７月２０日小テスト

１）ミトコンドリアに2,4-ジニトロフェノールを加えると酸素消費とATP合成はどのようになるかを記せ。

２）光合成で生成する酸素は、何に由来するかを書き、それを示す実験を説明せよ。

３）光合成の明反応と暗反応を簡潔に説明せよ。

答案用紙に名前を書くのを忘れないこと。

Why leaves are green: interaction of light with chloroplasts.

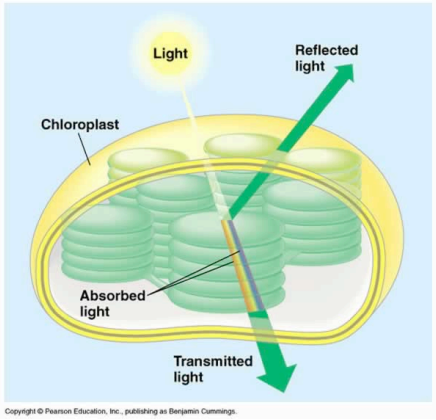


Fig 10-7. Determining an absorption spectrum.

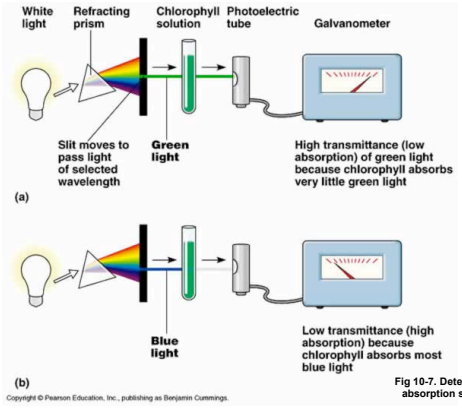
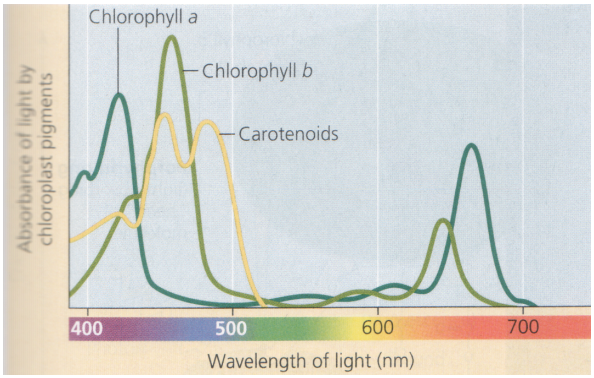


Fig 10-7. Determining an absorption spectrum.

Absorption spectra



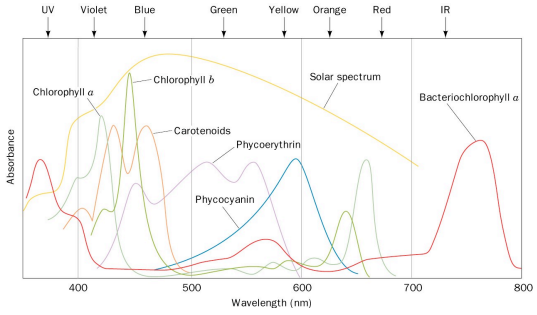


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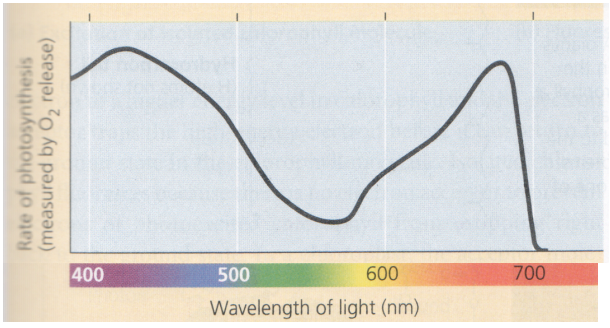
Figure 24-5 Absorption spectra of various photosynthetic pigments.

Action spectrum



光の持つエネルギー

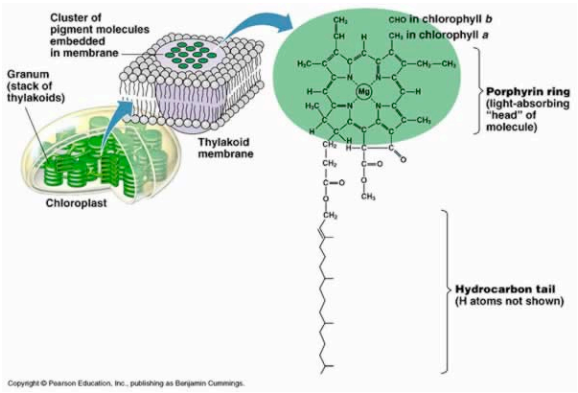
$E=h\nu=hc/\lambda$

E:エネルギー
λ :波長
h :プランク定数
(6.625x10^{-34}J・s)
ν :振動数
c :光の速さ
(2.998x10^{8}ms^{-1})

$$\frac{6.625\times10^{-34}(\mathrm{J\cdot s})\cdot 2.998\times10^{8}(\mathrm{ms^{-1}})\cdot 6\times10^{23}}{680\times10^{-9}(\mathrm{m})}$$

⇨ 176kJ・einstein^{-1}

Fig 10-9. Location and structure of chlorophyll molecules in plants.



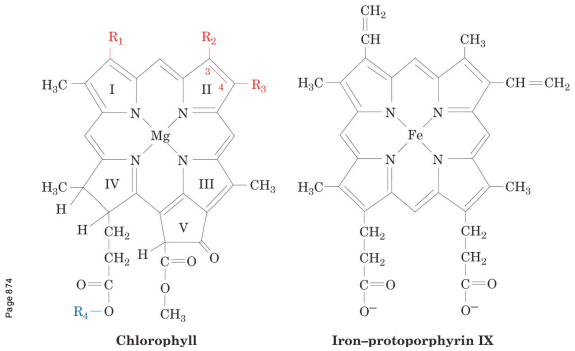


Figure 24-3 Chlorophyll structures.

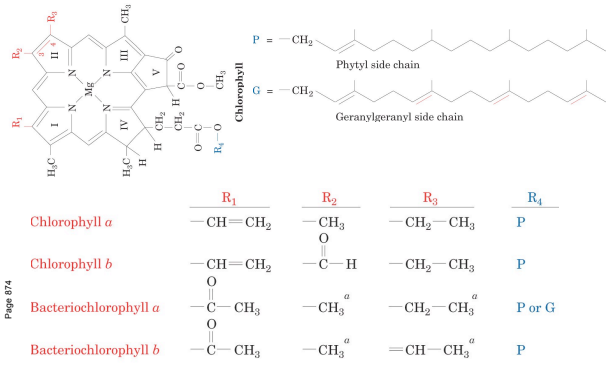
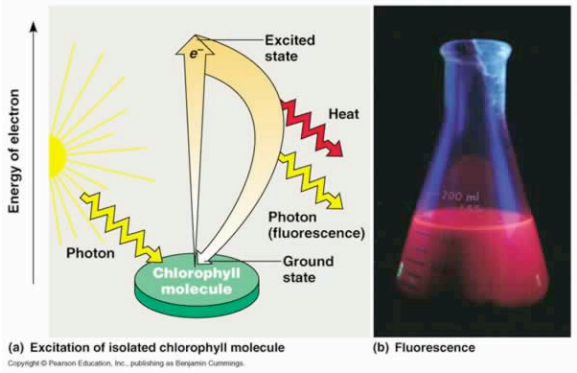


Figure 24-3 (*continued*) Chlorophyll structures.

Fig 10-10. Excitation of isolated chlorophyll by light.



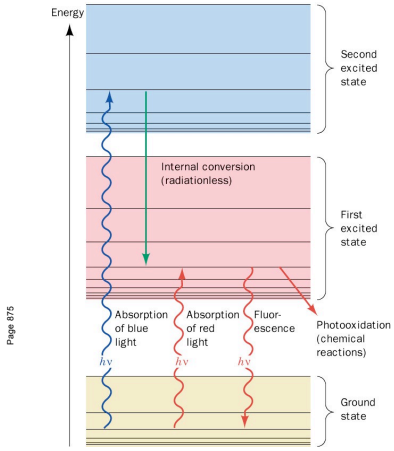
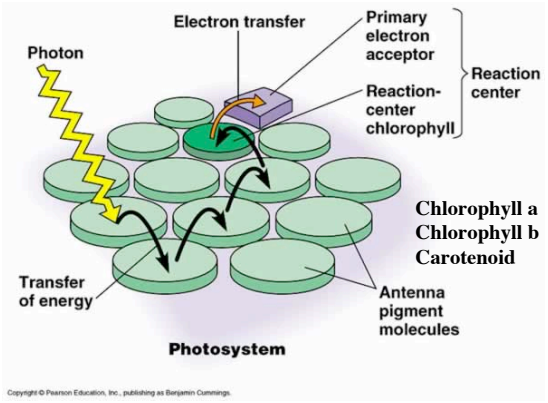


Figure 24-4 Energy diagram indicating the electronic states of chlorophyll and their most important modes of interconversion.

Fig 10-11. How a photosystem harvests light.



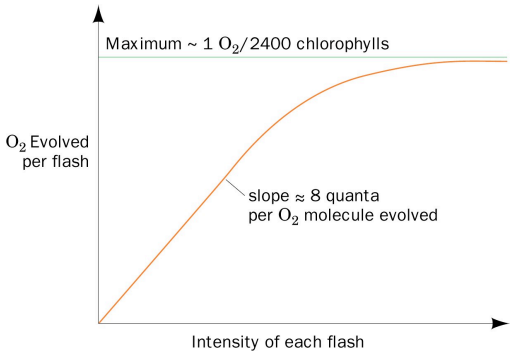


Figure 24-6 The amount of O_2 evolved by *Chlorella* algae versus the intensity of light flashes.

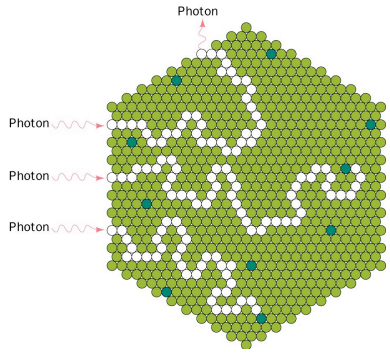


Figure 24-7a Flow of energy through a photosynthetic antenna complex. (*a*) Diagram of random photon migration by exciton transfer.

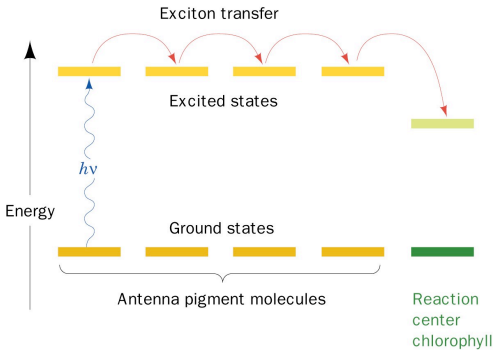


Figure 24-7b Flow of energy through a photosynthetic antenna complex. (*b*) The excitation is trapped by the RC chlorophyll.

$\alpha_8\beta_8$の型１６量体
２４分子のBchla（緑）
８分子のリコペン（黄）

Figure 24-8a X-Ray structure of LH2 from *Rs. molischianum*. (*a*) View perpendicular to the bacterial membrane from the cytoplasm.

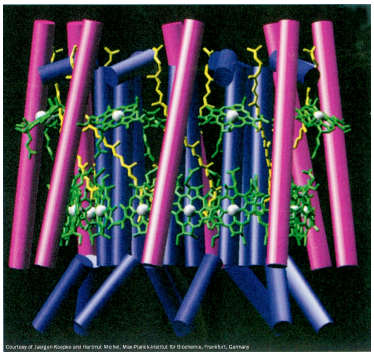


Figure 24-8b X-Ray structure of LH2 from *Rs. Molischianum*. (*b*) View parallel to the membrane with the cytoplasm above.

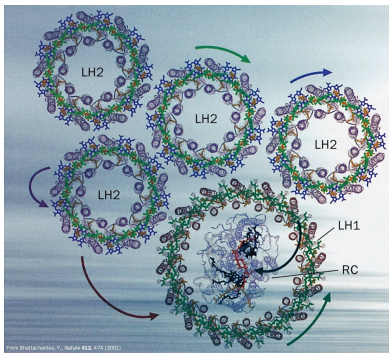


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Figure 24-9 Model of the light-absorbing antenna system of purple photosynthetic bacteria.

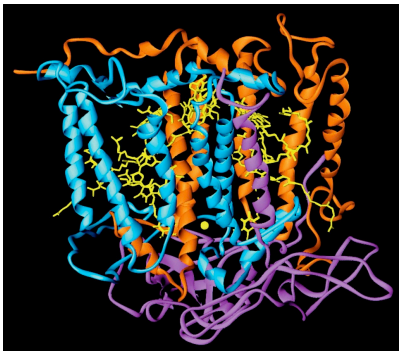

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Figure 24-11 A ribbon diagram of the photosynthetic reaction center (RC) from *Rb. sphaeroides*.

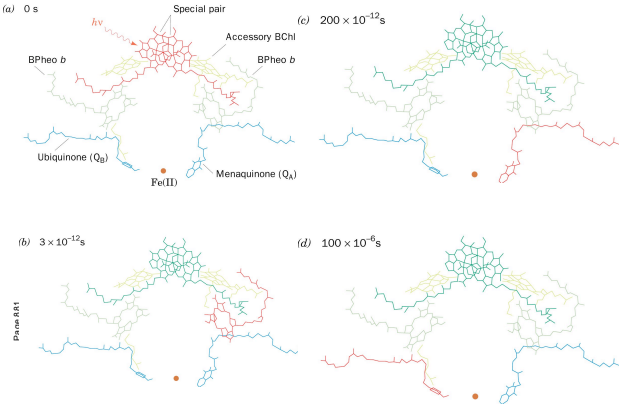

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Figure 24-12 Sequence of excitations in the bacterial RC of *Rps. viridis*.

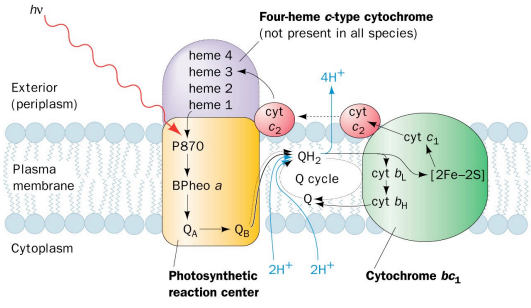

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Figure 24-13a Photosynthetic electron-transport system of purple photosynthetic bacteria. (*a*) A schematic diagram.

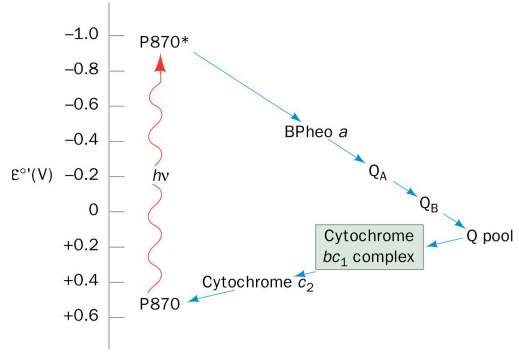

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Figure 24-13b The standard reduction potentials of the components of the purple photosynthetic bacteria's photosynthetic electron-transport system.