Micronutrients and Supplements Guide

Essential Vitamins and Minerals: The Micronutrient Foundation

Introduction While macronutrients provide energy, micronutrients are essential for optimal bodily function, disease prevention, and overall health. Understanding key vitamins and minerals helps ensure adequate intake through food and targeted supplementation when necessary.

Fat-Soluble Vitamins

Vitamin A (Retinol)

- Functions: Vision, immune function, skin health, cell differentiation
- Best sources: Liver, sweet potatoes, carrots, spinach, eggs
- Daily needs: 900mcg (men), 700mcg (women)
- Deficiency signs: Night blindness, dry skin, poor immune function

Vitamin D (Cholecalciferol)

- Functions: Bone health, immune function, mood regulation, hormone production
- Best sources: Sunlight exposure, fatty fish, fortified foods, supplements
- Daily needs: 600-800 IU (higher in winter or limited sun exposure)
- Deficiency signs: Bone pain, muscle weakness, frequent infections, depression

Vitamin E (Tocopherol)

- Functions: Antioxidant protection, immune function, skin health
- Best sources: Nuts, seeds, vegetable oils, green leafy vegetables
- Daily needs: 15mg
- Deficiency signs: Muscle weakness, vision problems, immune dysfunction

Vitamin K

- Functions: Blood clotting, bone health, heart health
- Best sources: Green leafy vegetables, broccoli, Brussels sprouts
- Daily needs: 90-120mcg

- Deficiency signs: Easy bruising, excessive bleeding, weak bones

Water-Soluble Vitamins

B-Complex Vitamins

- B1 (Thiamine): Energy metabolism, nerve function - whole grains, pork, legumes
- B2 (Riboflavin): Energy production, antioxidant function - dairy, eggs, green vegetables
- B3 (Niacin): Energy metabolism, cholesterol regulation - meat, fish, nuts
- B6 (Pyridoxine): Protein metabolism, brain function - poultry, fish, potatoes
- B12 (Cobalamin): Red blood cell formation, nerve function - animal products only
- Folate: DNA synthesis, red blood cell formation - leafy greens, legumes, fortified grains
- Biotin: Fat and carbohydrate metabolism - eggs, nuts, seeds

Vitamin C (Ascorbic Acid)

- Functions: Immune function, collagen synthesis, antioxidant protection, iron absorption
- Best sources: Citrus fruits, berries, bell peppers, broccoli, tomatoes
- Daily needs: 75mg (women), 90mg (men), 125mg (smokers)
- Deficiency signs: Fatigue, poor wound healing, frequent infections

Essential Minerals

Calcium

- Functions: Bone health, muscle contraction, nerve transmission, blood clotting
- Best sources: Dairy products, leafy greens, sardines with bones, fortified foods
- Daily needs: 1000-1200mg
- Absorption enhancers: Vitamin D, magnesium; Inhibitors: excessive fiber, caffeine

Iron

- Functions: Oxygen transport, energy production, immune function
- Types: Heme iron (animal sources, better absorbed), non-heme iron (plant sources)

- Best sources: Red meat, poultry, fish, beans, spinach, fortified cereals
- Daily needs: 8mg (men), 18mg (women), 27mg (pregnant women)
- Absorption enhancers: Vitamin C, meat; Inhibitors: tea, coffee, calcium

Magnesium

- Functions: Energy production, protein synthesis, blood glucose control, muscle function
- Best sources: Nuts, seeds, whole grains, leafy greens, dark chocolate
- Daily needs: 400-420mg (men), 310-320mg (women)
- Deficiency signs: Muscle cramps, fatigue, irregular heartbeat, mood changes

Zinc

- Functions: Immune function, wound healing, protein synthesis, taste and smell
- Best sources: Meat, shellfish, legumes, seeds, nuts
- Daily needs: 11mg (men), 8mg (women)
- Deficiency signs: Poor wound healing, loss of appetite, hair loss, frequent infections

Supplementation Guidelines

When Supplements May Be Needed:

- Vitamin D: Most people, especially in winter months
- B12: Vegans and vegetarians, adults over 50
- Iron: Menstruating women, vegans, diagnosed deficiency
- Calcium: Limited dairy intake, osteoporosis risk
- Omega-3: Limited fish consumption
- Folate: Women of childbearing age

Quality Considerations:

- Look for third-party testing (USP, NSF, ConsumerLab)
- Choose appropriate forms (methylfolate vs folic acid, chelated minerals)
- Consider timing (fat-soluble with meals, iron on empty stomach)

- Avoid megadoses unless medically supervised

Food First Approach:

- Prioritize nutrient-dense whole foods
- Eat a variety of colorful fruits and vegetables
- Include both animal and plant protein sources
- Choose whole grains over refined grains
- Use supplements to fill specific gaps, not replace good nutrition