Common names for the vitamin B family are:
B_1 — thiamine
B_2 — riboflavin
B_3 — niacin
B_5 — pantothenic acid
B_6 — pyridoxine
B_7 — biotin
B_9 — folic acid
B_{12} — cobalamins

Many of the water-soluble vitamins serve as **coenzymes**, molecules that work in conjunction with enzymes to enhance their activity. Members of the vitamin B family are particularly adept in acting as coenzymes. Niacin plays an essential role in energy transfer during glucose and fat metabolism. The synthesis of niacin in the body requires the essential amino acid tryptophan. Thus, a diet deficient in tryptophan may lead to niacin deficiency. Such a deficiency causes pellagra, a serious condition that is characterized by "the 4Ds" of diarrhea, dermatitis, dementia, and death. This disease is still common today in parts of the world, including several African nations.

Some vitamins were discovered when observers correlated diseases with the lack of specific foods. For example, vitamin C (ascorbic acid) must be supplied in the diet, typically via citrus fruits and green vegetables. An insufficient supply of the vitamin leads to scurvy, a disease in which collagen, an important structural protein, is broken down.

This practice also led to British sailors being called "limeys."

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The link between citrus fruits and scurvy was discovered more than 200 years ago when it was found that feeding British sailors limes or lime juice on long sea voyages prevented the disease. Thanks to Nobel Laureate Linus Pauling (1901–1994) who in 1970 authored *Vitamin C and the Common Cold*, vitamin C continues to be in the public eye.

Your Turn 11.16 You Decide Megadoses of Vitamin C

Decades ago, Linus Pauling claimed that large doses of vitamin C were therapeutic in preventing the common cold.

a. What range of vitamin C daily constitutes a "megadose"?
b. Find evidence to either support or refute the claim of preventing the common cold. Cite your sources.
c. Interview three people of different age groups, including a nurse or physician if you are able. Ask if they take vitamin C, and if so, why.

We would be remiss not to mention vitamin E, which actually consists of several closely related fat-soluble vitamins rather than a single compound. Vitamin E is only synthesized by plants, and in varying amounts. Vegetable oils and nuts are good sources of it. Nonetheless, it is so widely distributed in foods that it is difficult to create a diet deficient in vitamin E. Since the 1990s, this vitamin has been in the news as part of the antioxidant system that protects the body from chemically active and damaging free radicals. Although at one time taking vitamin E supplements was recommended, this is no longer the case. Skin preparations are another matter, though. Many products contain vitamin E, and claim that it prevents or helps heal skin damage. Investigate these claims for yourself in the next activity.

Your Turn 11.17 You Decide Vitamin E and Your Skin

Check the advertisements and you will see that many hand lotions and beauty creams contain vitamin E.

a. Identify three skin products that contain vitamin E.
b. How is vitamin E thought to help protect your skin?
c. Although it might seem logical that vitamin E would be good for the skin, it is difficult to find evidence. Investigate this topic to see for yourself. Use the resources on the Internet to assist you.

Minerals are ions or ionic compounds that, like vitamins, have a wide range of physiological functions. You may be familiar with minerals such as sodium and calcium,