

Dietary-Essential, Non-Vitamin, Non-Mineral Compounds				
Compound	Required from Diet?	Function	Half-Life	Notes
Lutein	Yes	Eye and brain antioxidant	3–5 days	Stored in retina; essential for macular health
Zeaxanthin	Yes	Macular protection	3–5 days	Works synergistically with lutein
Lycopene	Yes	Antioxidant (prostate, skin)	2–3 days	Not synthesized by body
Sulforaphane	Yes (from crucifers)	Phase II detox, NRF2 activator	1–3 hours	Must be eaten or taken—precursor in broccoli sprouts
Curcumin	Yes	Anti-inflammatory, gene modulation	1–2 hours	Poor bioavailability unless enhanced
EGCG (Epigallocatechin gallate)	Yes	Antioxidant, brain & metabolic support	~3–5 hours	Found in green tea—rapidly metabolized
Resveratrol	Yes	SIRT1 activation, anti-aging	1–3 hours	Short half-life; rapidly cleared
Quercetin	Yes	Antihistamine, antioxidant	11–28 hours	From apples, onions—supports zinc transport
Spermidine	Yes	Autophagy, longevity genes	Unknown (longer-term gene effect)	Not synthesized adequately after youth
Taurine	Semi-essential	Electrolyte, bile acid, mitochondrial function	1–2 hours (plasma)	Synthesized in liver but insufficient in stress, age, or disease
Carnitine (ALCAR, L-Carnitine)	Semi-essential	Fatty acid transport, brain & heart	1–3 hours	Endogenous production declines with age
PQQ (Pyrroloquinoline quinone)	Likely essential	Mitochondrial biogenesis, antioxidant	3–8 hours	Emerging evidence suggests it's conditionally essential
CoQ10 (Ubiquinone)	Conditionally essential	Mitochondrial energy (ETC)	~33–35 hours	Declines significantly with age and statin use
Alpha Lipoic Acid (ALA)	Synthesized in small amounts	Mitochondrial enzyme cofactor, antioxidant recycling	~30–60 min	Body makes small amounts—diet boosts significantly
Choline	Yes	Brain, liver, methylation	Varies	Essential nutrient but not always categorized as a vitamin
Inositol	Yes	Insulin signaling, neurotransmission	~1–2 days	Often overlooked but dietary intake is crucial
Apples appear in 7 out of the 10 categories.				
Onions hit 4.				
Tea covers 6, depending on preparation.				
Kale hits 4+ and synergizes well with others.				