TABLE 25.1. Substituents of different Bacteriochlorophylls

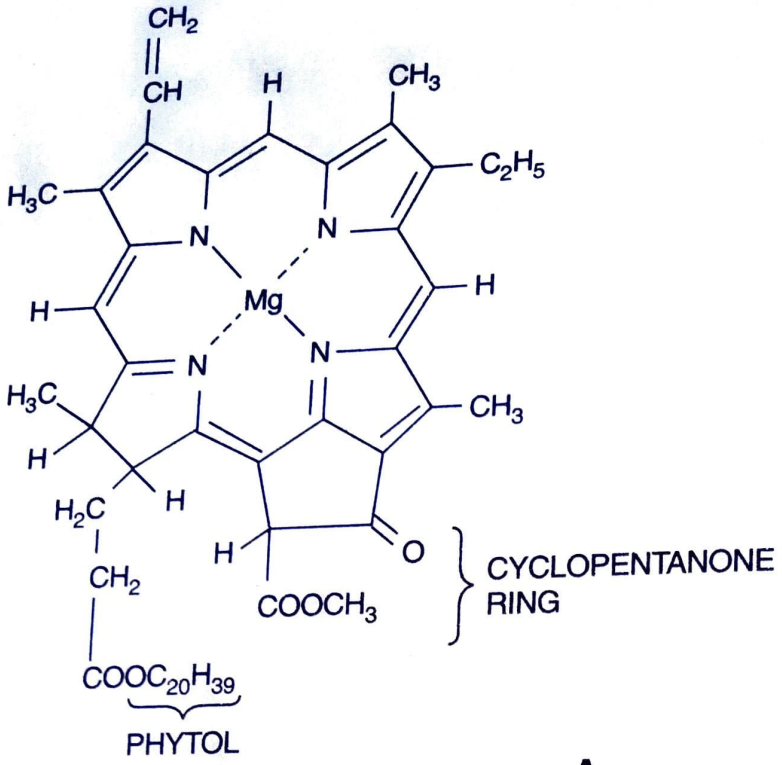
Bacteriochlorophylls	Substrates								Absorption spectra
	R_1	R_2	R_3	R_4	R_5	R_6	R_7	(nm)	
Bacteriochlorophyll *a* (purple bacteria)		$-\overset{\overset{O}{\|}}{C}-CH_3$	$-CH_3$[b]	$-CH_2-CH_3$	$-CH_3$	$-C(=O)-O-CH_3$	P/Gg[a]	$-H$	830–890
Bacteriochlorophyll *b* (purple bacteria)		$-\overset{\overset{O}{\|}}{C}-CH_3$	$-CH_3$[c]	$=\overset{\overset{H}{\|}}{C}-CH_3$	$-CH_3$	$-C(=O)-O-CH_3$	P	$-H$	1020–1040
Bacteriochlorophyll *c* (green sulfur bacteria)		$-\overset{\overset{OH}{\|}}{\overset{\overset{H}{\|}}{C}}-CH_3$	$-CH_3$	$-C_2H_5$ $-C_3H_7$[d] $-C_4H_9$	$-C_2H_5$ $-CH_3$	$-H$	F	$-CH_3$	745–755
Bacteriochlorophyll c_s (green nonsulfur bacteria)		$-\overset{\overset{OH}{\|}}{\overset{\overset{H}{\|}}{C}}-CH_3$	$-CH_3$	$-C_2H_5$	$-CH_3$	$-H$	S	$-CH_3$	740
Bacteriochlorophyll *d* (green sulfur bacteria)		$-\overset{\overset{OH}{\|}}{\overset{\overset{H}{\|}}{C}}-CH_3$	$-CH_3$	$-C_2H_5$ $-C_3H_7$ $-C_4H_9$	$-C_2H_5$ $-CH_3$	$-H$	F	$-H$	705–740
Bacteriochlorophyll *e* (green sulfur bacteria)		$-\overset{\overset{OH}{\|}}{\overset{\overset{H}{\|}}{C}}-CH_3$	$-\overset{\overset{O}{\|}}{C}-H$	$-C_2H_5$ $-C_3H_7$ $-C_4H_9$	$-C_2H_5$	$-H$	F	$-CH_3$	719–726
Bacteriochlorophyll *g* (heliobacteria)		$-\overset{\overset{H}{\|}}{C}=CH_2$	$-CH_3$[b]	$-C_2H_5$	$-CH_3$	$-C(=O)-O-CH_3$	F	$-H$	670, 788

[a]P, Phytyl ester ($C_{20}OH_{39}O-$); F, farnesyl ester ($C_{15}H_{25}O-$); Gg, geranylgeraniol ester ($C_{10}H_{17}O-$); S, stearyl alcohol ($C_{18}H_{37}O-$).

[b]No double bond between C_3 and C_4; additional H atoms are in positions C_3 and C_4.

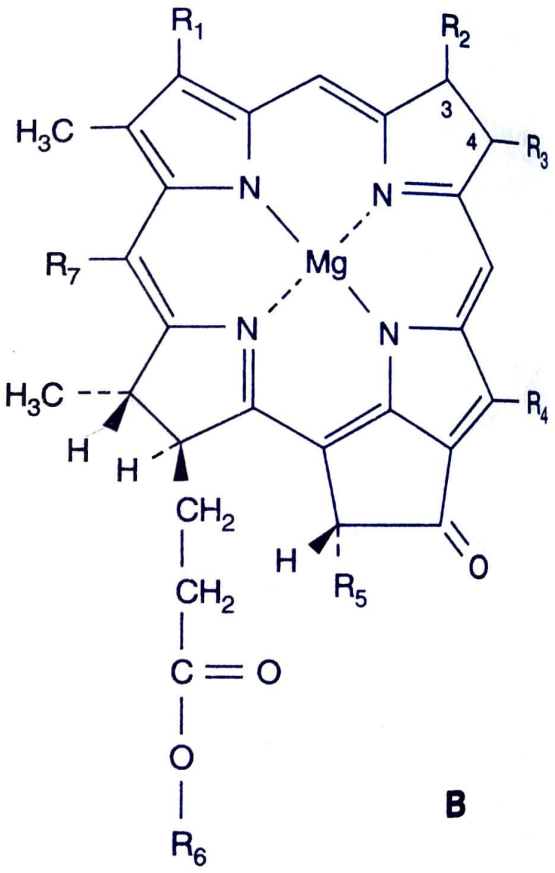
[c]No double bond between C_3 and C_4; an additional H atom is in position C_3.

[d]Bacteriochlorophylls *c*, *d*, and *e* consist of isomeric mixtures with the different substituents on R_3 as shown.

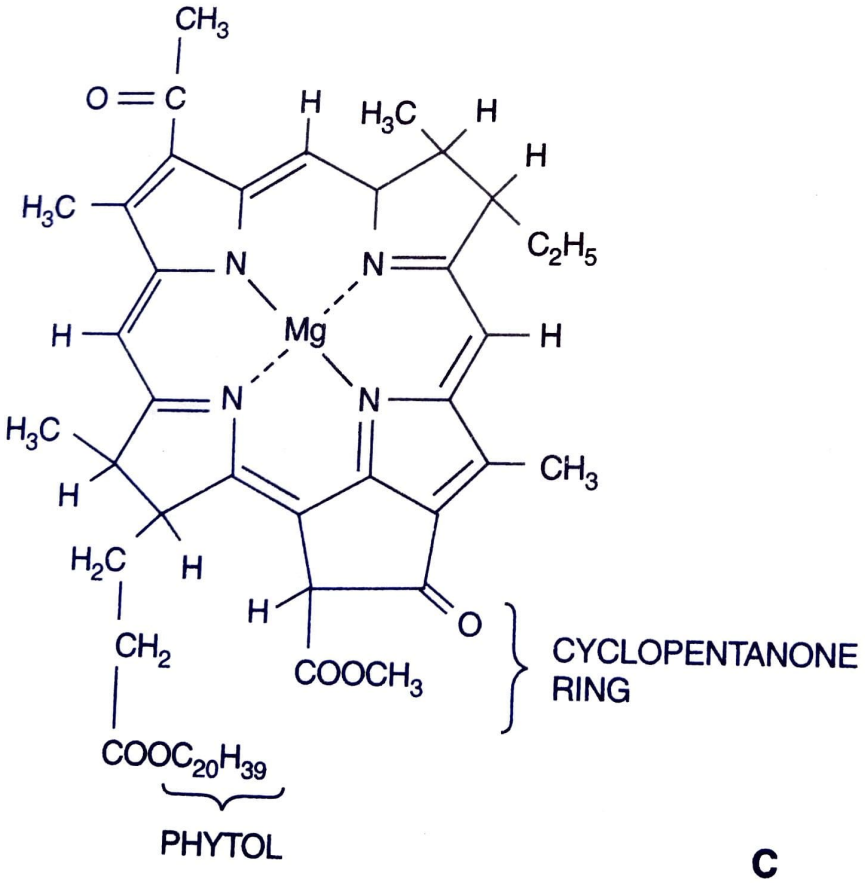


A

CHLOROPHYLL *a*



B



C

BACTERIOCHLOROPHYLL *a*

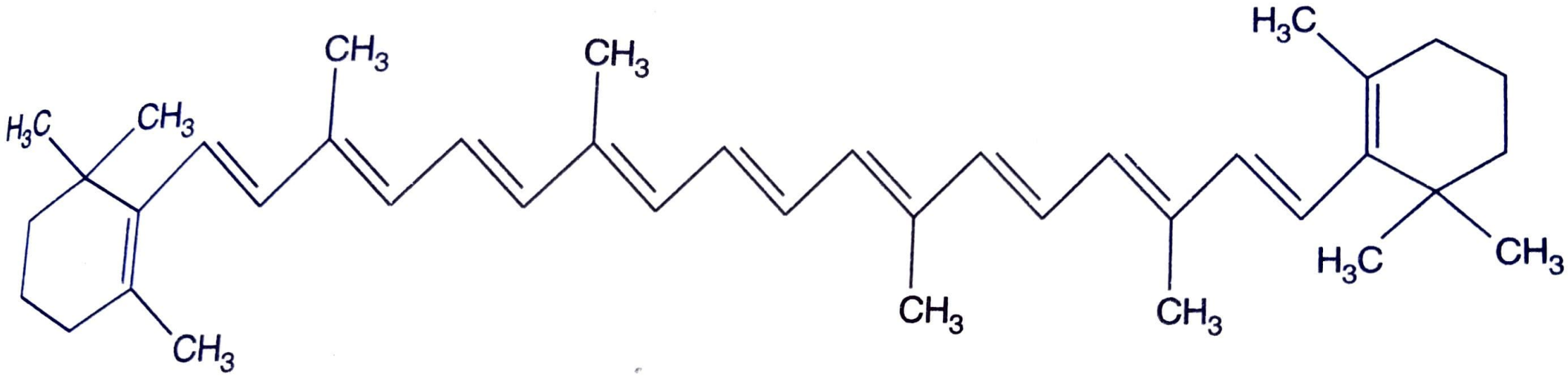


FIG. 25.2. Structure of β-carotene, a typical carotenoid.

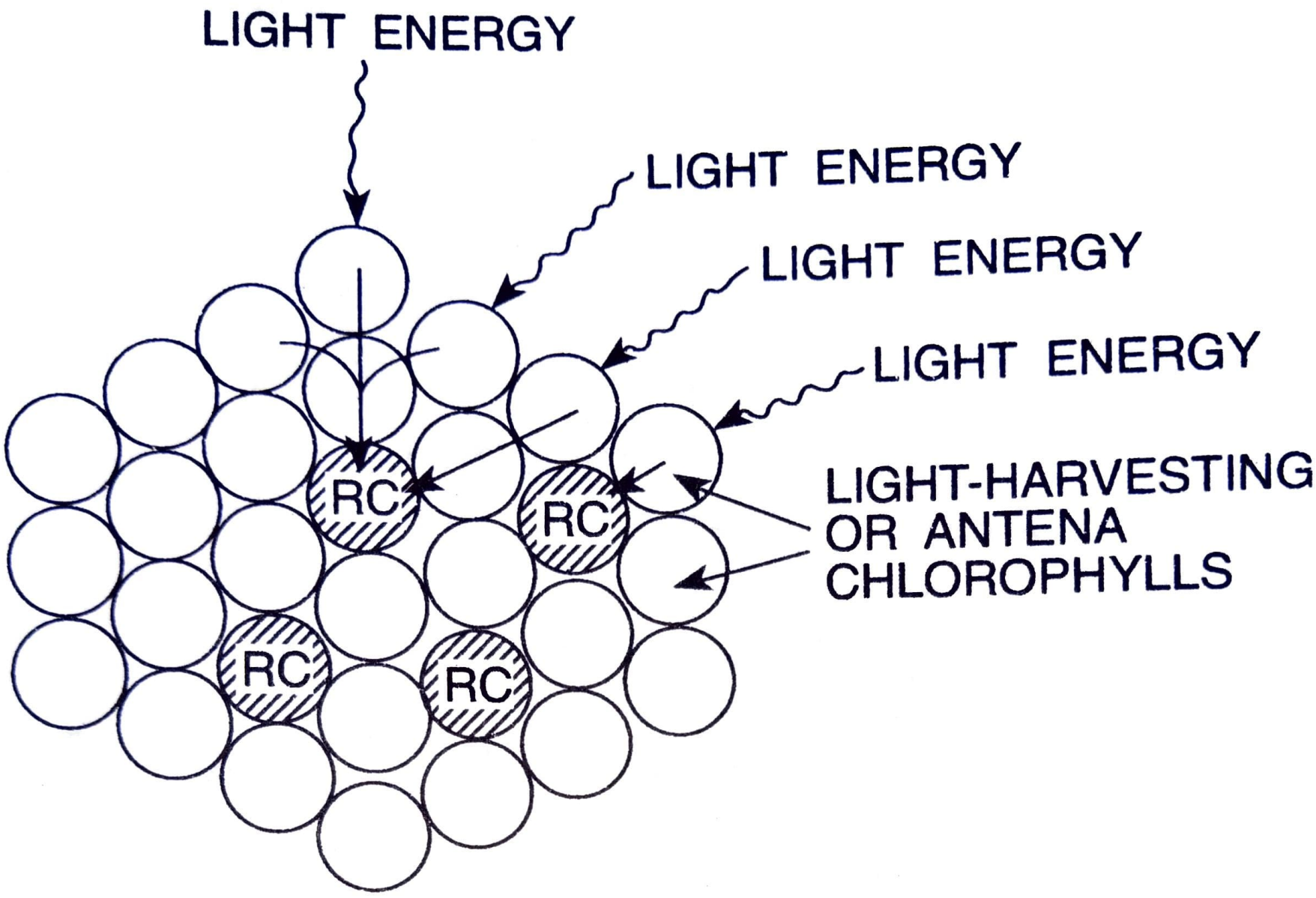


FIG. 25.3. Model representing the arrangement of light harvesting chlorophylls/bacteriochlorophylls versus reaction centres within a photosynthetic membrane. RC = reaction centre.