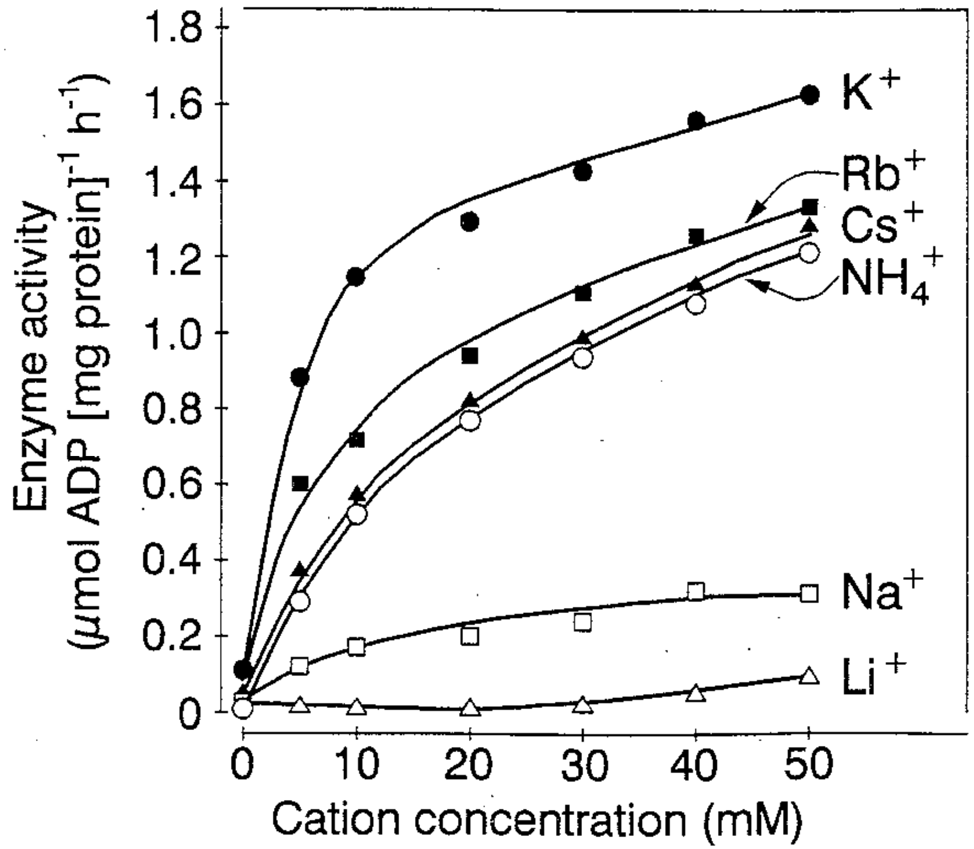
# AGRY 515 2012

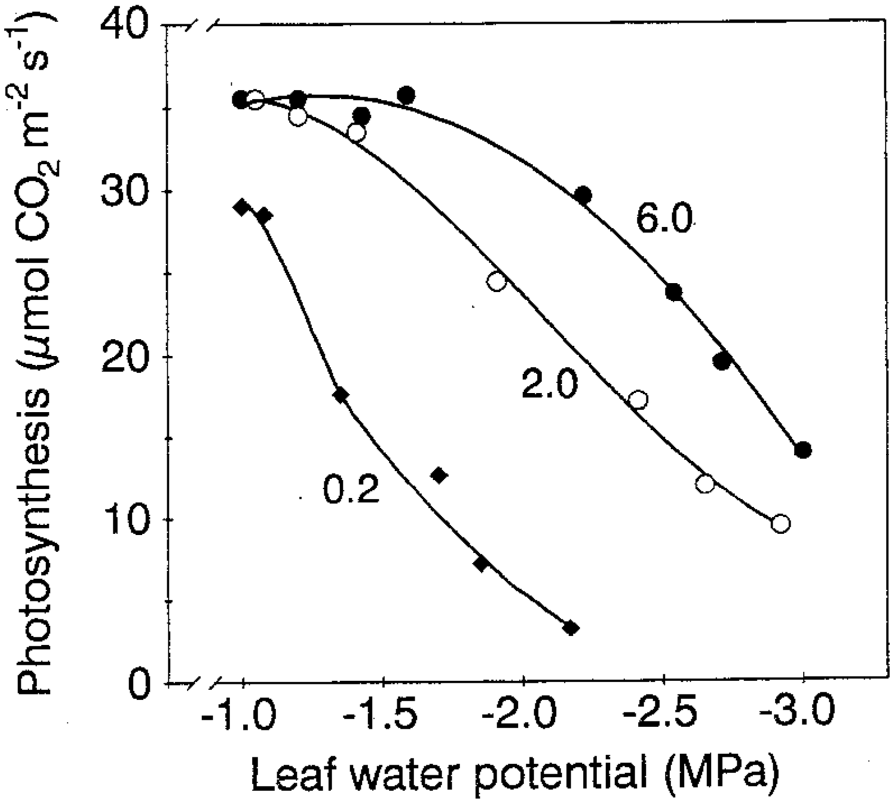
- K
- P
- S

# Fig. 1. Effect of univalent cations on enzyme activity. (Fig. 6.29 in Marschner, 2012)




Effect of univalent cations (as chlorides) on the activity of ADP-glucose starch synthase from maize. (Nitsos and Evans, 1969.)

Fig. 2. Effect of K supply and leaf water potential on leaf photosynthesis. (Fig. 6.35 in Marschner, 2012.)




Effect of $K^+$ supply (mM) to wheat plants on photosynthesis of leaves at declining leaf water potentials. (Based on Sen Gupta *et al.*, 1989.)

# Fig. 3. Schematic of role of K in cell extension & osmoregualtion. (Fig. 6.32 in Marschner, 2012.)

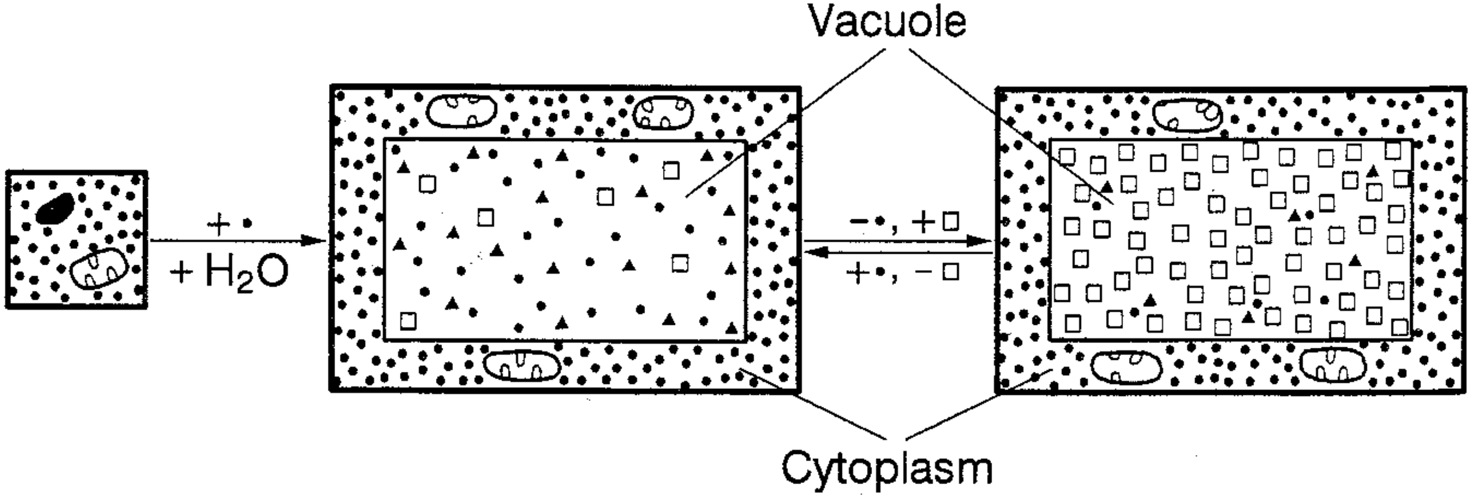



**Fig. 8.32** Model of the role of potassium and other solutes in cell extension and osmoregulation. Key: ●, $K^+$; □, reducing sugars; sucrose, $Na^+$; ▲, organic acid anions.

# Fig 4. Schematic of stomatal opening driven by K+ transport. (Fig. 6.34 in Marschner, 2012.)

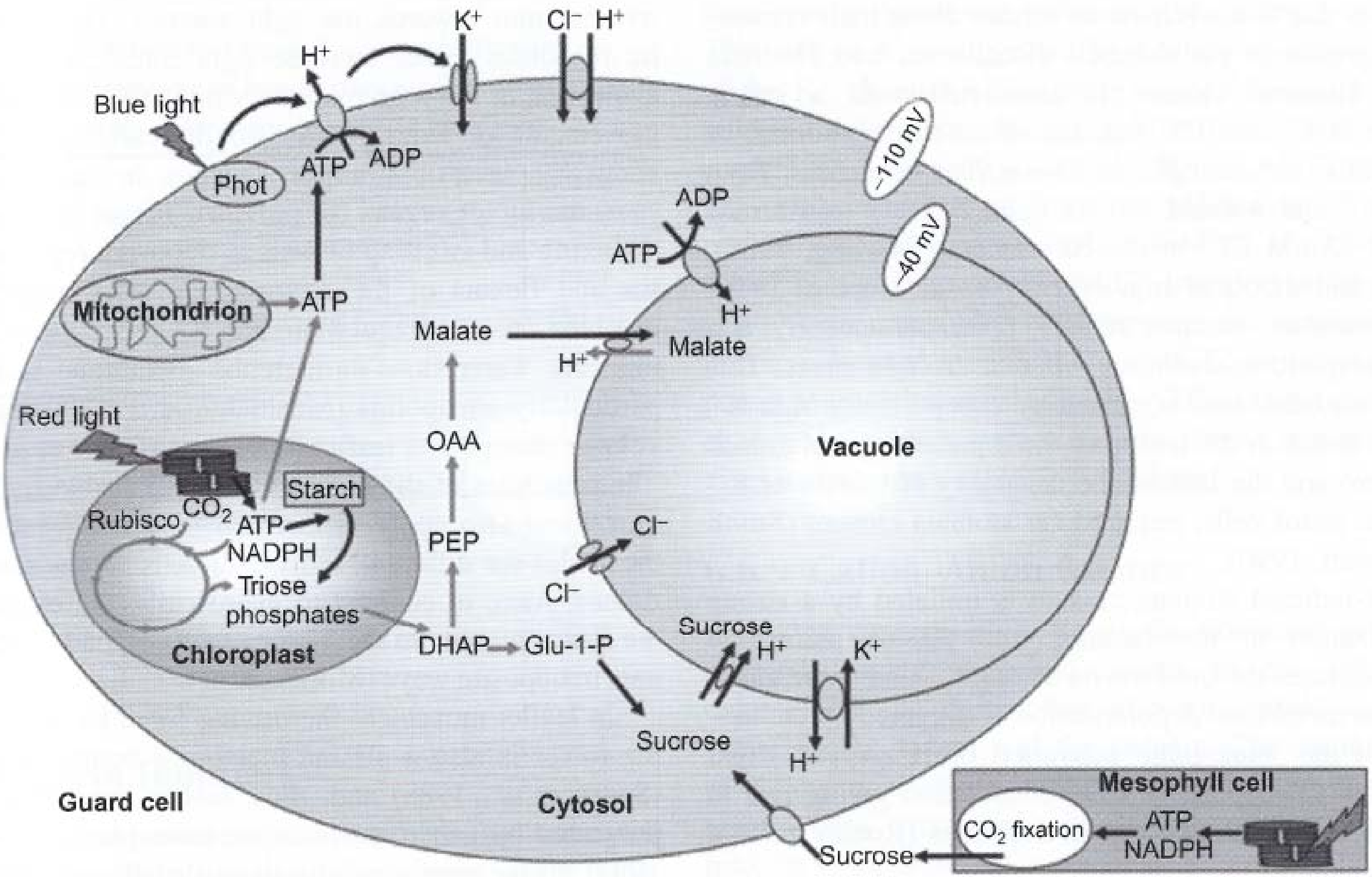
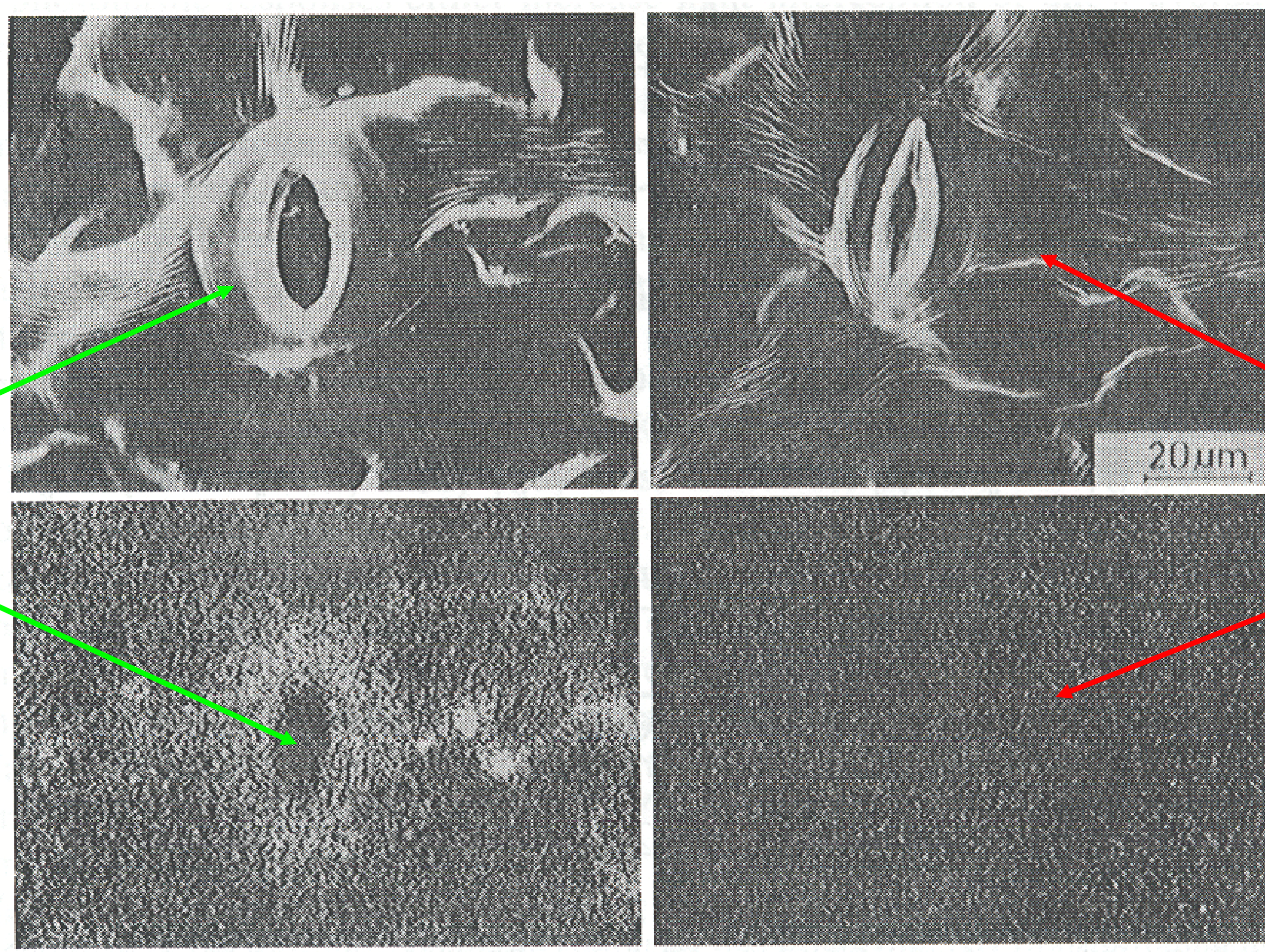



FIGURE 6.34 Schematic diagram of possible osmoregulatory pathways in guard cells for stomata opening. The diagram is not to scale. For explanations see text. Inspired by and redrawn from Roelfsema and Hedrich (2005) and Lawson (2009). DHAP = dihydroxyacetonphosphat; PEP = phosphoenolpyruvate; OAA = oxalacetate.

# Fig. 5. Stomata and K distribution. (Fig. 6.33 Marschner, 2012.)

Electron Probe Analyzer Picture

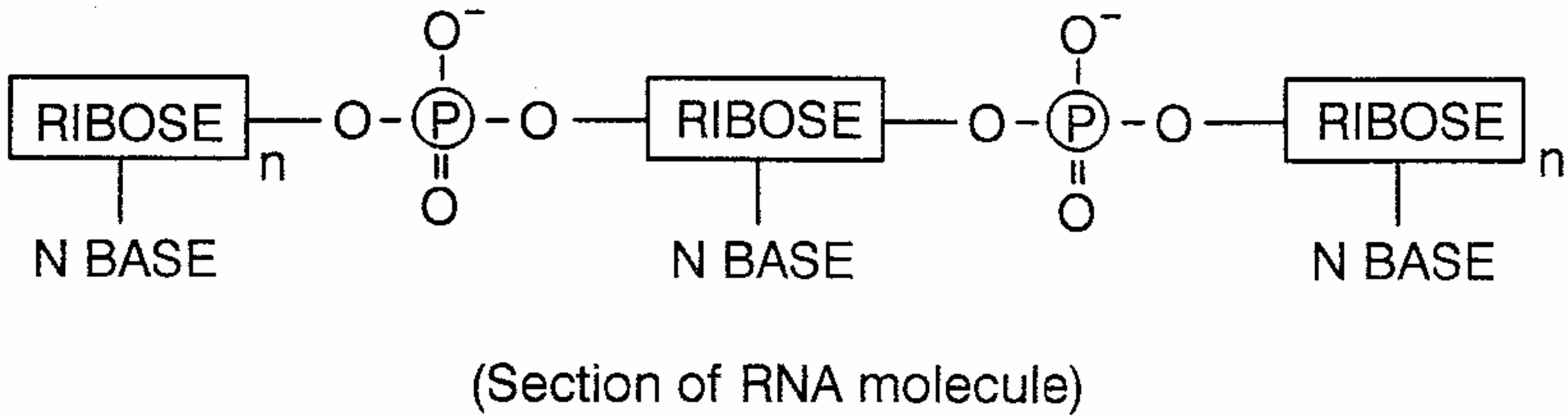
Open




Closed

X-ray Microprobe Images of K Distribution

Fig. 6. In both DNA and RNA, phosphate forms a bridge between ribonucleoside units to form macromolecules...




Marschner, 2012, p. 158.

Fig. 7. Model of a biomembrane with polar lipids (Fig. 2.4 from Marschner, 1995) and the phospholipid lecithin.

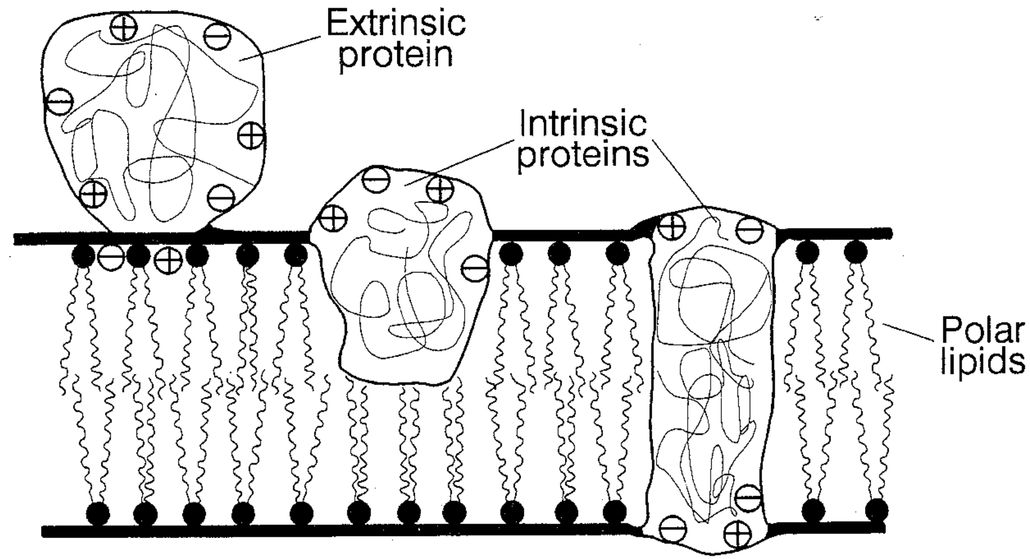
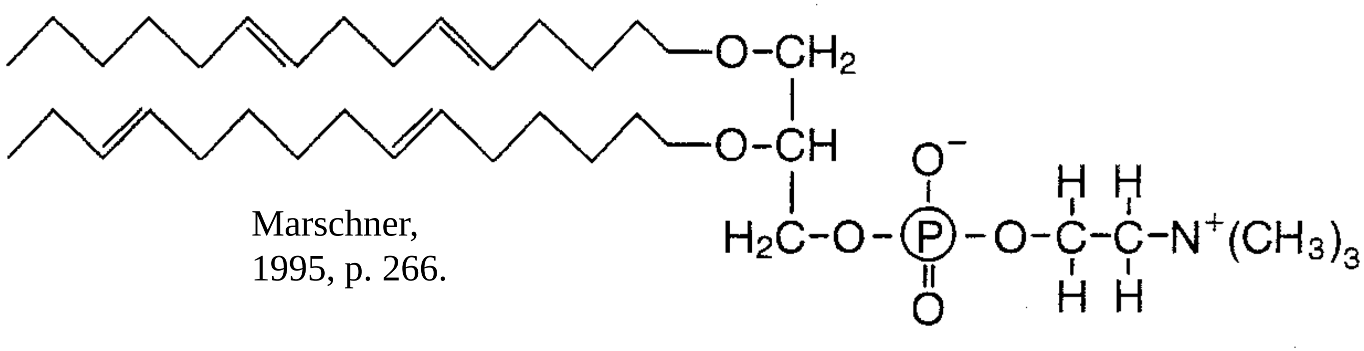
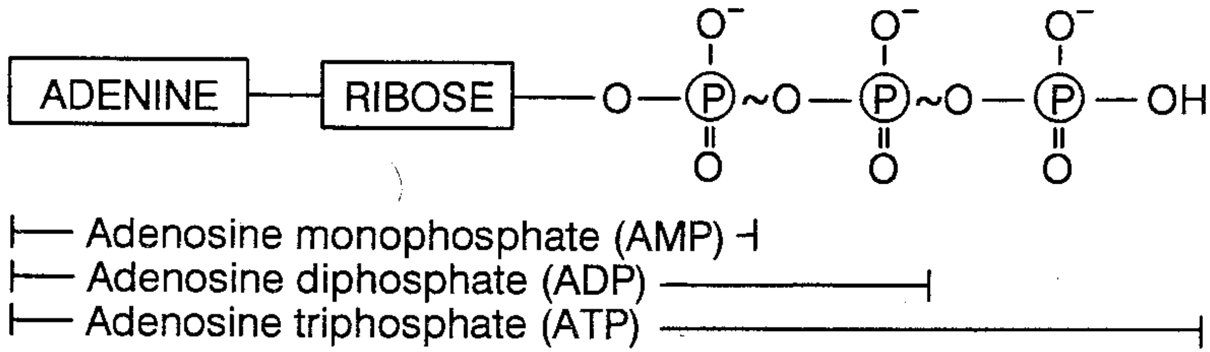


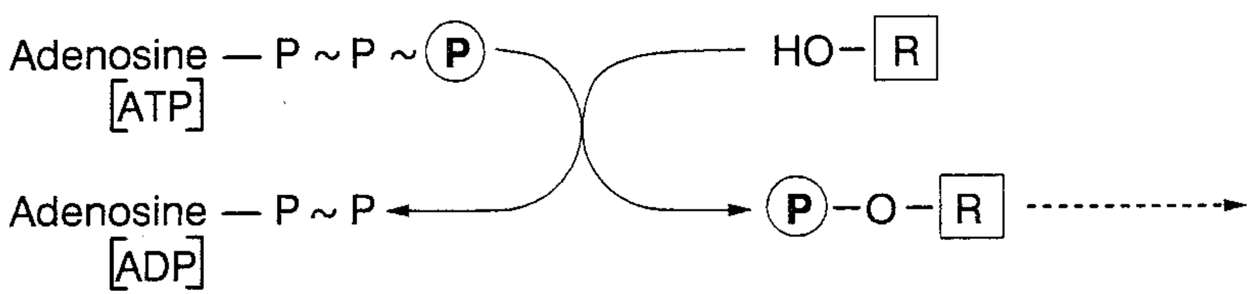

**Fig. 2.4** Model of a biomembrane with polar lipids and with either extrinsic or intrinsic, integrated proteins. The latter can cross the membrane to form 'protein channels'.




Marschner, 1995, p. 266.

# Fig. 8. P and Energy Metabolism




Marschner, 2012, p. 159

Table 1. Impact of P deficiency on soybean. (Table 6.10 from Marschner, 2012 (format is different))

**Table 8.17**

Effect of Phosphorus Deficiency on Various Growth Parameters and Contents of Phosphorus and Carbohydrates in Soybean[a]

| Parameter | | | Treatment: High P | Treatment: Low P |
|---|---|---|---|---|
| Leaf area ($dm^2$) | | | 12.1 | 1.8 |
| No. primary trifoliates | | | 7 | 4 |
| Shoot/root dry wt ratio | | | ~4.2 | ~1.0 |
| Chlorophyll ($mg\ dm^{-2}$) | | | 3.02 | 2.80 |
| P content leaves $P_i$ | | | 4.43 | 0.28 |
| ($mg\ g^{-1}$ dry wt) $P_{org}$ | | | 2.44 | 0.59 |
| P content (total P $mg^{-1}$ dry wt) | | | | |
| Stem and petioles | | | 5.84 | 1.14 |
| Roots | | | 10.54 | 1.29 |
| Ratio $\frac{\text{Total Root P}}{\text{Total Shoot P}}$ | | | 0.54 | 1.57 |
| Carbohydrates | Leaves | Starch | 0.4 | 12.8 |
| | ($g\ m^{-2}$ leaf) | Sucrose | 0.7 | 0.2 |
| | Roots | Starch | 23 | 160 |
| | ($mg\ g^{-1}$ fresh wt) | Sucrose | 16 | 177 |

[a]Based on Fredeen *et al.* (1989). Reprinted by permission of the American Society of Plant Physiologists.

# Fig. 9. Pathways of S assimilation. (Fig. 8.18, Marschner, 1995.)

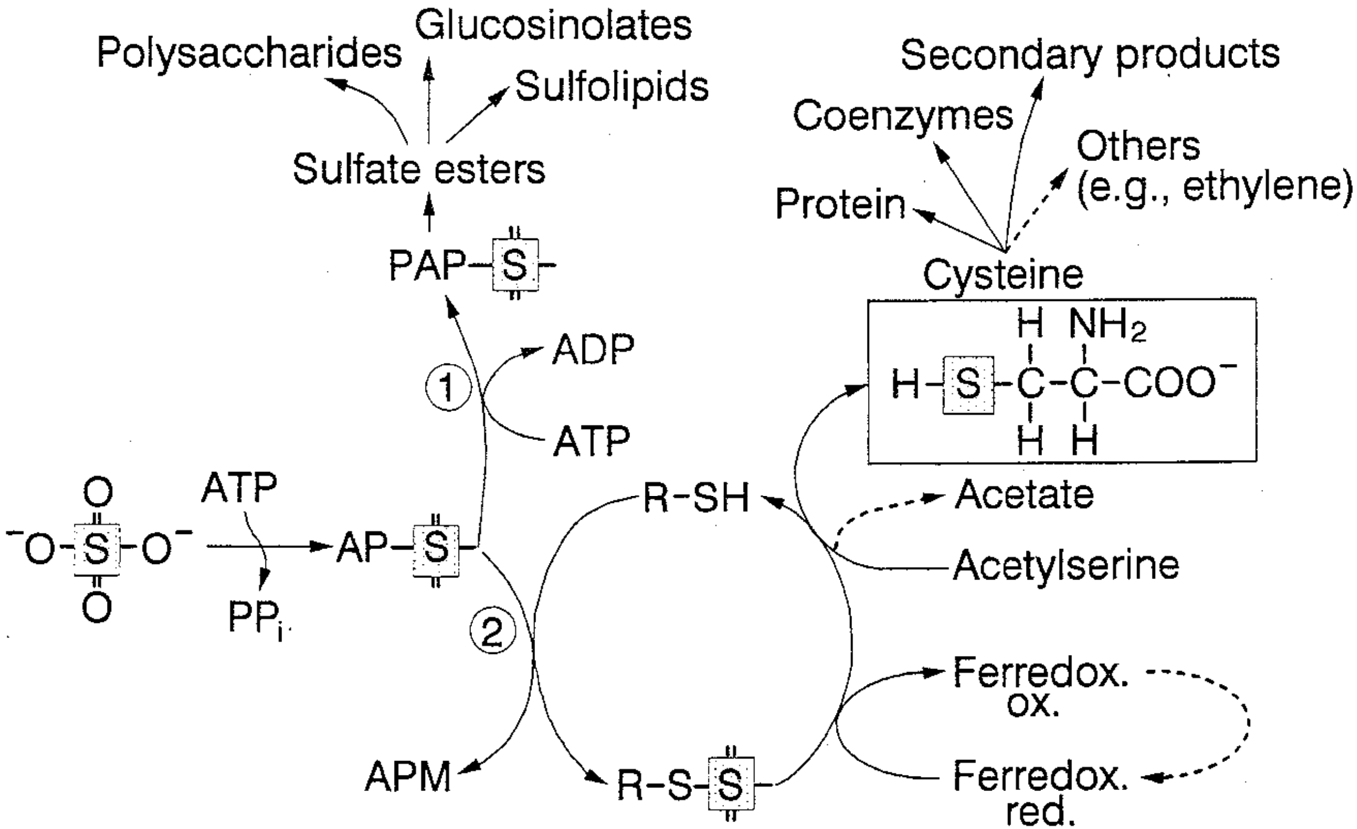
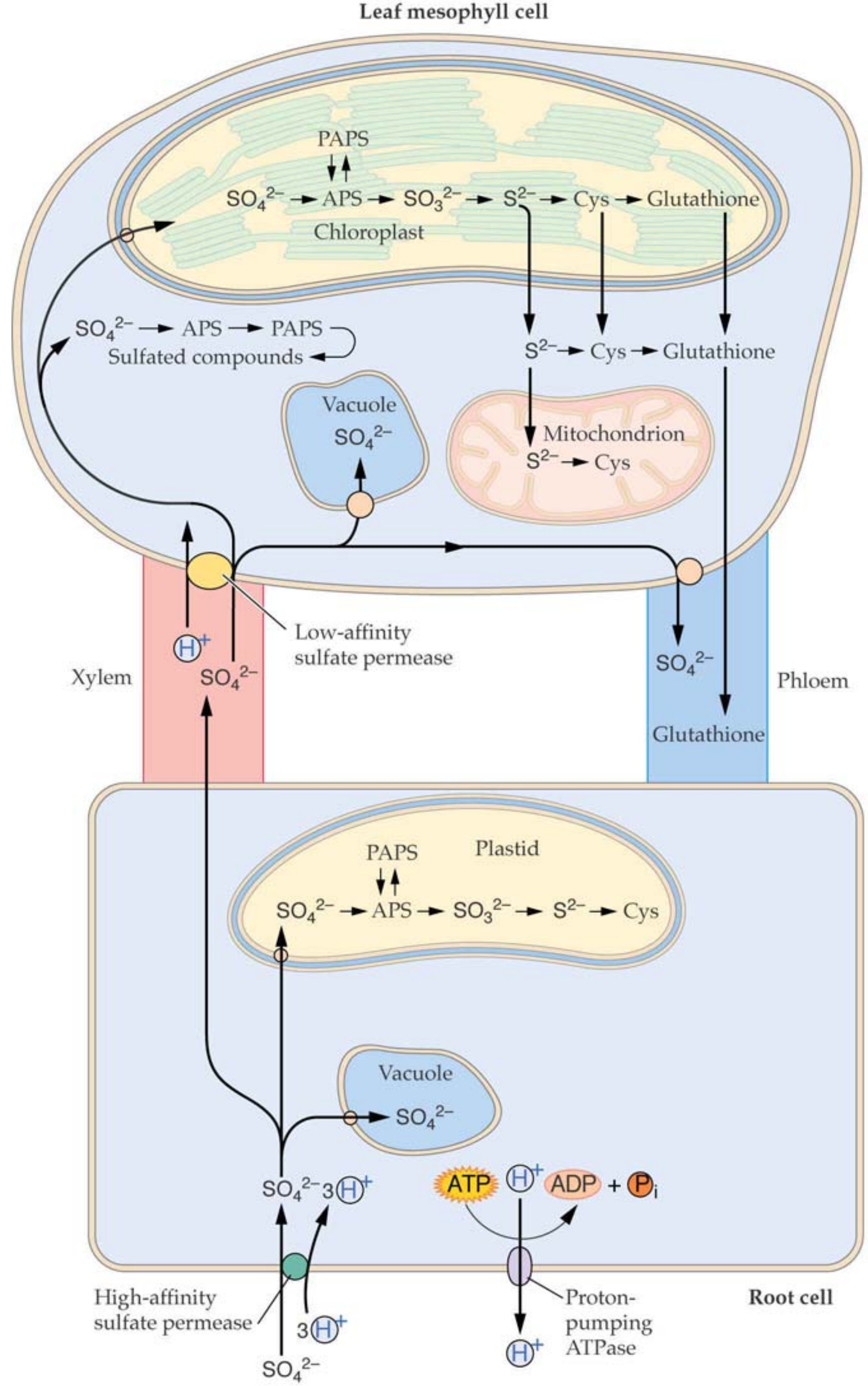



**Fig. 8.18** Pathways of sulfur assimilation in higher plants and green algae. (1) Synthesis of sulfate esters; (2) sulfate reduction according to the APS pathway. (Based on Schiff, 1983 and Schmidt and Jäger, 1992.)

Fig. 10. S uptake, reduction and transport in plants (similar to Fig. 6.15 in text)




Ref. ASPB