**Selenium**

Selenium is a trace mineral, meaning it is needed in amounts less than 100 mg per day.

| RDA/AI                      | Adults ages 19 and over: 55 µg  
Pregnant women, all ages: 60 µg  
Lactating women, all ages: 70 µg  
Teens ages 14-18: 55 µg  
Children ages 9-13: 40 µg  
Children ages 4-8: 30 µg  
Children ages 1-3: 20 µg  
Infants ages 7-12 months: 20 µg  
Infants ages 0-6 months: 15 µg |
|-----------------------------|-------------------------------------------------------------------------------|
| Tolerable upper intake level| Adults ages 19 and over: 400 µg  
Teens ages 14-18: 400 µg  
Children ages 9-13: 280 µg  
Children ages 4-8: 150 µg  
Children ages 1-3: 90 µg  
Infants ages 7-12 months: 60 µg  
Infants ages 0-6 months: 45 µg |
| Function                    | Component of glutathione peroxidase antioxidant enzyme system—it spares vitamin D and prevents oxidative damage to cell membranes  
Immune function  
Production of thyroxine (thyroid hormone) |
| Metabolism                  | Absorption of selenium occurs in the duodenum and jejunum of the small intestine and occurs more readily in conditions of deficiency. Excess selenium is excreted via urine.  
In the body, selenium is stored as selenomethionine, and selenocysteine is the active form.  
Selenium is transported bound to albumin and then later to α2-globulin.  
During stress, infection, or tissue injury, glutathione peroxidase selenium enzyme may protect against the damaging effects of peroxides and oxidized free radicals.  
A selenoprotein enzyme called type I iodothyronine 5′-deiodinase converts thyroxine (T4) to triiodothyronine (T3).  
Vitamin E and selenium may function together in their antioxidant roles, reinforcing one another’s protective effects against harmful oxidation. Glutathione peroxidase functions in the mitochondria and the cytosol of cells, while vitamin E functions in the cell membrane. |
| Disease States that Alter Metabolism | Impaired absorption: Crohn’s disease, Celiac disease, and other GI tract conditions; resection or surgical removal of the stomach |
| Food Sources                | Liver, kidney, pork, seafood (tuna, cod, shrimp, halibut), poultry (turkey, chicken), Brazil nuts, wheat, rice (depending |
| **Tests for assessing nutrient metabolism** | Measure selenium or glutathione peroxidase amounts in serum, platelets, or erythrocytes or in whole blood. Erythrocyte selenium is a more long-term marker of selenium intake. Urine samples and toenail clippings may also aid in selenium level assessment. |
| **Drug-Nutrient Interactions** | Anticoagulant medications: aspirin, clopidogrel (Plavix), dalteparin (Fragmin), enoxaparin (Lovenox), heparin, ticlopidine (Ticlid), warfarin (Coumadin), and others. Taking selenium with these medications may increase chances of bruising and bleeding because selenium also slows blood clotting. Statin drugs: atorvastatin (Lipitor), fluvastatin (Lescol), lovastatin (Mevacor), and pravastatin (Pravachol). Taking selenium, beta-carotene, vitamin C, and vitamin E together might decrease the effectiveness of some cholesterol-lowering medications. Sedative (Barbiturates) medications: Taking selenium with these drugs may increase the effects and side effects of these drugs because it alters the metabolism of these drugs. |
| **Nutrient Measurement** | Measure selenium or glutathione peroxidase amounts in serum, platelets, or erythrocytes or in whole blood. Erythrocyte selenium is a more long-term marker of selenium intake. |
| **Deficiency Signs and Symptoms** | Impaired immune functions, increased risk of viral infections, infertility, depression, hostility, impaired cognitive function, and muscle pain and wasting. Diseases that can result: Keshan disease (enlarged heart and poor heart function, occurs in selenium deficient children). Kashin-Beck disease (osteoanthropathy: deforming arthritis). Myxedematous endemic cretinism (mental retardation). |
| **Toxicity Signs and Symptoms** | Selenosis: gastrointestinal upsets, hair loss, white blotchy nails, garlic breath odor, fatigue, irritability, and mild nerve damage. |

**Works Cited**