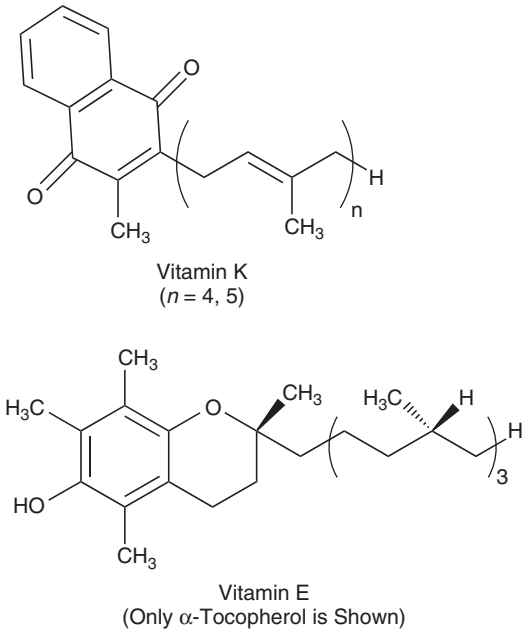

Figure 5-33 Vitamin K and vitamin E are both actually groups of related compounds, all of which are lipid soluble.

7. Olestra is a dietary fat substitute in which six to eight fatty acids are esterified to a central molecule of sucrose. It is used in food preparation to replace normal fat, or triglycerides, because it has much the same physical–chemical characteristics as regular triglycerides. Unlike triglycerides, Olestra is not digested by intestinal lipases, and it passes through the digestive tract unchanged. Hence, its use in food preparation (especially for fried foods) can reduce fat calories taken in the diet.
   a. Given that the ester linkages of the fatty acids to the sucrose are chemically the same as those joining fatty acids to glycerol in triglycerides, why can't the body's lipases break down Olestra?
   b. Fried snack foods prepared with Olestra have been fortified with vitamins A, D, E, and K. Why might such fortification be advisable?
8. Microorganisms isolated from hot springs in Yellowstone National Park tend to have longer saturated alkyl chains in their phospholipids than do related species growing under more temperate conditions. Propose an explanation for the difference.
9. The hydrophobic interaction as A and B form a complex is typically accompanied by release of water. Why would formation of electrostatic/ion-pairing interactions between A and B also tend to release water?
10. Explain qualitatively how alkyl chain stiffness in an amphiphile aggregate would affect the equilibrium between vesicles and planar bilayers. Which form is favored by stiff chains, and why?

REFERENCES

A. L. Blobaum and L. J. Marnett. (2007). "Structural and functional basis of cyclooxygenase inhibition," *J. Med. Chem.* 50:1425–1441.

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