

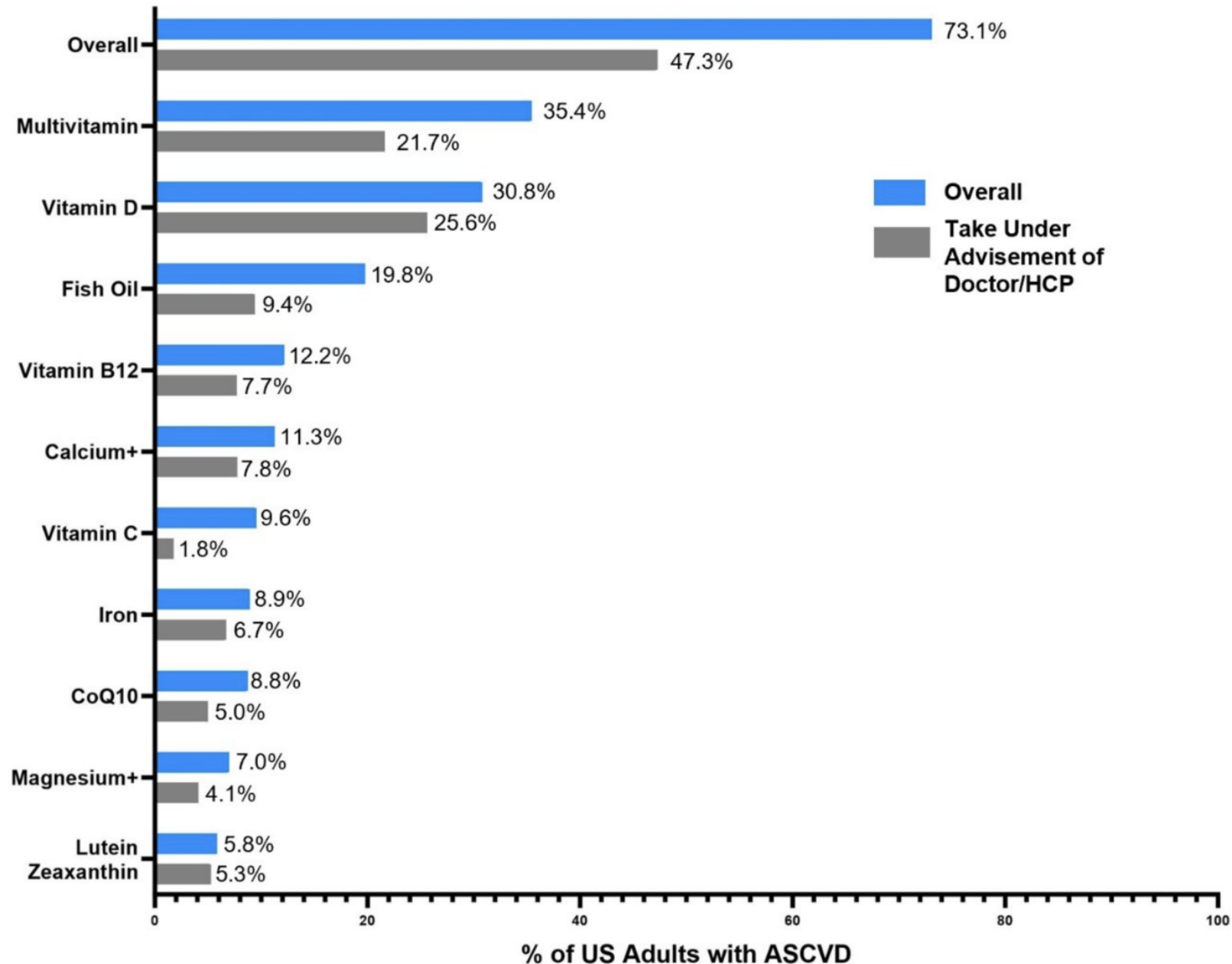
Supplements and CVD

Radhika Nandur Bukkapatnam MD MAS

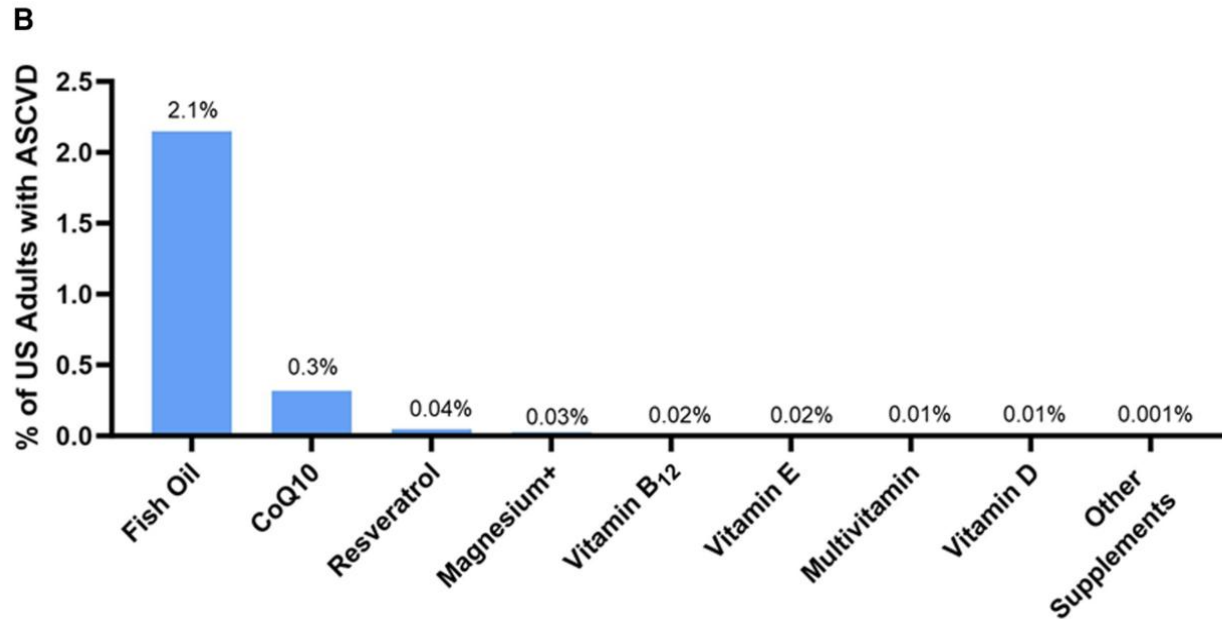
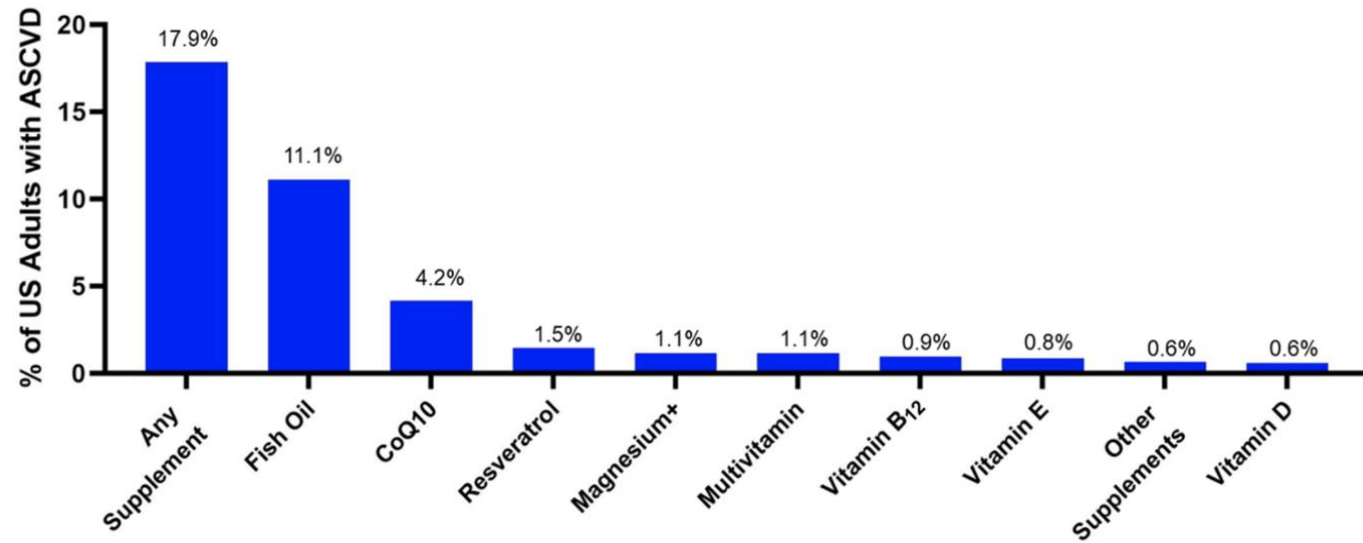
September 24 2026

- Among all US adults, dietary supplement use increased from 48.4% to 56.1% from 2007 to 2008 through 2017 to 2018
- Most commonly used: multivitamins, vitamin D, and fish oil/omega-3 fatty acids.
- Large randomized clinical trials of multivitamins, vitamin D, and fish oil supplements showed no benefit
- Reflecting this lack of evidence, guidelines for management of patients with ASCVD including chronic coronary heart disease or prior stroke do not include any recommendations for dietary supplements

Use of Supplements for Overall Health



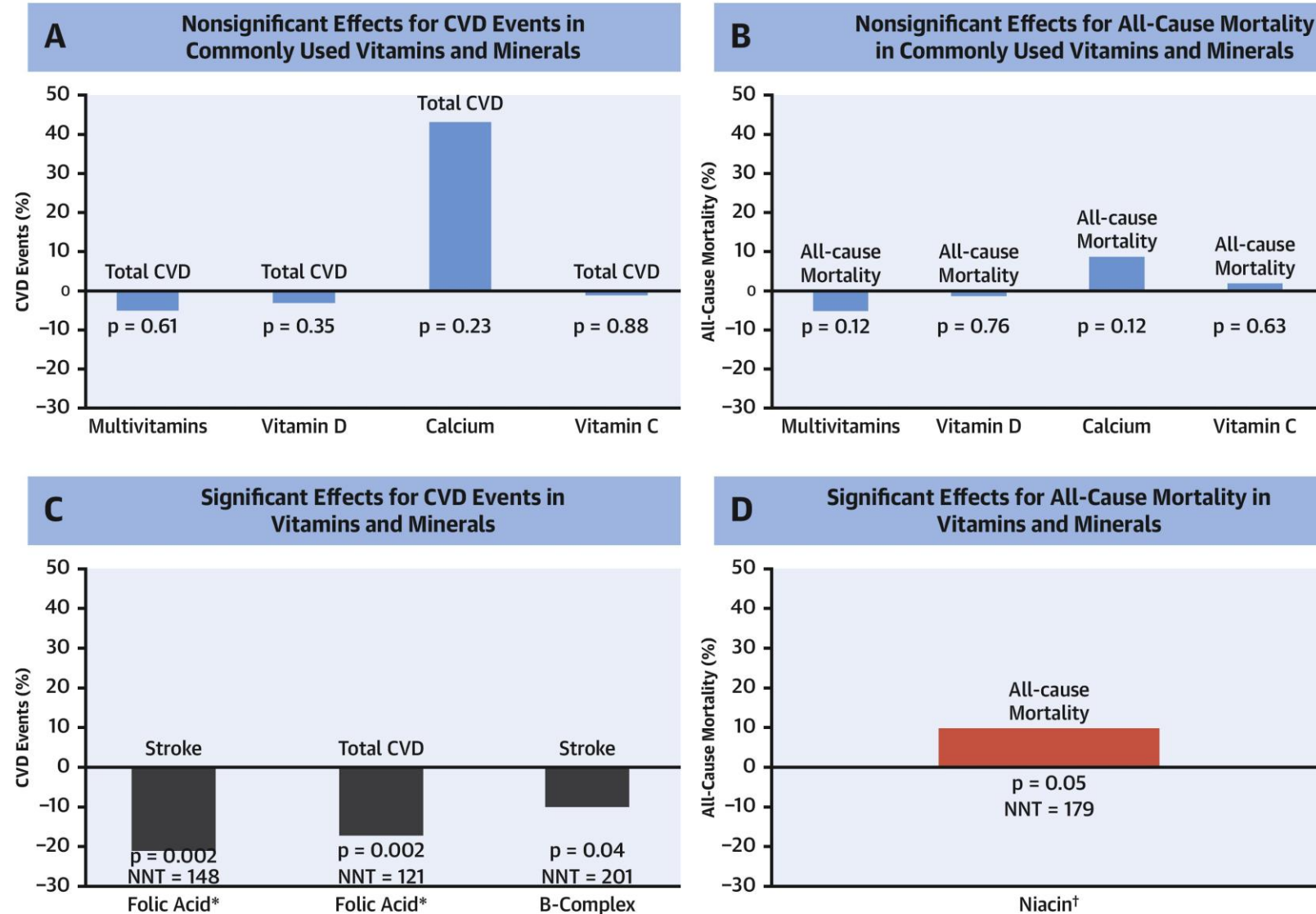
Use of Supplements for “Heart Health”



Commonly used Supplements

- Fish Oil: Mixed results: no benefit unless prescription doses
- Resveratrol found in grapes, marketed for its antioxidant properties. No large randomized trials have been conducted on resveratrol and cardiovascular outcomes, though a meta-analysis found no significant impact of resveratrol on cardiovascular risk factors such as blood pressure and low-density lipoprotein
- Coenzyme Q10, also known as ubiquinol or ubiquinone, is involved in mitochondrial energy production, and is often used to treat individuals with statin-induced myalgias

CENTRAL ILLUSTRATION: Micronutrient Risks and Benefits



Jenkins, D.J.A. et al. J Am Coll Cardiol. 2021;77(4):423-36.

Supplements used for Lipid lowering

- Red yeast rice monacolin K
- Fish oil
- Garlic
- Berberry
- Cinnamon
- Beets

Functional foods and Supplements that lower Cholesterol

Inhibition of Intestinal Cholesterol Absorption & Bile Acid Reabsorption Nutraceuticals

Plant sterols/stanols → displace dietary cholesterol from micelles.

Viscous soluble fibers (e.g., psyllium, oat β -glucan, konjac) → bind bile acids/cholesterol and increase fecal excretion.

Chitosan → binds dietary fat and cholesterol in the gut.

Sodium alginate → forms gel matrix and reduces absorption.

Green tea catechins (EGCG) → reduce micellar cholesterol solubility.

Probiotics and prebiotics → modulate bile acid metabolism and cholesterol excretion.



Inhibition of Hepatic Cholesterol Synthesis & Enhancement of LDL Receptor Expression Nutraceuticals



Red yeast rice (monacolin K) → inhibits HMG-CoA reductase.

Berberine → upregulates hepatic LDL receptors; reduces cholesterol synthesis.

Bergamot extract → inhibits HMG-CoA reductase and ACAT; increases LDL uptake.

Garlic extract (allicin) → mild HMG-CoA reductase inhibition.

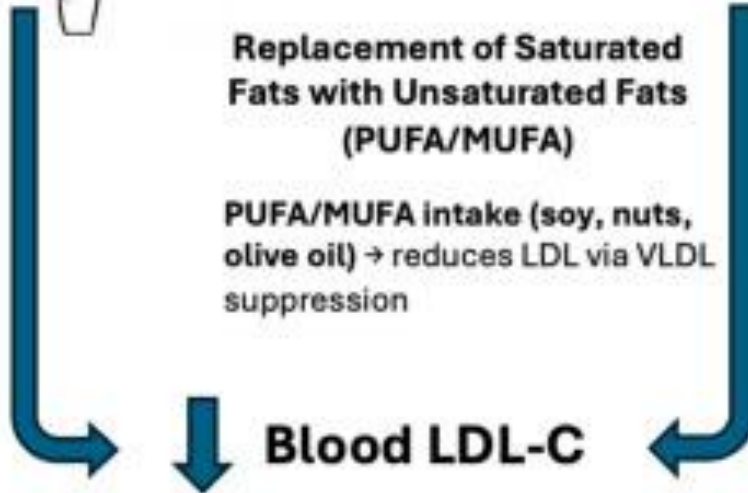
Artichoke extract → enhances bile acid excretion; mild synthesis inhibition.

Omega-3 fatty acids → reduce VLDL production.

Replacement of Saturated Fats with Unsaturated Fats (PUFA/MUFA)

PUFA/MUFA intake (soy, nuts, olive oil) → reduces LDL via VLDL suppression

Blood LDL-C

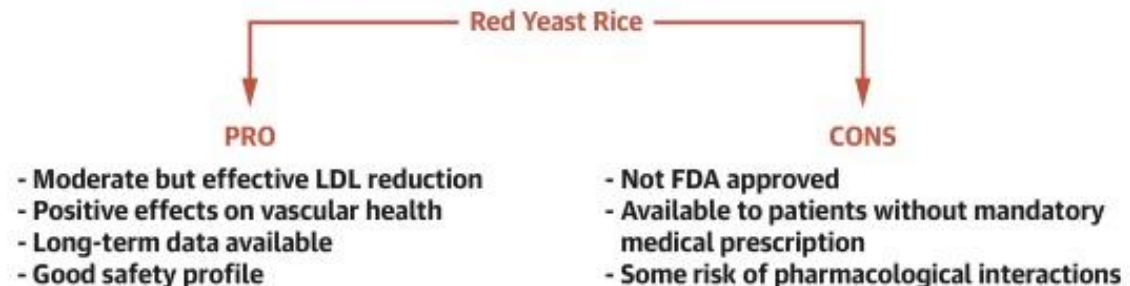


Red Rice Yeast Extract

- RYR is a nutraceutical obtained by the fermentation of rice as result of a yeast. the typical red coloration is due to the presence of pigments that are by-products of the fermentative metabolism process

CENTRAL ILLUSTRATION: Effects of Long-Term Treatment With Red Yeast Rice on Hard Outcomes and in Older Secondary Prevention Trials Carried Out With First-Generation Statins: Implication for Use in Clinical Practice

	Treatment	Patients Involved	Mean Follow-Up Duration	Endpoint	Main Effect (RRR)
Chinese Coronary Secondary Prevention Study (CCSPS)	Red Yeast Rice vs. Placebo	4,870	4.5 years	Nonfatal myocardial infarction and death from coronary heart disease (Primary)	-45%
Cholesterol and Recurrent Events trial (CARE)	Pravastatin 40 mg vs. Placebo	4,159	5 years	Nonfatal myocardial infarction and death from coronary heart disease (Primary)	-24%
Long-Term Intervention with Pravastatin in Ischaemic Disease (LIPID)	Pravastatin 40 mg vs. Placebo	9,014	6.1 years	Nonfatal myocardial infarction and death from coronary heart disease (Secondary)	-24%
Scandinavian Simvastatin Survival Study (4S)	Simvastatin 20/40 mg vs. Placebo	4,444	5.4 years	Nonfatal myocardial infarction and death from coronary heart disease (Secondary)	-42%



Cicero, A.F.G. et al. J Am Coll Cardiol. 2021;77(5):620-8.

Fish Oil

- Decrease risk for arrhythmias, which can lead to sudden cardiac death.
- Decrease risk for thrombosis, which can lead to heart attack and stroke.
- Decrease triglyceride and remnant lipoprotein levels.
- Decrease rate of growth of the atherosclerotic plaque.
- Improve endothelial function.
- (slightly) lower blood pressure.
- Reduce inflammatory responses.

Caution with Fish Oil

- Some types of fish may contain significant levels of methylmercury, polychlorinated biphenyls (PCBs), dioxins, and other environmental contaminants
- Very high (“Eskimo”) intakes could cause excessive bleeding in some people.

AHA Recommendations

- **The AHA recommends that all adults eat fish (particularly fatty fish) at least two times a week.**
- **For patients with documented CHD, the AHA recommends ≈ 1 g of EPA and DHA (combined) per day.**
- **An EPA+DHA supplement may be useful in patients with hypertriglyceridemia.** Two to four grams of EPA+DHA per day can lower triglyceride 20% to 40%.

Garlic

- Protective effect of garlic on atherosclerosis has been attributed to its capacity to reduce lipid content in arterial wall.
- Garlic depressed the hepatic activities of lipogenic and cholesterologenic enzymes such as malic enzyme
- Garlic also increased the excretion of cholesterol
- Increased consumption of garlic is associated with lower incidence of hypertension in population, due to its prostaglandin like effects, which decreases peripheral vascular resistance



Beets and Cinnamon

BETROOT



Beets are high in **betalain** and **trimethylglycine** which support **liver detoxification** and healthy **bile flow**.



High in **fiber** and **magnesium** for **healthy bowel motility**.



High in **nitrates** to provide us with **long-lasting energy**.



High in **potassium** which helps properly transmit nerve **impulses** and keeps our **memory sharp** and **thinking clearly**.



Rich in **calcium** and **magnesium** minerals necessary for **developing** and **maintaining bones** and preventing osteoporosis.



Contains an antioxidant called **betalain** which protects our cells **from damage** and prevents **cancer**.



DRJOCKERS
SUPERCHARGE YOUR HEALTH!

Health Benefits of Cinnamon

A simple spice with surprising health benefits

- Rich in Antioxidants**
Helps protect cells from oxidative stress.
- Supports Heart Health**
May support healthy cholesterol and blood pressure as part of a balanced diet.
- May Help Support Healthy Blood Sugar**
Can support normal blood sugar management when combined with healthy eating.
- Supports Digestion**
May help promote digestive comfort.
- Anti-Inflammatory Properties**
Contains natural plant compounds that may support overall wellness.

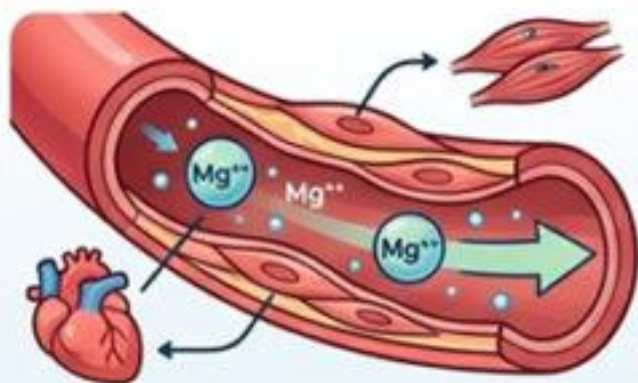
HEALTH TIP
Use cinnamon to flavor oatmeal, smoothies, yogurt, fruit, or tea instead of adding extra sugar.

SAVE THIS GUIDE
Small healthy habits can make a big difference.

FIT4HEALTH

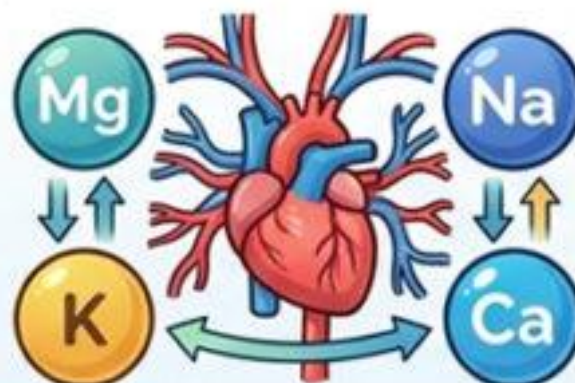


HOW MAGNESIUM AFFECTS BLOOD PRESSURE



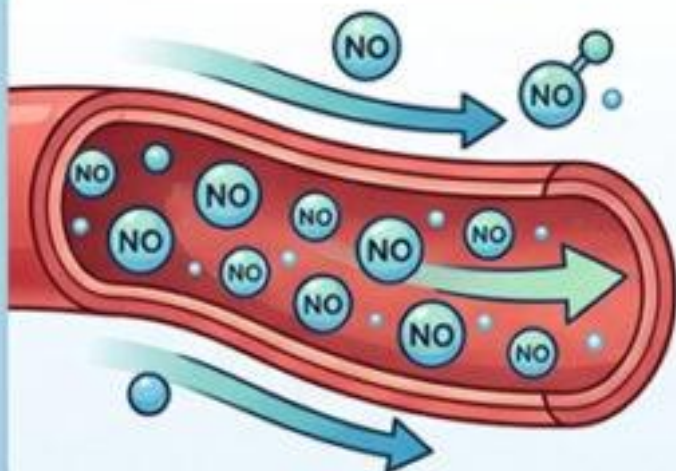
RELAXATION OF BLOOD VESSELS

Magnesium helps relax the muscles in blood vessel walls, allowing arteries to widen and improve blood flow.



ELECTROLYTE REGULATION

Magnesium works with potassium and calcium to regulate fluid balance, nerve signals, and heart function.



SUPPORT FOR NITRIC OXIDE PRODUCTION

Magnesium supports nitric oxide production, helping blood vessels expand and improve circulation.



OVERALL CARDIOVASCULAR HEALTH

Maintaining adequate magnesium levels may support healthy blood pressure and overall cardiovascular function.



MAINTAINING ADEQUATE MAGNESIUM LEVELS MAY SUPPORT HEALTHY BLOOD PRESSURE AND OVERALL CARDIOVASCULAR FUNCTION.



8 Types of MAGNESIUM and Their Uses

- Magnesium Citrate**
Helpful for constipation & detox
- Magnesium Glycinate**
Promotes relaxation & sleep
- Magnesium Malate**
Supports energy & chronic pain
- Magnesium Taurate**
Heart health & blood sugar
- Magnesium Threonate**
Memory and cognitive function
- Magnesium Chloride**
Skin health & muscle recovery
- Magnesium Sulfate**
Sore muscles & sprains
- Magnesium Oxide**
Heartburn & migraines

Vitamins and Vascular Health

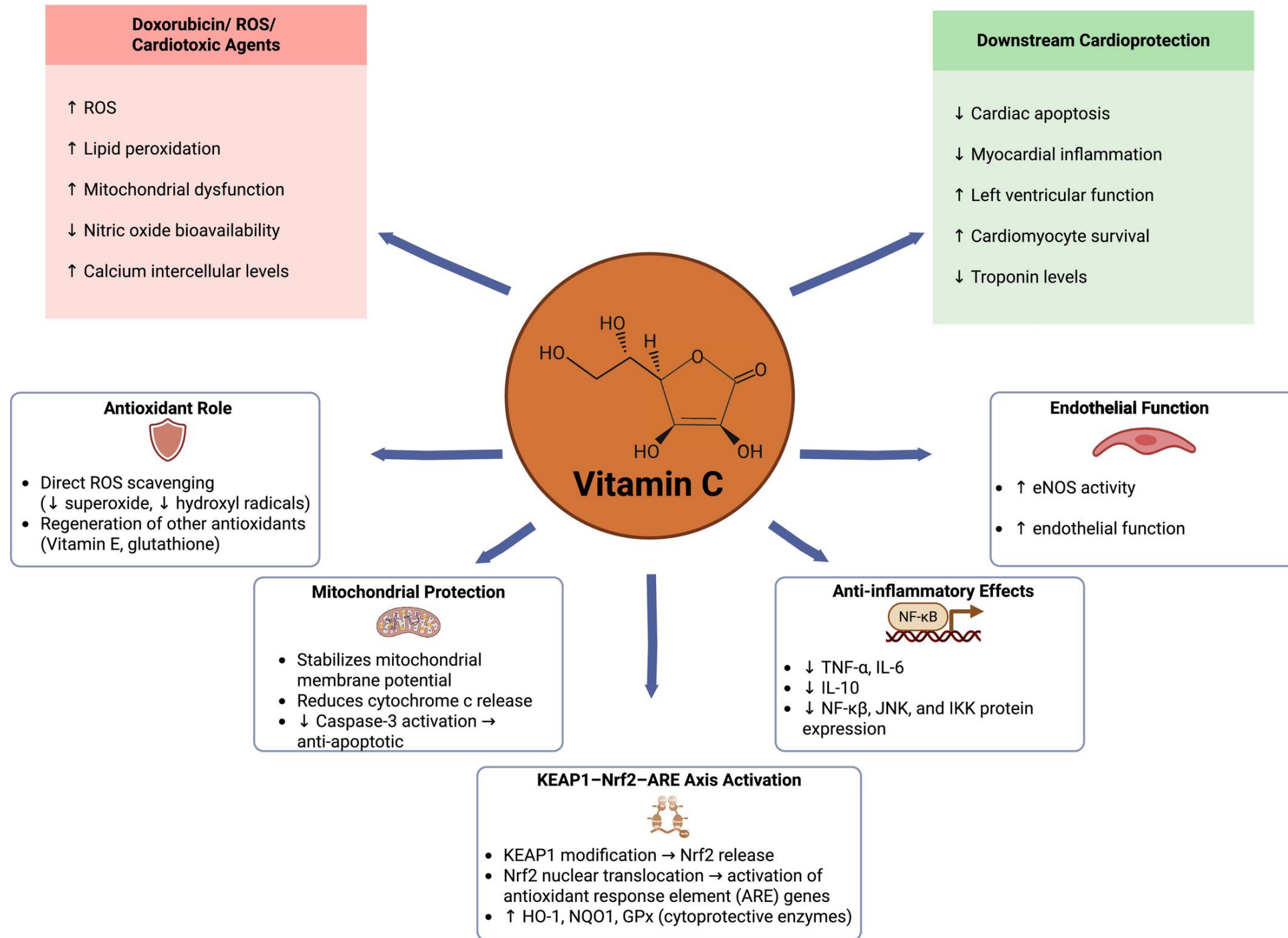
- Folate (B9)
 - Folate improves endothelial function both by lowering homocysteine levels and through homocysteine-independent mechanisms. Evidence from human clinical studies demonstrates that folate can enhance vascular reactivity and may reduce cardiovascular disease (CVD) events, particularly in at-risk populations with low baseline folate or elevated homocysteine levels. The cardiovascular benefit of folate is dose-dependent, and excessive supplementation, especially with folic acid, may pose risks.
 - Excessive folate intake risks for older adults with CVD include masking B12 deficiency, potential increases in mortality risk, and attenuation of cognitive benefits.

Vitamin D

- Its role in modulating inflammation and oxidative stress, improving endothelial function, and reducing several cardiometabolic risk factors supports its inclusion as part of a comprehensive, multi-modal approach to cardiovascular health. Therefore, vitamin D should be considered an integral component in the prevention and management of CVD.
- Preferably, it should be used in combination with other nutritional supplements, a heart-healthy diet, and prescription medications to reduce the risk of CVD incidence. People should consider vitamin D₃ supplementation with at least 2000 IU/day (50 mcg/day) (more for those who are obese) when sun exposure is insufficient to maintain serum 25(OH)D concentrations above 75 nmol/L.
- To reduce CVD mortality rates, higher doses to achieve higher 25(OH)D concentrations might be warranted.

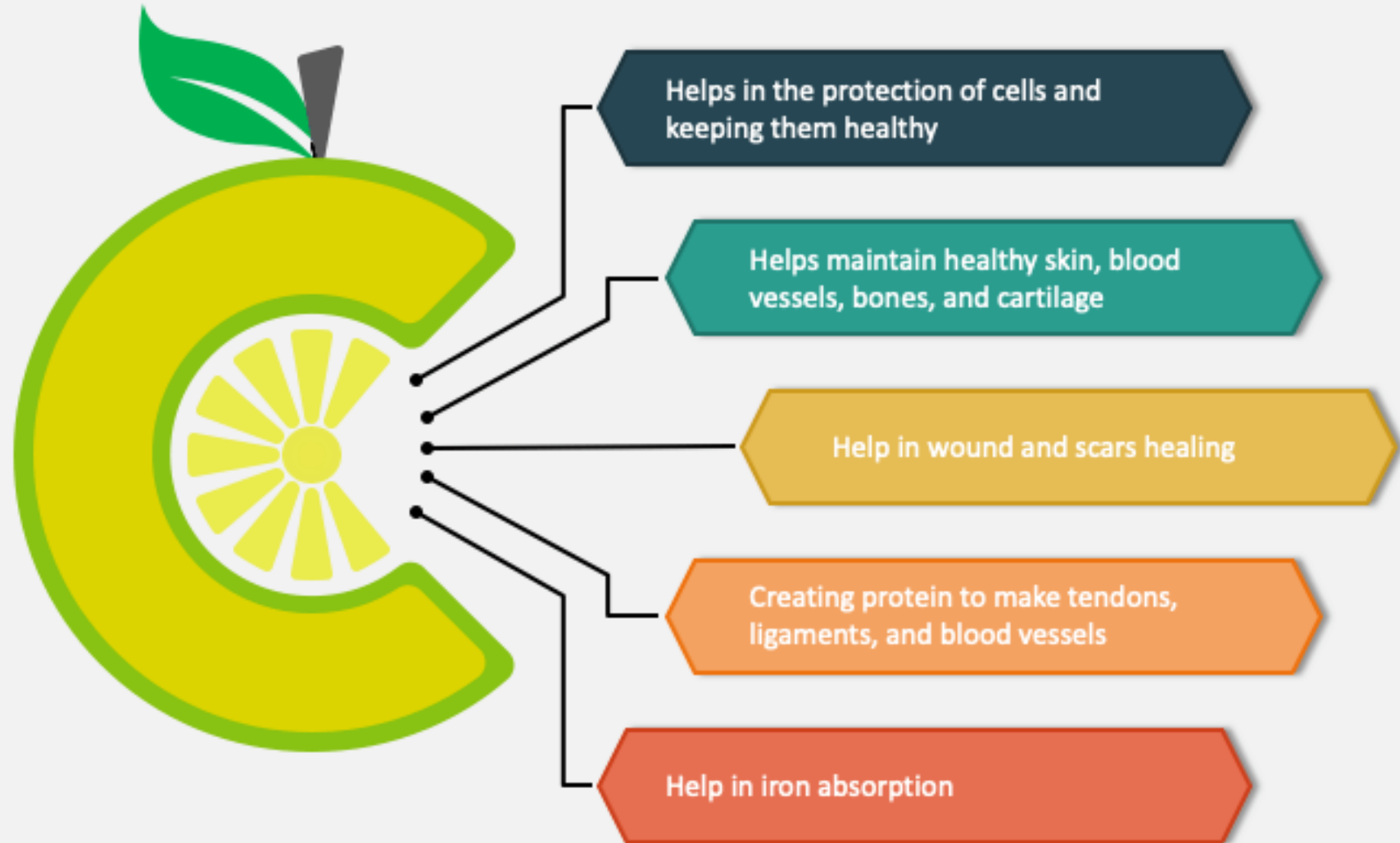
- Vitamins B9 and B12 are also involved in the conversion of homocysteine to methionine. Reducing homocysteine lowers its toxicity, which can otherwise harm blood vessels.
- There are two forms of dietary folate. The natural form is found in foods (leafy greens, legumes, and liver). It is reduced but requires conversion in the body to the active form utilized by cells [[3](#),[5](#)]. The synthetic, more stable form is oxidized and is used in supplements and food fortification.

Vitamin C



VITAMIN C

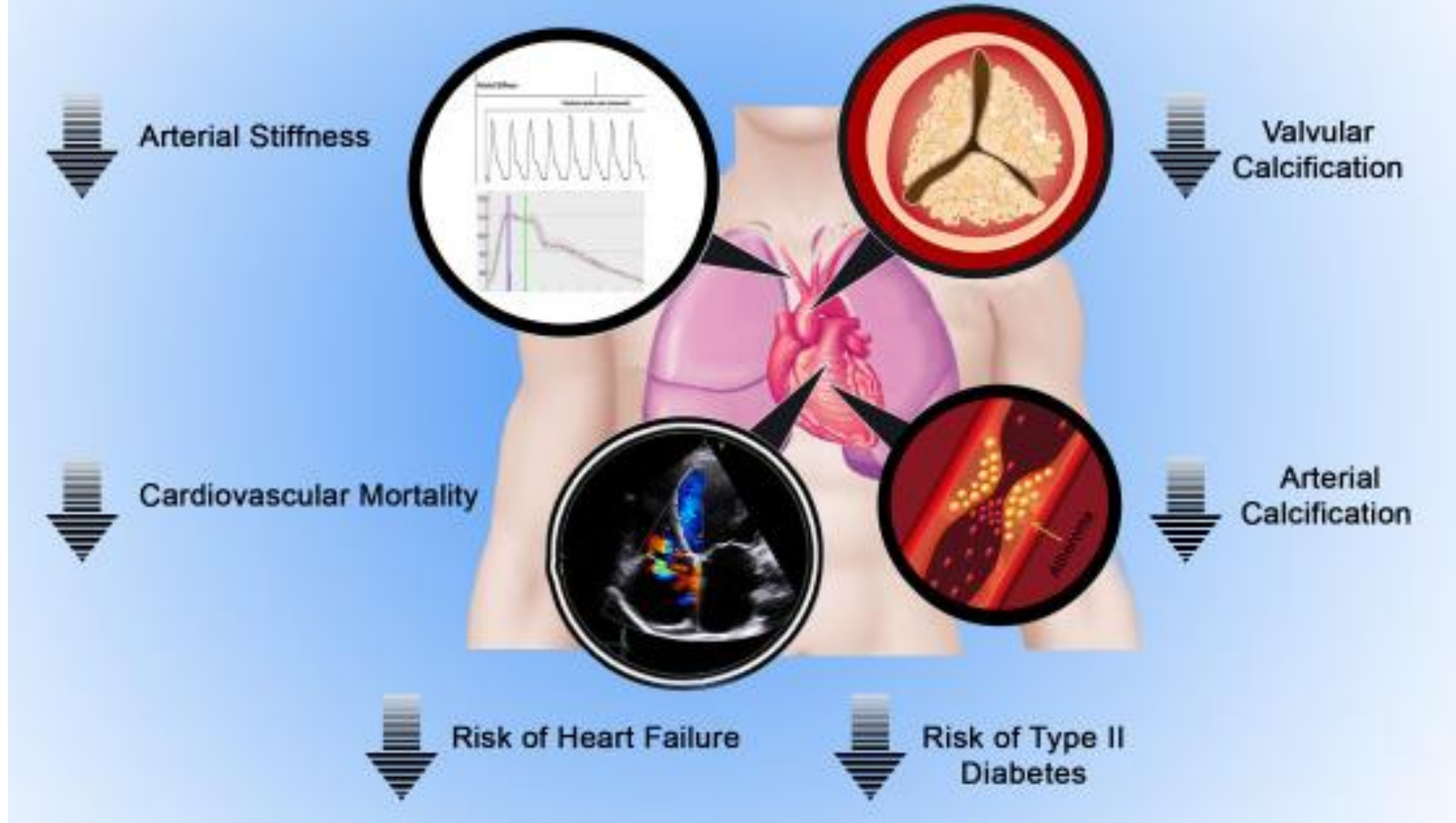
Functions of Vitamin C



Vitamin K 2

- Deficient in US population
- 1) phylloquinones (vitamin K₁), present in leafy green vegetables and responsible for mediating coagulation
- (2) MKs (vitamin K₂), present in fermented food and implicated in systemic calcification.⁷⁸ Its pattern of bodily distribution appears tissue specific.
- Vitamin K₂ helps regulate the homeostasis of soft tissue calcification through activation of an anti-calcific protein known as matrix Gla protein (MGP).
- Increased vitamin K₂ intake may reduce arterial stiffness, slow progression of vascular and valvular calcification, lower the incidence of diabetes and coronary artery disease, and decrease cardiovascular mortality.
- With evidence mounting, the definitive role of vitamin K₂ supplementation in delaying progression of vascular and valvular

Cardiovascular Effects of K2



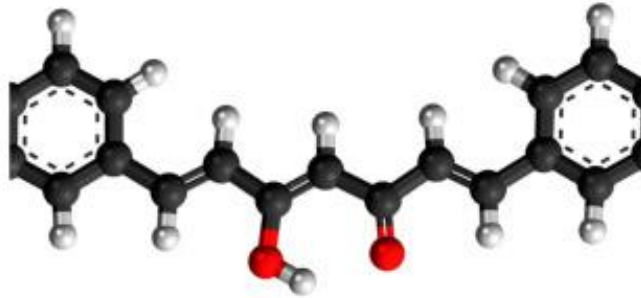
Turmeric



Polycystic ovary syndrome
regulating gene expression:
SOD, GPx, PGC-1 α , SIRT1,
modulation AMPK



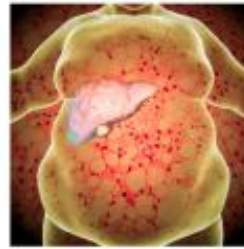
Non-alcoholic fatty disease
inhibiting lipid peroxidation,
neutralize ROS, RNS,
neutralize DNA damage



curcumin



Atherosclerosis
inhibiting TLR expression
skewing macrophage polarization M1 to M2,
regulating TLR4/AMPK/NF- κ B in macrophage



Metabolic syndrome
suppressing CCAAT/enhancer binding protein
alpha and PPAR,
upregulating of GLUT2, GLUT3, GLUT4 gene
expression

- Curcumin limits the risk of lipid peroxidation, which triggers inflammatory responses that may lead to cardiovascular disease (CVD) and atherosclerosis, due to its ability to scavenge reactive oxygen forms. Moreover, curcumin and statins influence the same mediators of plasma lipid changes

Ashwagandha

- Ashwagandha is an evergreen shrub found in parts of India, Africa, and the Middle East. It has been used for many years in Ayurvedic medicine.
- Ashwagandha belongs to a group of herbs often called adaptogens. In simple words, adaptogens may help the body respond to stress

Ashwagandha



Properties of Ashwagandha



Cardiovascular effects of Ashwagandha

- Studies have shown that Ashwagandha extracts exhibit an anti-angiogenic effect by inhibiting vascular endothelial growth factor (VEGF)-induced capillary sprouting and formation by lowering the mean density of microvessels.
- Anti-inflammatory role of Ashwagandha extract, as the action of this plant causes a decrease in the expression of pro-inflammatory cytokines.
- Research results have also proved that *W. somnifera* demonstrates cardioprotective effects due to its antioxidant properties and reduces ischemia/reperfusion-induced apoptosis. It seems that this plant can be successfully used as a potential treatment for several conditions, mainly those with increased inflammation

- Ashwagandha can cause side effects, even when it comes from a plant. Common side effects may include:
- Drowsiness
- Stomach upset
- Diarrhea
- Vomiting
- Nausea
- Headache
- Rare cases that link ashwagandha supplements with liver injury.
- It may be safe for short-term use up to 3 months
- It may interact with medicines for diabetes, high blood pressure, thyroid hormone, seizures, sedation, anxiety, and immune system suppression.

Nattokinase

- Natto, a cheese-like food made of soybeans fermented with *Bacillus subtilis*, has been consumed as a traditional food in Asian countries for more than 2000 years.
- Recent studies demonstrated that a high natto intake was associated with decreased risk of total CVD mortality and, in particular, a decreased risk of mortality from ischemic heart diseases



Nattokinase



Anti-atherosclerotic & lipid lowering effects

Reduces high blood pressure

Antithrombotic effects

Degrades fibrin directly
Converts prourokinase to urokinase
Increases t-PA formation

Fibrinolytic actions

Neuroprotective actions

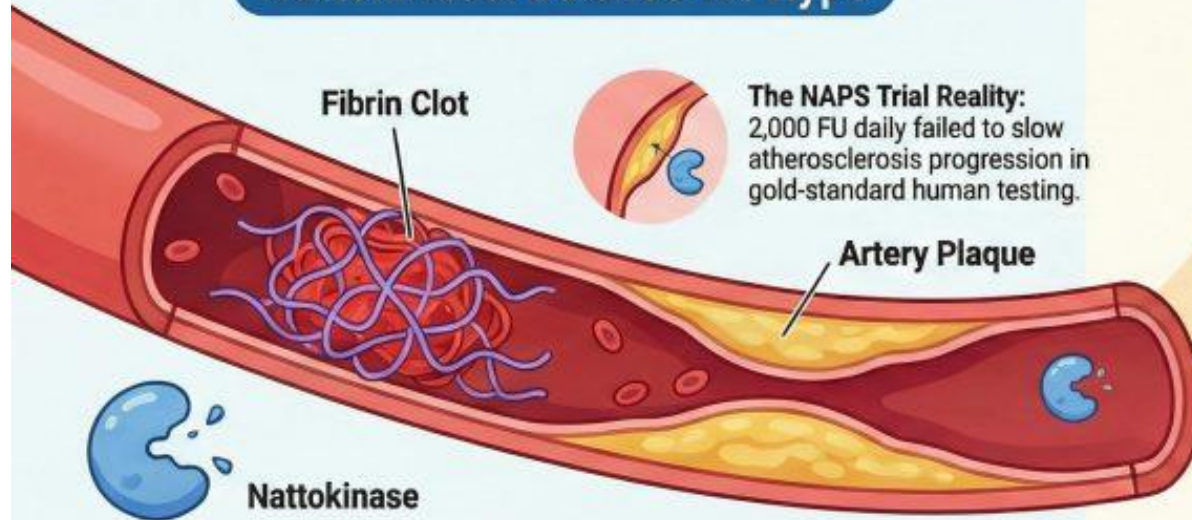
Anti-platelet & anticoagulant effects

Cardiovascular Health

Nattokinase

Nattokinase & Heart Health: Clinical Evidence vs. Marketing Claims

Nattokinase: Science vs. Hype



The NAPS Trial Reality:
2,000 FU daily failed to slow atherosclerosis progression in gold-standard human testing.

Fibrin Clots vs. Artery Plaque:
Nattokinase breaks down blood clots (fibrin), but plaque is embedded inside the artery wall.



Proven Blood Pressure Support

Trials show nattokinase effectively lowers blood pressure in stage 1 hypertension patients.

While Nattokinase is widely marketed as a "natural pipe cleaner" for arteries, clinical human research tells a more nuanced story. This infographic

This infographic contrasts popular beliefs with findings from gold-standard trials and compares Nattokinase to more effective plaque-stabilizing alternatives.

The Hierarchy of Plaque Reversal

Supplements that are more clinically proven for plaque reduction



Tier 1: Aged Garlic Extract

Strong clinical data shows it reduces soft, dangerous plaque prone to rupture.



Tier 1: High-Dose Omega-3s (EPA)

Randomized trials confirm high-dose EPA reduces coronary plaque volume and composition.



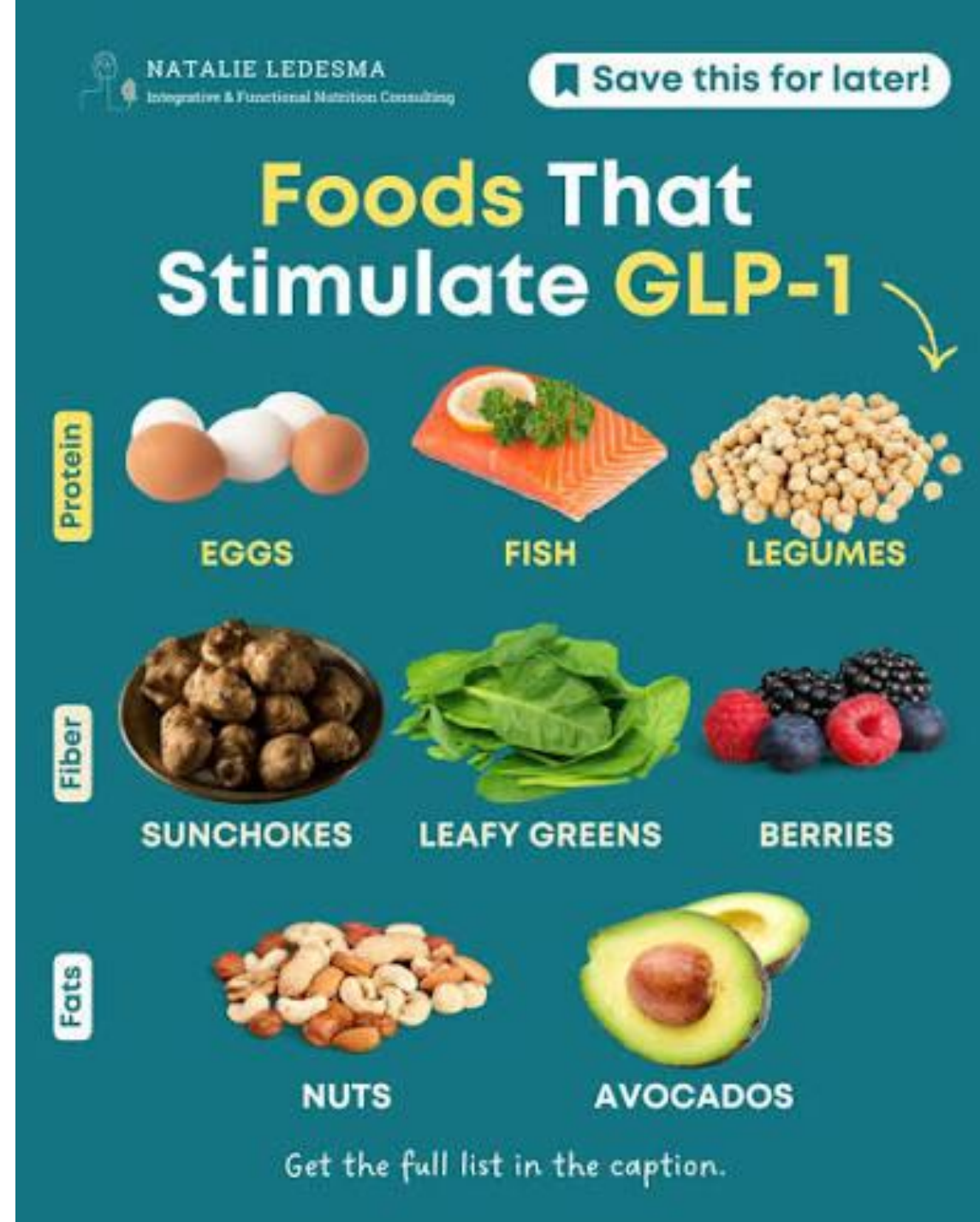
Safety & Bleeding Risk

Treat as a mild medication; avoid combining with blood thinners without clinical supervision.

Creatine, Peptides and Collagen

- There have been anecdotal reports and case studies suggesting a link between creatine monohydrate supplementation and the onset of atrial fibrillation.
- Peptides?
- Collagen?

GLPs



BMS: Vitamins and Supplements to Avoid with CVD

- Interfere with CCB, ACEI and betablockers
- St John's wort can make some blood pressure medicines, such as calcium channel blockers like amlodipine, less effective. This can make it harder to manage your blood pressure.

References

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- Jenkins DJA, Spence JD, Giovannucci EL, Kim YI, Josse R, Vieth R, Blanco Mejia S, Viguiliouk E, Nishi S, Sahye-Pudaruth S, Paquette M, Patel D, Mitchell S, Kavanagh M, Tsirakis T, Bachiri L, Maran A, Umatheva N, McKay T, Trinidad G, Bernstein D, Chowdhury A, Correa-Betanzo J, Del Principe G, Hajizadeh A, Jayaraman R, Jenkins A, Jenkins W, Kalaichandran R, Kirupaharan G, Manisekaran P, Qutta T, Shahid R, Silver A, Villegas C, White J, Kendall CWC, Pichika SC, Sievenpiper JL. Supplemental Vitamins and Minerals for CVD Prevention and Treatment. *J Am Coll Cardiol*. 2018 Jun 5;71(22):2570-2584. doi: 10.1016/j.jacc.2018.04.020. PMID: 29852980.

Thank You