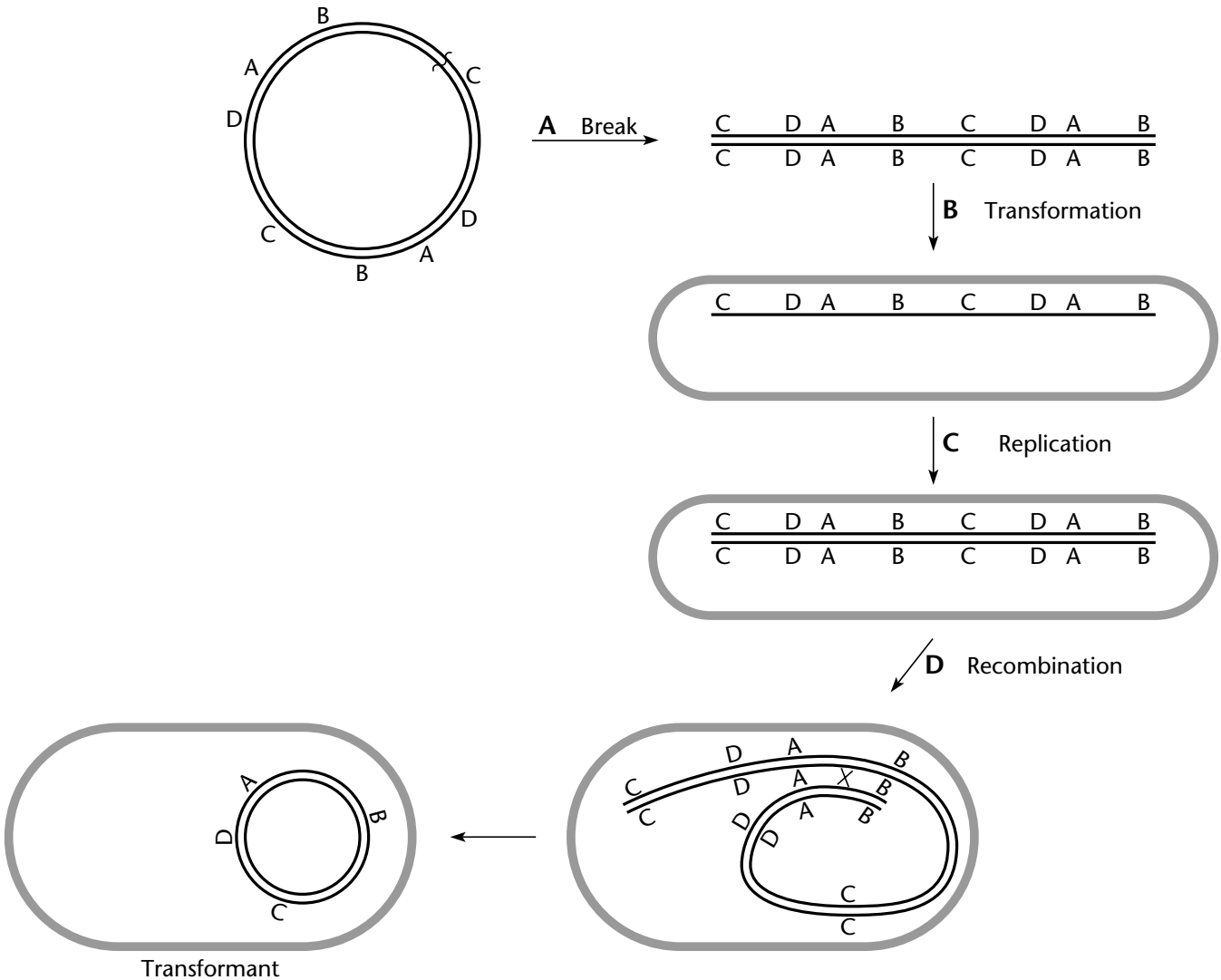
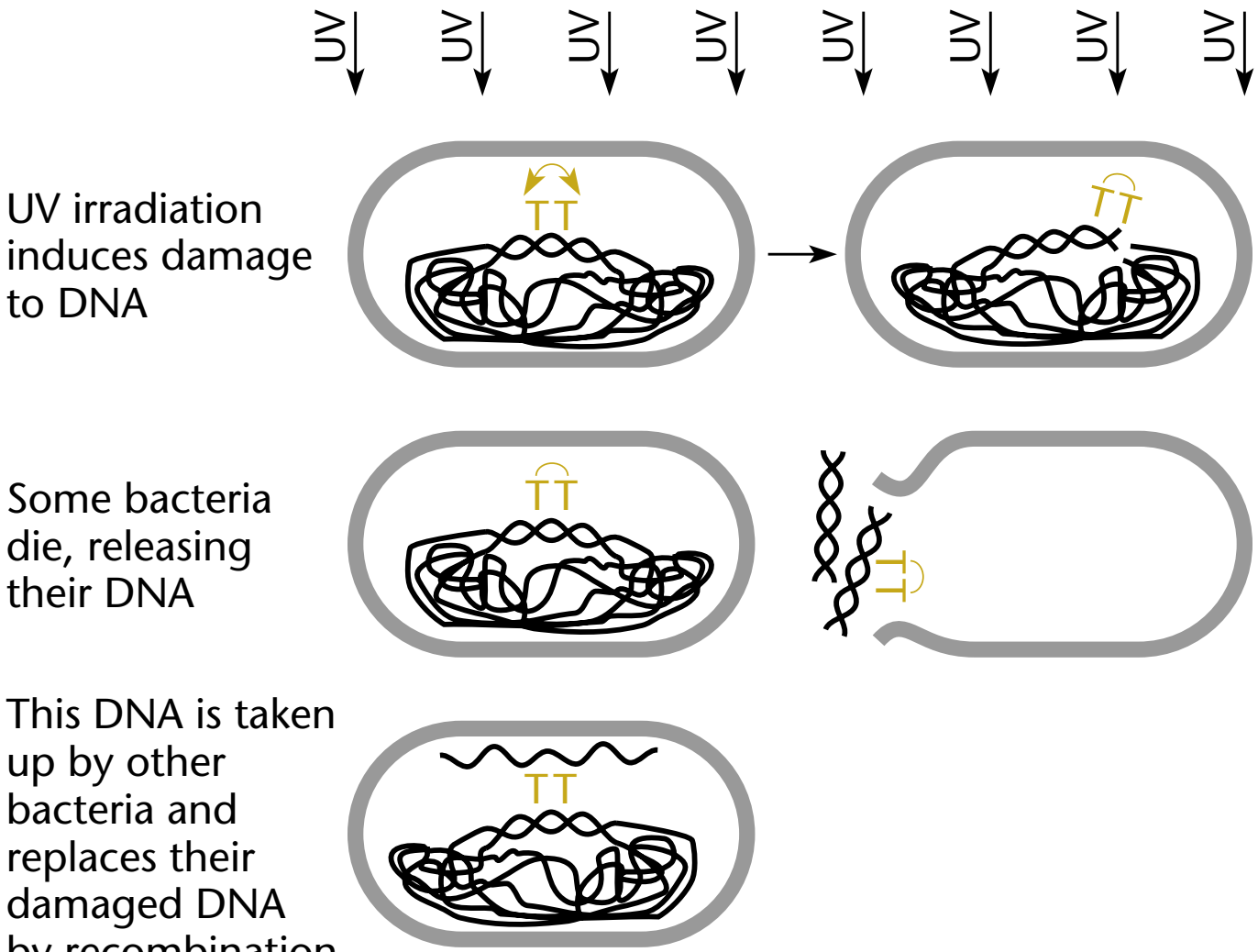

B
A
C
C
D
D
C
A
B
A Break
C D A B C D A B
C D A B C D A B
B Transformation
C D A B C D A B
C Replication
C D A B C D A B
C D A B C D A B
D Recombination
D A B
C D A X B
C D A B
C
C
A
B
D
C
Transformant

Figure 6.10


UV
UV
UV
UV
UV
UV
UV
UV
UV irradiation induces damage to DNA
Some bacteria die, releasing their DNA
This DNA is taken up by other bacteria and replaces their damaged DNA by recombination