

VITAMIN	SOURCE	DEFICIENCY	TOXICITY
<b>FAT SOLUBLE</b>			
<b>A</b> Vision, growth, immune function, spermatogenesis/embryonal development, epithelial differentiation	<b>Retinoids</b> egg yolk, dairy <b>Carotenoids</b> yellow/red fruits/veggies, dark leafy greens	◦ GI/fat malabsorption disorders ◦ Chronic nephritis ◦ intestinal parasite ◦ <b>alcoholism</b> - bitot's spots Signs: ↑ keratinization → <b>Ocular</b> - nyctalopia, xerophthalmia <b>Derm</b> - rough, dry scaly skin follicular hyperkeratosis (bumps)	Bone/muscle pain, Cirrhosis, dry itchy skin, conjunctivitis ↑ <b>beta carotene</b> → <b>orange skin</b> (not toxic)
<b>D</b> Calcium transport, bone health, immune, CNS,	<b>UV light</b> - photolytic action produces VD from sterols in body <b>Food</b> - fish, egg yolk, fortified foods	<b>Bone health</b> - weakening Adults: <b>Osteomalacia</b> (fractures due to bone weakening) Children: <b>rickets</b> Risks: breastfed, raised in poverty, >50 yo, limited sun exposure, alcoholics, fat malabsorption	<b>Hypercalcemia</b> and <b>calcification</b> of soft tissue from supplementation <b>NOT</b> sun exposure
<b>E</b> antioxidant, DNA repair, immune function	vegetable oils, nuts, leafy greens, cereal	<b>Rare</b> . Neurologic problems - nerve degeneration in hands/feet. ↑ <b>Risk</b> : fat malabsorption disorders alcoholics, preemies, genetic defect	↑ <b>bleeding</b> and <b>impaired blood coagulation</b>
<b>K</b> blood coagulation	<b>dark leafy greens, broccoli, cabbage</b> ◦ small amount made in GI tract via bacterial synthesis	Problems w/ <b>blood coagulation</b> ex. bruising, nose/GI bleeds life threatening bleeds in newborns ↳ in/around brain ↓ bone density → ↑ <b>risk of fractures</b>	May <b>reduce effectiveness of anticoagulants</b> (warfarin) → ↑ <b>clot risk</b>

<b>WATER SOLUBLE</b>			
<b>C</b> potent antioxidant co-factor for enzyme involved with synthesis of norepi, collagen, carnitine	<b>Citrus fruits, Papaya, cantaloupe, broccoli, strawberry</b> ↓ intake → <b>smoking ↑ need</b> to repair damage	<b>Hyperkeratosis</b> Corkscrew hairs <b>Hemorrhage</b> <b>bleeding gums</b> , poor wound healing <b>Hematologic anemia</b> , ↑ bleed time <b>Severe</b> → <b>Scurvy</b> 3HS	<b>Readily excreted</b> less toxicities
<b>B</b> <b>B1 Thiamin</b> Coenzyme in carb metabolism	enriched, fortified, whole-grain products	<b>Alcoholics</b> - <b>Wernicke-Korsakoff</b> affects nervous system ◦ Wernicke's encephalopathy ◦ Korsakoff syndrome → <b>irreversible</b> <b>Berberi</b> : wet affects CVS → HF, SOB, ↑HR, edema dry affects NS → confusion, tingling <b>Tx</b> : IV thiamine → PO thiamine	
<b>B3 Niacin</b> required for energy metabolism	meat, fish, poultry grains - enriched, and whole-grains	<b>Pellagra</b> : 4D's seen - diarrhea, dermatitis, dementia, death <b>Signs/sx</b> - scaly skin sores, inflamed mucus membranes	<b>Supplements</b> → flushing, GI distress
<b>B6 Pyridoxine</b> >enzymes, gluconeogen, RBC metabolism	steak, bananas, navy bean	<b>Causes</b> : alcoholism, meds (isoniazid) <b>Sx</b> : peripheral neuropathy, anemia, glossitis, dermatitis	<b>Neuropathy</b>
<b>B12 Cobalamin</b> lipid metabolism, dna synthesis, nerve cells, RBCs	meat, fish, poultry, milk	<b>Risk factors</b> : Vegah, alcoholism, Crohn's, pernicious anemia <b>Sx</b> : megaloblastic anemia, peripheral neuropathy (can be permanent), glossitis, diarrhea, fatigue	