Vitamin B12 (cobalamin)

Chief functions
- Is important in metabolism of energy-yielding nutrients
- Acts with folate in the production of hemoglobin
- Is needed for normal fatty acid and DNA synthesis
- Functions metabolically as a coenzyme in new cell synthesis
- Protects the sheath around nerve fibers
- Helps build bone tissue
- Aids in the formation of red blood cells; needed to make all blood cells

Possible benefits
- Alzheimer’s disease:
  - May play a role in prevention of onset
  - Low levels of vitamin B₁₂ are found in persons diagnosed with Alzheimer’s disease
  - Research is inconsistent

Deficiency symptoms
- Pernicious anemia (macrocytic and megaloblastic anemias)
- Low levels in blood affect growth and repair of all body cells
- Fatigue of nervous system, progressing to degeneration and leading to possible paralysis
- Malfunction of nerves and muscles
- Hypersensitivity to touch—tingling or numbness
- Smooth tongue

Toxicity symptoms
- None known (tested as high as a 100-microgram dose)

Stability
- Foods may lose some B₁₂ when cooked to >100° C (212° F)
- Slowly destroyed in the presence of acid

Nutrient-nutrient reactions and absorption
- Calcium is necessary for normal absorption of B₁₂
- Deficiency of either iron or B6 decreases the absorption of B₁₂
- A high intake of folic acid can mask B₁₂ anemia
- Vitamin E deficiency might impair conversion of B₁₂ to its active form
- Efficiency of absorption decreases with age
- Some B₁₂ is stored in the liver, kidney, and other tissues:
  - Deficiency signs do not develop for up to 5 to 6 years after complete elimination from diet
- B₁₂ is recycled from bile and other intestinal secretions
- Gastric acid is required to cleave the B₁₂-intrinsic factor complex to make it bioavailable to the body

Mahan LK, Escott-Stump S, Raymond JL. *Krause’s Food and the Nutrition Care Process*.