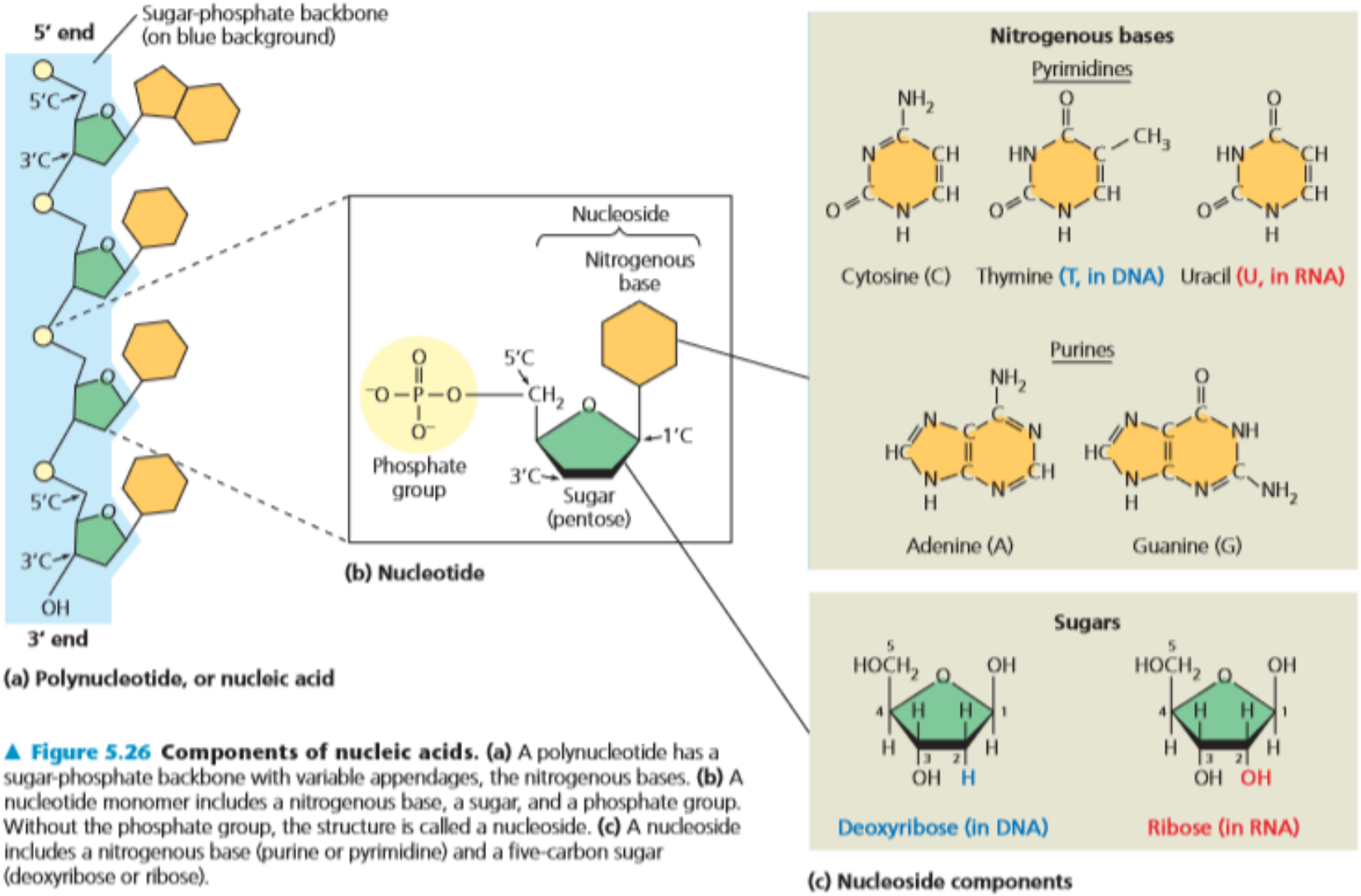
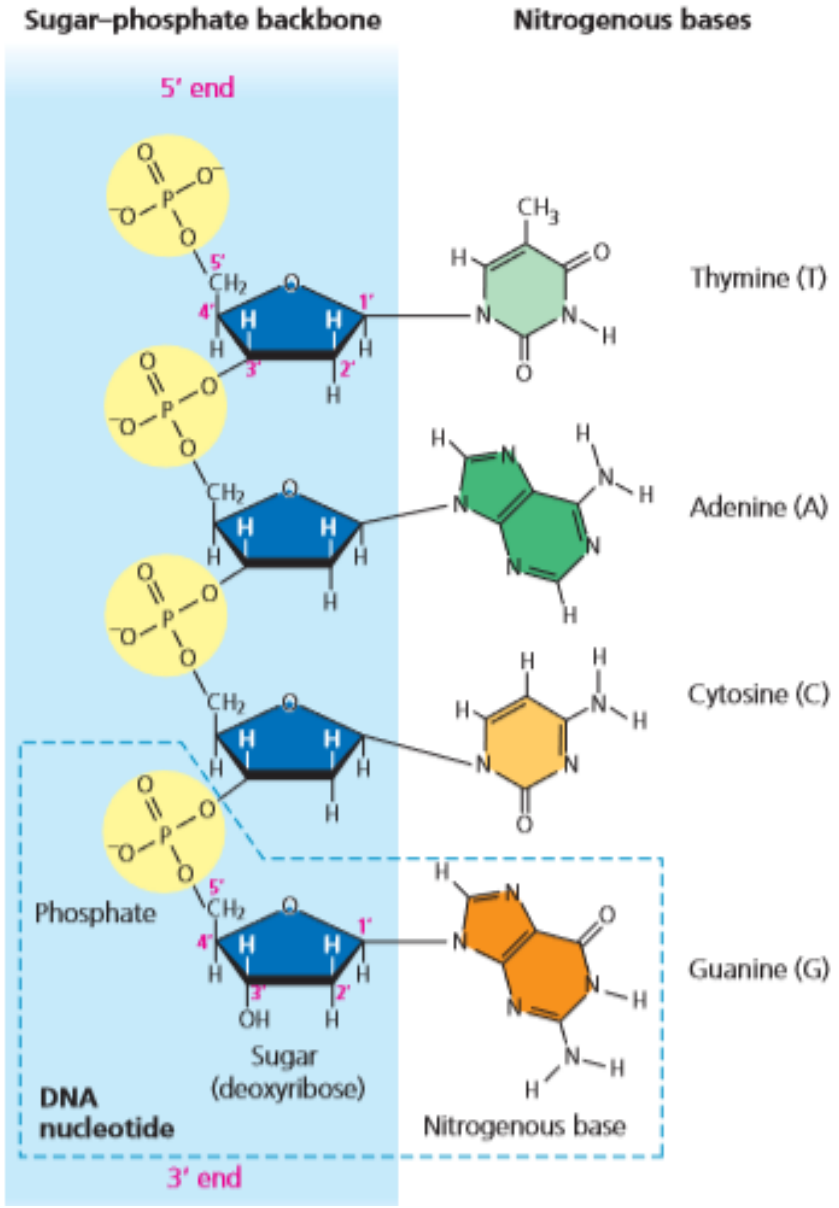
Materi Genetik

Asam Nukleat

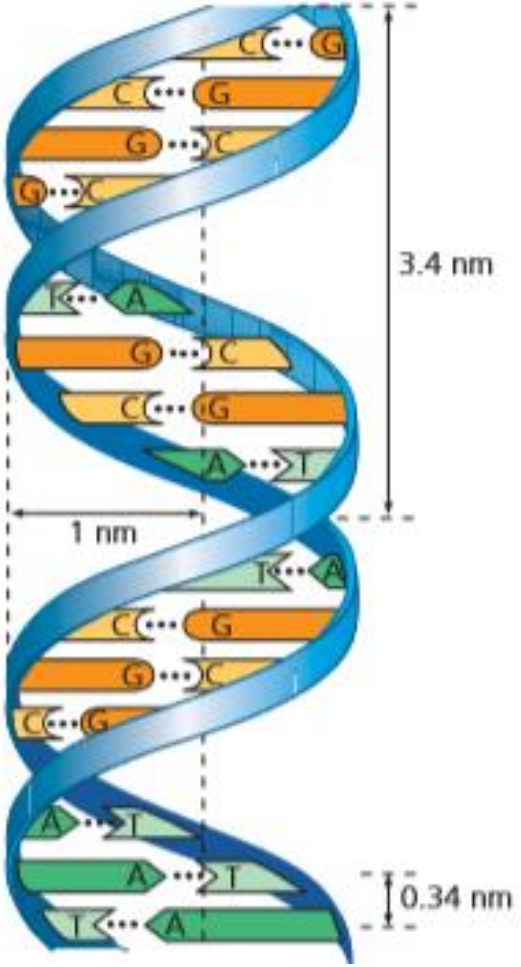


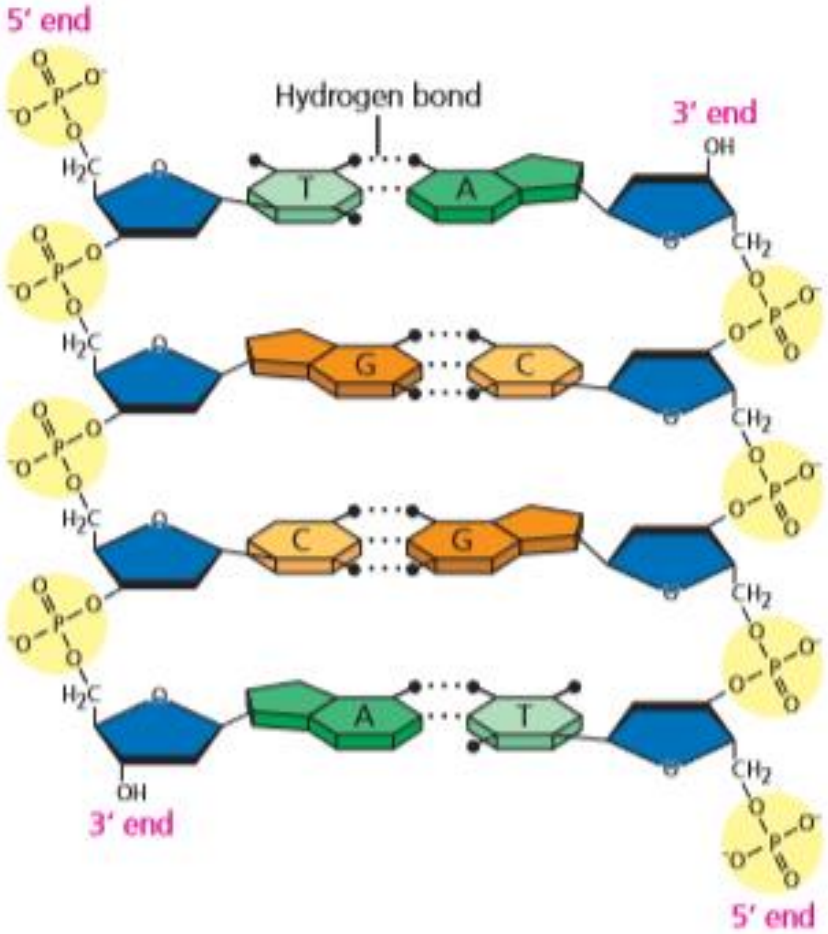
▲ **Figure 5.26** **Components of nucleic acids.** **(a)** A polynucleotide has a sugar-phosphate backbone with variable appendages, the nitrogenous bases. **(b)** A nucleotide monomer includes a nitrogenous base, a sugar, and a phosphate group. Without the phosphate group, the structure is called a nucleoside. **(c)** A nucleoside includes a nitrogenous base (purine or pyrimidine) and a five-carbon sugar (deoxyribose or ribose).

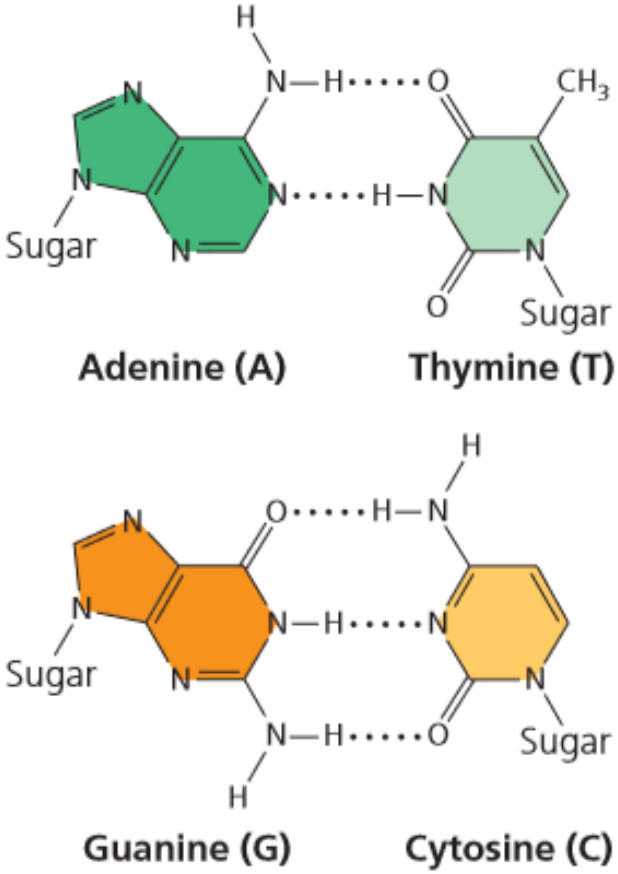
Struktur Dasar DNA



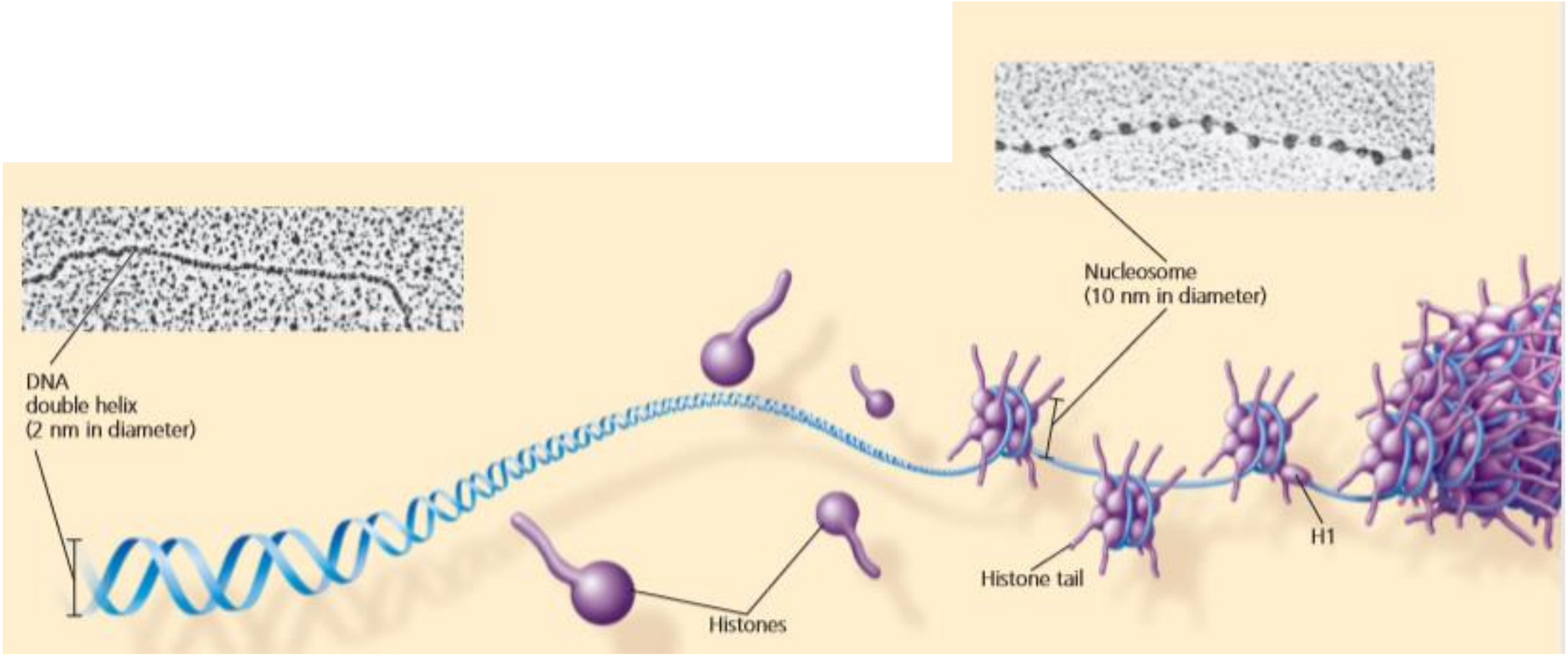
Double Heliks

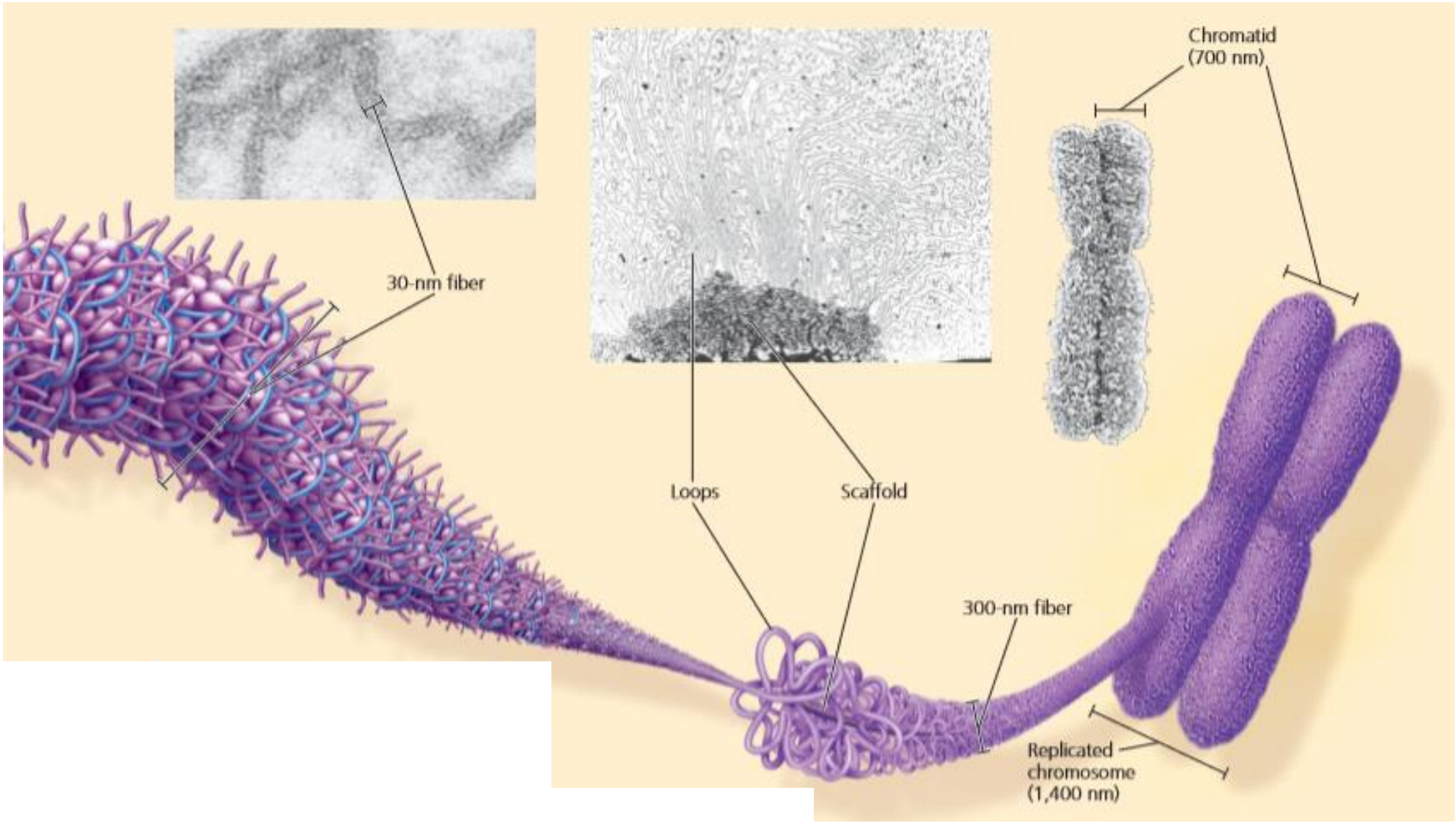




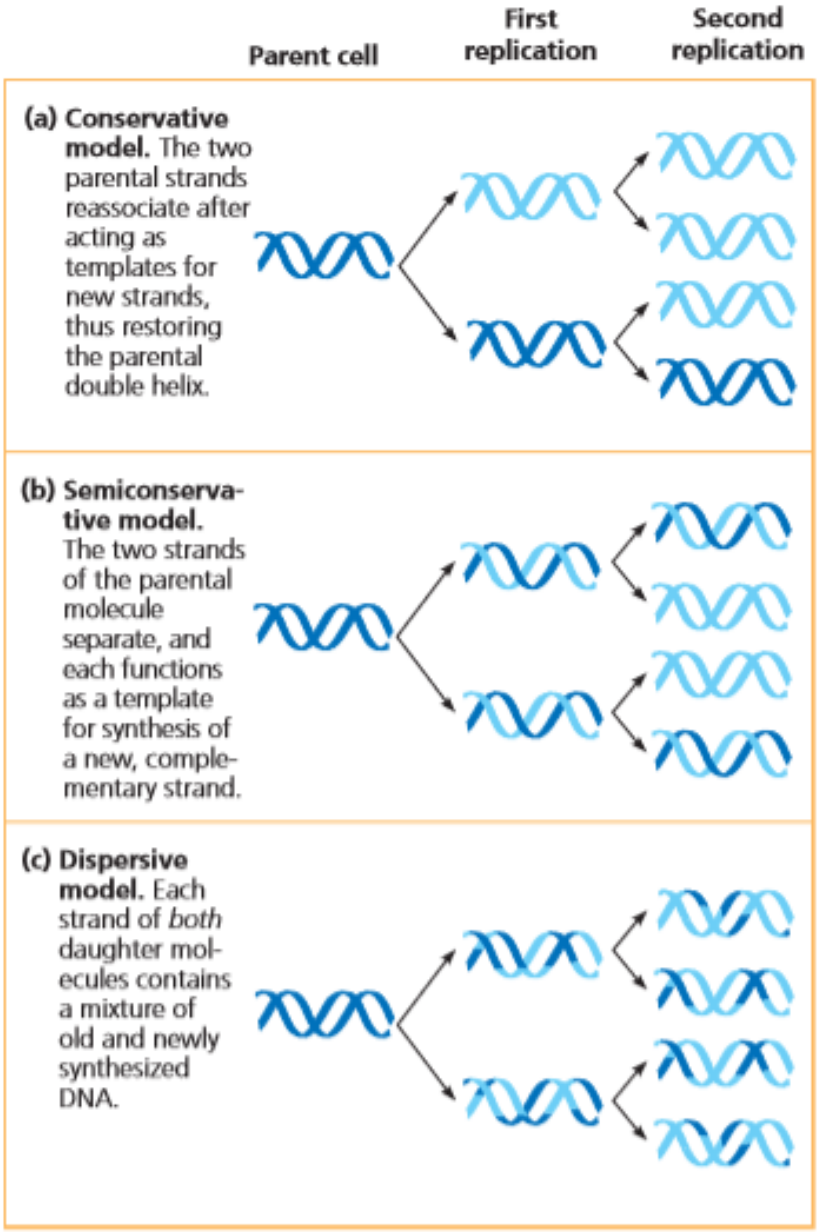


▲ **Figure 16.8 Base pairing in DNA.** The pairs of nitrogenous bases in a DNA double helix are held together by hydrogen bonds, shown here as black dotted lines.

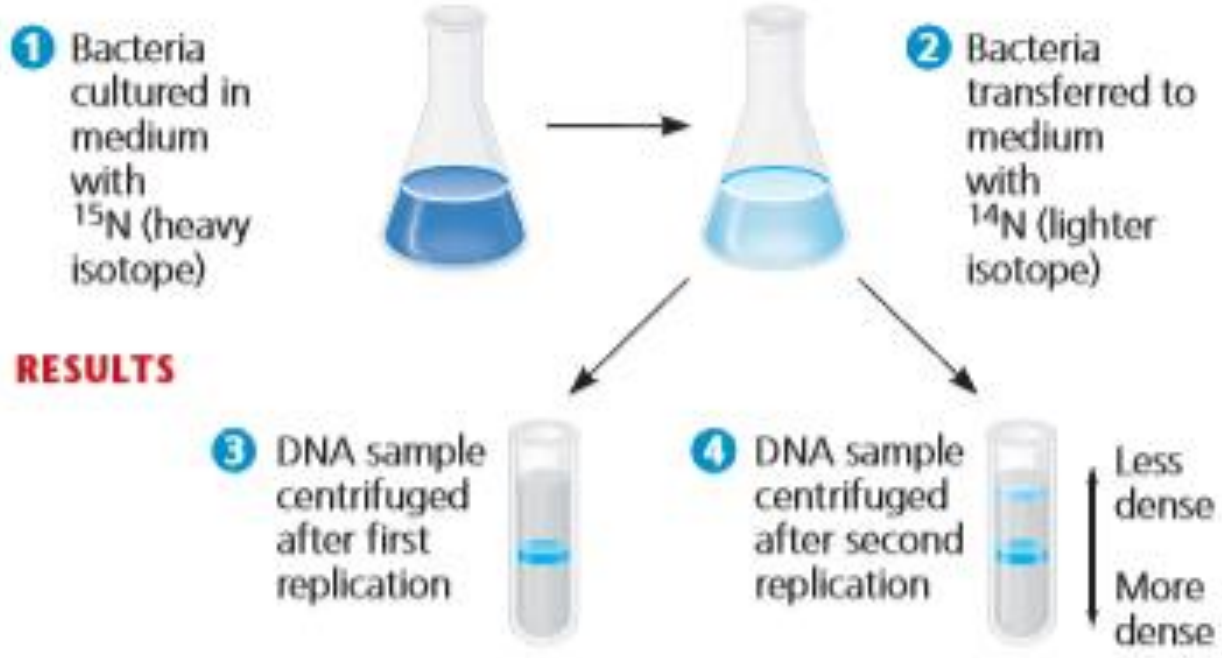

DNA
double helix
(2 nm in diameter)
Nucleosome
(10 nm in diameter)
Histones
Histone tail
H1

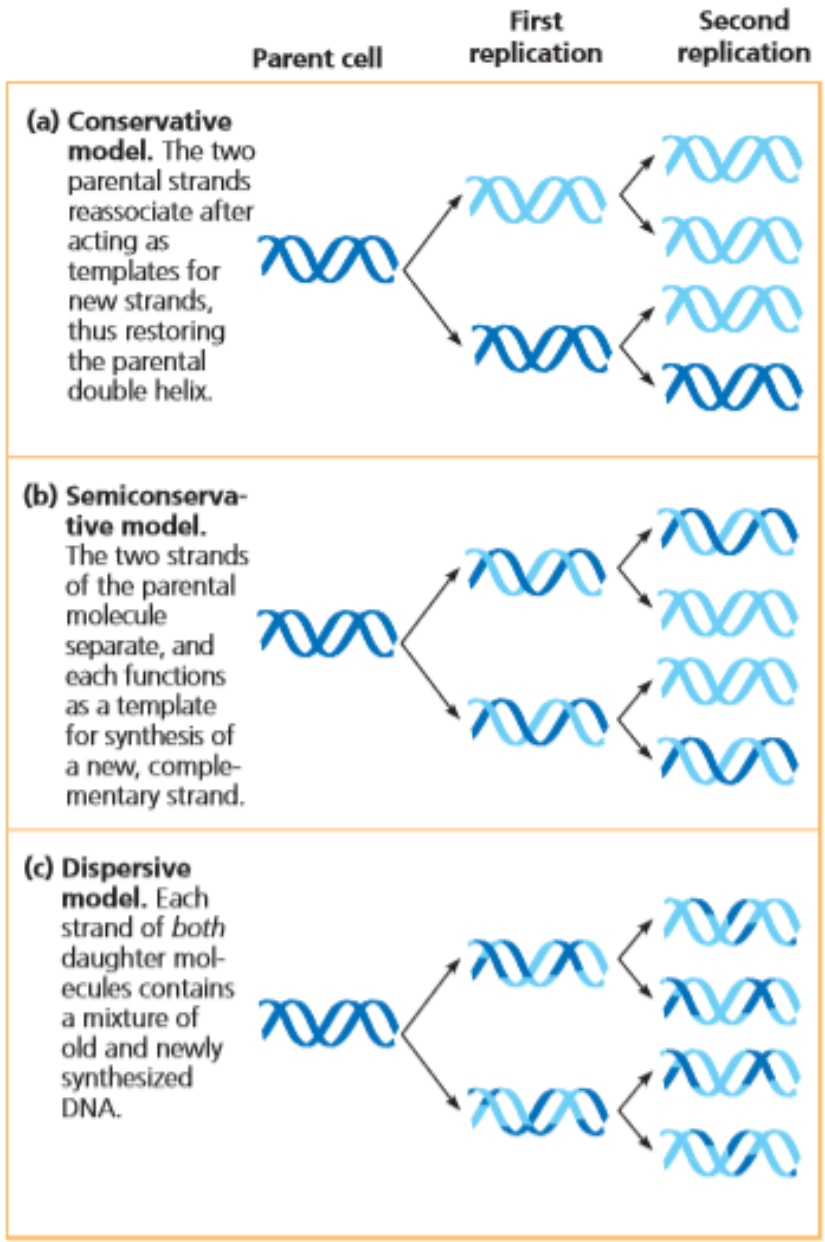

Chromatid
(700 nm)
30-nm fiber
Loops
Scaffold
300-nm fiber
Replicated
chromosome
(1,400 nm)

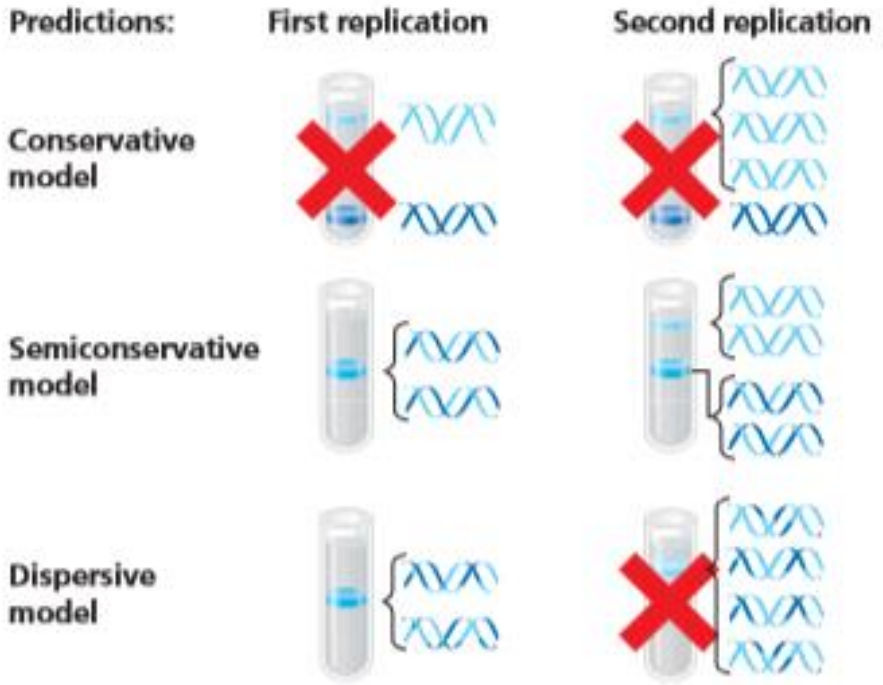
Replikasi DNA

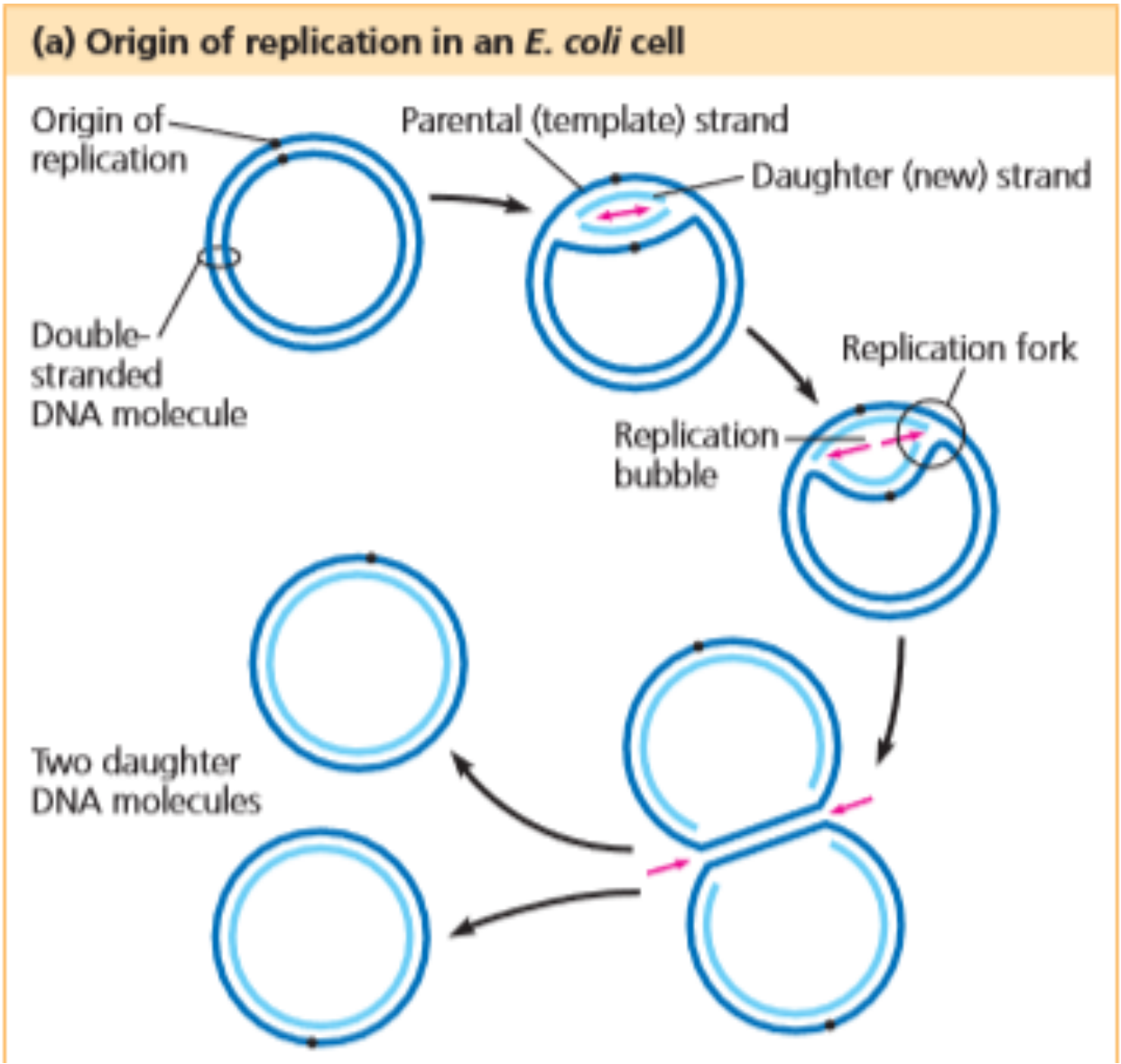


Pembuktian

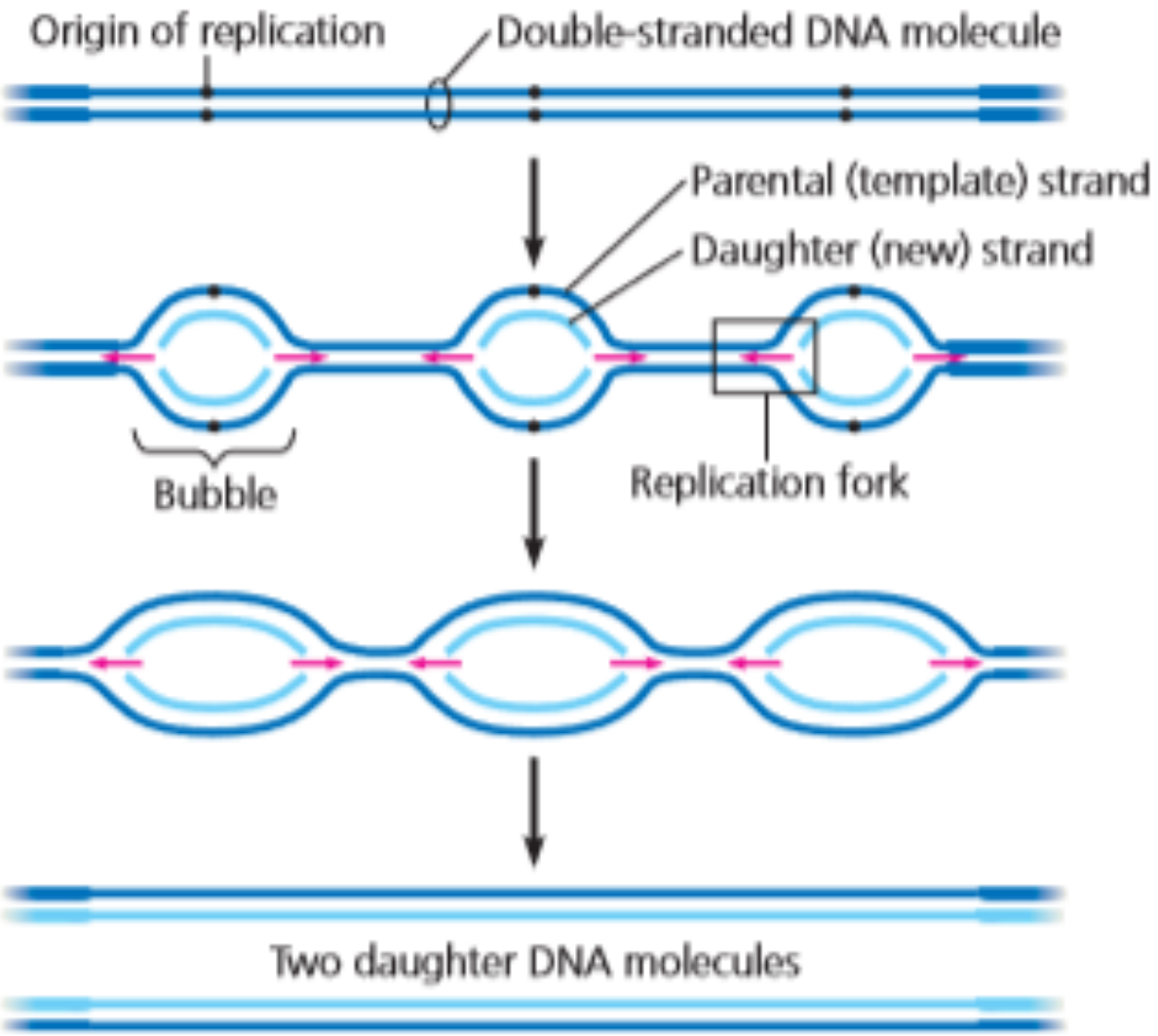

1 Bacteria cultured in medium with ^{15}N (heavy isotope)
2 Bacteria transferred to medium with ^{14}N (lighter isotope)
RESULTS
3 DNA sample centrifuged after first replication
4 DNA sample centrifuged after second replication
Less dense
More dense


Parent cell
First replication
Second replication
(a) Conservative model. The two parental strands reassociate after acting as templates for new strands, thus restoring the parental double helix.
(b) Semiconservative model. The two strands of the parental molecule separate, and each functions as a template for synthesis of a new, complementary strand.
(c) Dispersive model. Each strand of both daughter molecules contains a mixture of old and newly synthesized DNA.

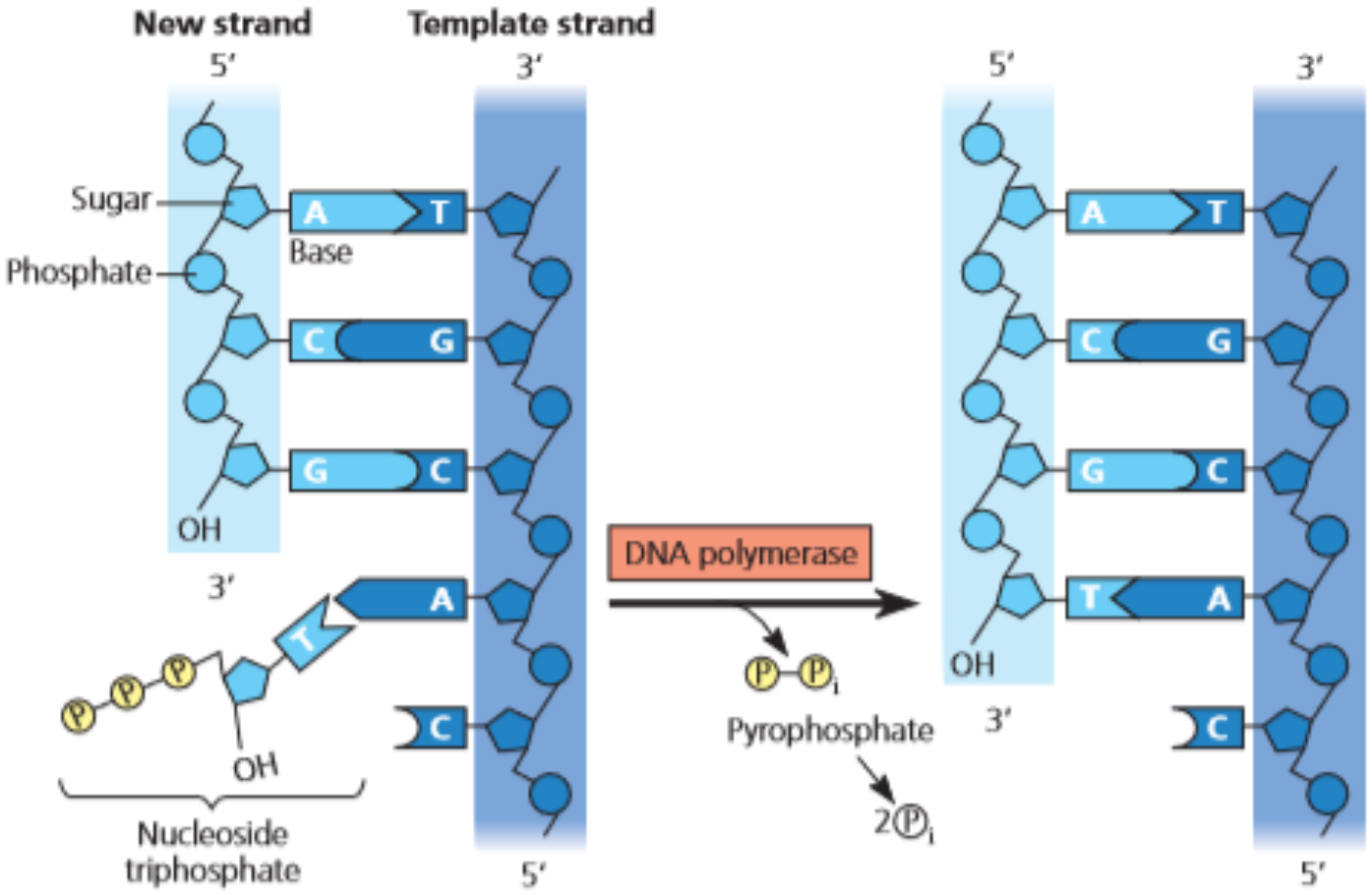

Predictions:
First replication
Second replication
Conservative model
Semiconservative model
Dispersive model

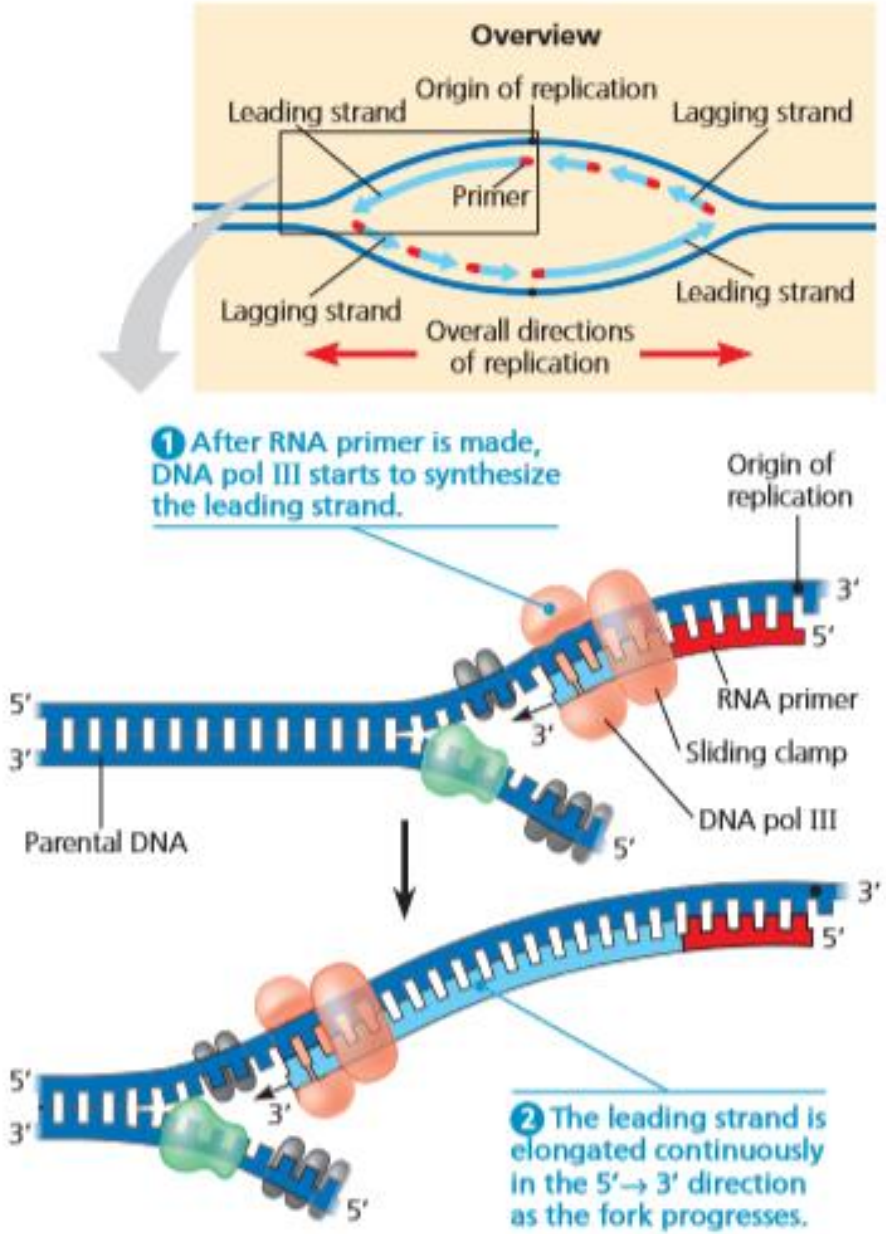

(a) Origin of replication in an E. coli cell
Origin of replication
Parental (template) strand
Daughter (new) strand
Double-stranded DNA molecule
Replication fork
Replication bubble
Two daughter DNA molecules

(b) Origins of replication in a eukaryotic cell



DNA polymerase menambahkan nukleotida pada ujung 3’




Overview
Origin of replication
Leading strand
Lagging strand
Primer
Lagging strand
Leading strand
Overall directions of replication
1 After RNA primer is made, DNA pol III starts to synthesize the leading strand.
Origin of replication
3′
5′
RNA primer
Sliding clamp
DNA pol III
5′
3′
Parental DNA
5′
3′
3′
5′
5′
3′
2 The leading strand is elongated continuously in the 5′→ 3′ direction as the fork progresses.