

Fig. 13.2 Structure of several carotenoids present in purple and green bacteria. The conjugated double bonds (marked in red) are important for spectral features and functional properties

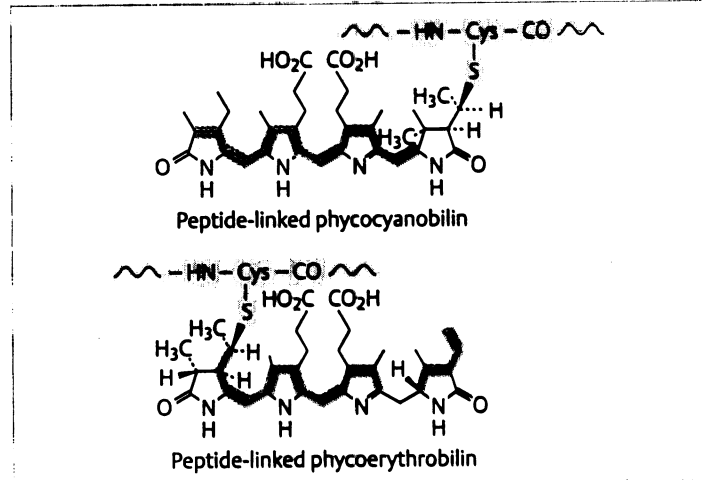


Fig. 13.4 Formulas of the open-chain tetrapyrroles phycocyanobilin and phycoerythrobilin. Phycobiliproteins are accessory light-harvesting systems for the operation of photosystem II in cyanobacteria. They consist of proteins and the prosthetic groups and are derived biosynthetically from porphyrins by loss of one carbon atom as carbon monoxide. They are covalently bound via cysteinyl (-Cys-) residues to proteins. They are, in addition to other phycobilins, important light-harvesting pigments in cyanobacteria (see Fig. 13.11). The in vivo absorption maxima of phycobiliproteins are between 565 and 670 nm (Fig. 13.5); they fill the gap of the chlorophyll-a and carotenoid maxima in the green-yellow-orange region of the visible light spectrum, which is important for the ecophysiology of cyanobacteria. The position of the absorbance maxima depends on various factors, including the state of aggregation. The phycobiliproteins are organized with linker proteins in phycobilisomes (Figs. 2.14 and 13.11)

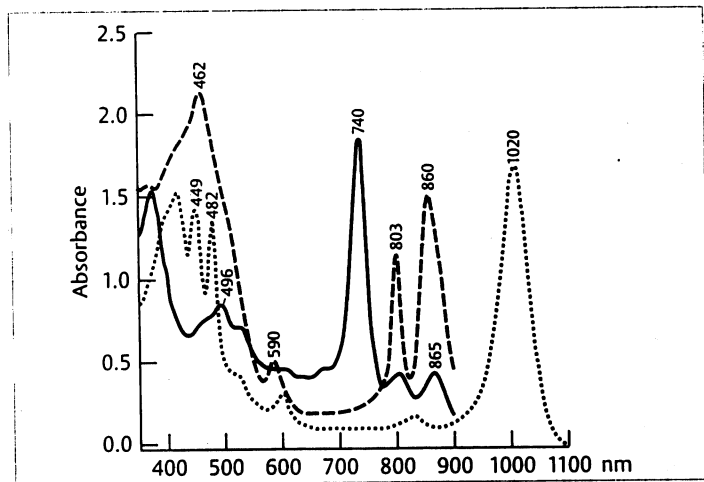


Fig. 13.3 Absorbance spectra of pigment-proteins bound to membranes isolated from *Chloroflexus aurantiacus*, a gliding, green bacterium containing BChl c (absorbance at 740 nm) as dominating species in chlorosomes, BChl a (865 nm), and carotenoids (496 nm) — (solid line); *Rhodospseudomonas palustris*, containing BChl a (370, 590, 803, and 860 nm) and carotenoids (462 nm) - - - - (broken line); *Rhodospseudomonas viridis*, containing BChl b (370, 600, and 1020 nm) and carotenoids (449 and 482 nm) (dotted line). *Rps. palustris* and *Rps. viridis* have lamellar intracytoplasmic membranes

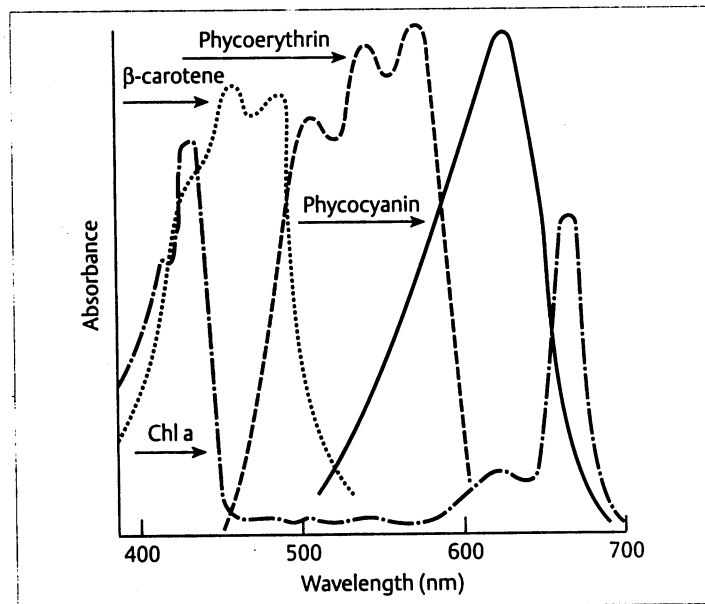


Fig. 13.5 Absorption spectra of pigment-proteins from cyanobacteria. - . . . chlorophyll a (Chl a), - - - - phycocyanin, β -carotene, — phycoerythrin