FRUIT ANTHOCYANINS & FLAVONOIDS

What are anthocyanins? Anthocyanins are the deep red, purple, and blue pigments that give berries, dark cherries, elderberries, black currants, red grapes, and purple cabbage their rich color. They are a subclass of flavonoids — plant compounds that serve as some of the most potent antioxidants, anti-inflammatories, and vascular protectors found in nature.

Why does color matter? The deeper and darker the color of a berry or fruit, the higher its anthocyanin content. Wild blueberries have far more anthocyanins than cultivated ones. Black elderberries are among the richest sources on earth. The pigment IS the medicine — and eating a wide variety of deeply colored fruits and berries gives your body a broad spectrum of these protective compounds.

THE SCIENCE — WHY ANTHOCYANINS ARE SO POWERFUL

Capillary Health & Tissue Integrity

One of the most important — and underappreciated — actions of anthocyanins is their profound effect on the capillary system. Capillaries are the smallest blood vessels in the body, and they are responsible for delivering nutrients to every single cell and removing waste from every tissue.

- Strengthen capillary walls — reduce fragility and permeability
- Improve nutrient delivery to tissues through capillary exchange
- Enhance drainage of toxins and metabolic waste from peripheral tissues
- Support healthy osmolality (fluid balance) in tissue spaces
- Reduce capillary fragility that leads to easy bruising, spider veins, and hemangiomas
- Maintain structural integrity of vascular connective tissue

Because capillaries supply every organ, tissue, and system in the body, improving capillary health has cascading benefits throughout the entire body — which is why anthocyanins show up in clinical research for such a wide range of conditions.

Antioxidant Power

Anthocyanins are among the most potent free radical scavengers identified in plant medicine. Free radicals are unstable molecules that damage cells, accelerate aging, promote inflammation, and drive chronic disease.

- Neutralize free radicals directly — including superoxide, hydrogen peroxide, and hydroxyl radicals
- Regenerate other antioxidants — including Vitamin C and Vitamin E
- Protect cell membranes from oxidative damage
- Reduce oxidative damage to DNA — anti-mutagenic
- Protect mitochondria — the energy-producing organelles inside each cell
- Reduce lipid peroxidation — protection of fats from oxidation (including cholesterol)

Ellagic acid — found particularly in raspberries and blackberries — is an organic acid within the anthocyanin pigment family with documented anti-carcinogenic properties, studied for its ability to block carcinogens and support normal cell death (apoptosis).

Anti-Inflammatory & Neuroprotective

Chronic inflammation is the root driver of nearly every degenerative disease. Anthocyanins work through multiple pathways to reduce inflammatory signaling throughout the body.

Anti-inflammatory mechanisms:

- Inhibit COX-1 and COX-2 enzymes — similar action to NSAIDs, without side effects
- Reduce NF-kB activation — a master switch for inflammatory gene expression
- Lower C-reactive protein (CRP) and other inflammatory markers
- Reduce TNF-alpha, IL-6, and other pro-inflammatory cytokines

Neuroprotective actions:

- Cross the blood-brain barrier — direct neuroprotection
- Reduce neuroinflammation — protective in brain and peripheral nerves
- Elderberry flavonoids particularly effective for neuralgia and neuritis
- Support myelin integrity around nerve fibers
- Protect dopaminergic neurons — relevance to Parkinson's research
- Improve cognitive function, memory, and processing speed

CLINICAL BENEFITS — CONDITIONS SUPPORTED BY ANTHOCYANINS & FLAVONOIDS

Cardiovascular & Arterial Health

- Protect the heart and blood vessel walls from oxidative damage
- Reduce arterial inflammation and plaque formation
- Improve lipid profiles — raise HDL, reduce oxidized LDL
- Arteritis, phlebitis, and vascular disease with compromised peripheral circulation show significant improvement
- Reduce risk of repeat cardiac events in those with heart disease history
- Maintain arterial elasticity and vasodilation
- Reduce clotting tendency — lower fibrinogen levels
- Prevent diabetic amputations by preserving peripheral circulation

Particularly valuable for heart attack recovery and family history of heart disease

Diabetes & Blood Sugar

- Lower fasting blood glucose levels
- Improve insulin sensitivity and cellular glucose uptake
- Reduce HbA1c over time with consistent use
- Diabetic retinopathy — particularly responsive to anthocyanins
- Protect small blood vessels damaged by high blood sugar (capillary protection)
- Reduce risk of diabetic neuropathy through nerve protection
- Prevent peripheral vascular complications — including limb loss
- Reduce inflammation driven by blood sugar dysregulation

1 tablespoon in a large glass of water twice daily with meals — consistent clinical results

Eye Health & Neurological

- Macular degeneration — clinical improvements documented in multiple cases
- Protect photoreceptors in the retina from oxidative damage
- Improve night vision and visual acuity
- Reduce retinal capillary fragility — key in diabetic retinopathy
- Trigeminal neuralgia and other neuralgias — elderberry particularly effective
- Neuritis and nerve inflammation — reduce pain and improve function
- Peripheral neuropathy — protect nerve tissue through capillary support
- Brain health and cognitive protection

For neuralgia and neuritis: 2 tablespoons twice daily

Respiratory, Cancer & Other

- Pulmonary fibrosis — progression slowed or stopped; patients regain energy and walking capacity
- Emphysema — improved survival and quality of life
- Asbestosis — cases show stopped progression
- Cancer — ellagic acid and organic pigments used as protective nutrients in all cancer patients
- Capillary fragility diseases — bruising, spider hemangiomas, Henoch-Schönlein purpura
- Peripheral edema — edema caused by polyols and organic waste cleared by flavonoids
- Immune support — elderberry reduces viral replication and shortens illness duration
- General tissue protection — because flavonoids protect capillary integrity, most pathology is affected positively

Because capillaries supply all tissues, most conditions benefit

HIGHEST FOOD SOURCES OF ANTHOCYANINS

FOOD SOURCE	ANTHOCYANIN LEVEL	KEY COMPOUNDS	PARTICULARLY GOOD FOR
Black elderberry	★★★★★ Highest	*Cyanidin-3-glucoside, cyanidin-3-sambubioside*	Immune support, neuralgia, respiratory, viral illness
Wild blueberries	★★★★★ Highest	*Delphinidin, cyanidin, petunidin, malvidin*	Brain health, vision, cardiovascular, diabetes
Blackberries	★★★★★ Highest	*Cyanidin-3-glucoside, ellagic acid*	Cancer protection, arterial health, capillary integrity
Black currants	★★★★★ Highest	*Delphinidin, cyanidin (very concentrated)*	Eye health, peripheral circulation, inflammation
Red raspberries	★★★★ Very High	*Ellagic acid, cyanidin, quercetin*	Cancer protection, macular health, anti-inflammatory
Cherries (dark)	★★★★ Very High	*Cyanidin, peonidin*	Joint pain, uric acid, sleep, cardiovascular
Strawberries	★★★ High	*Pelargonidin, ellagic acid, quercetin*	Capillary health, cardiovascular, skin
Red grapes	★★★ High	*Malvidin, peonidin, resveratrol*	Heart disease, arterial health, longevity
Purple cabbage	★★★ High	*Cyanidin (very stable), glucosinolates*	Gut health, estrogen metabolism, anti-cancer
Acai berry	★★★★★ Highest	*Cyanidin-3-glucoside, delphinidin*	Antioxidant capacity, brain health, mitochondria
Pomegranate	★★★★ Very High	*Punicalagin, anthocyanins, ellagic acid*	Cardiovascular, prostate health, inflammation
Beets	★★ Moderate	*Betacyanin (betalains — different class)*	Liver detox, blood pressure, endurance

HOW TO USE — DOSING & SUPPLEMENTATION

Whole Food Sources — Best Approach

The most bioavailable and synergistic way to get anthocyanins is through whole food sources — eaten fresh, frozen, or as high-quality concentrates. Different berries contain different anthocyanin profiles, so eating a variety provides the broadest protective spectrum.

Daily food targets:

- ½–1 cup of dark berries daily: blueberries, blackberries, raspberries, cherries
- Wild blueberries contain 2–3x more anthocyanins than cultivated — choose wild when possible
- Frozen berries retain virtually all anthocyanin content — an excellent and affordable option
- Purple cabbage, red onions, and dark grapes contribute meaningful dietary anthocyanins
- Anti-estrogen smoothie (see our smoothie handout) is an ideal daily vehicle for dark berries

Supplemental Fruit Anthocyanin Concentrates

When therapeutic dosing is needed — for active conditions, cardiovascular disease, diabetes, or neurological issues — a high-quality fruit anthocyanin concentrate provides consistent, measurable amounts beyond what diet alone can deliver.

General dosing guidelines:

- General health and prevention: 1 tablespoon once daily in a large glass of water
- Active condition support (diabetes, cardiovascular, vision): 1 tablespoon twice daily with meals
- Neuralgia and neuritis: 2 tablespoons twice daily
- Serious illness support: as directed by your provider — higher doses have been used safely

Consistency is essential — anthocyanins build up in tissues over time. Daily use for weeks to months produces the most significant clinical results.

Forms Available

Liquid concentrate (preferred for therapeutic use):

- Most bioavailable form — easily absorbed and rapidly distributed
- Mix into water, juice, or smoothies
- Look for products that are: whole berry, no added sugar, no artificial ingredients, cold-processed to preserve fragile pigments
- Fruit A (Fruit Anthocyanins) is the concentrate used clinically by integrative practitioners

Capsules and powder:

- Convenient for travel or those who dislike the taste
- Standardized extracts: look for standardized to cyanidin or total anthocyanin content
- Elderberry capsules: widely available, excellent for immune and neurological support
- Freeze-dried berry powders: whole-food option, good potency

Elderberry specifically:

- Most commonly studied anthocyanin for immune, respiratory, and neurological benefit
- Reduces viral replication by inhibiting virus attachment to cells
- Syrup: 1 tablespoon daily for prevention; 1 tablespoon 4x daily during active illness
- Gummies and commercial syrups: check for sugar content — choose low-sugar versions

Quality tips when choosing a supplement:

- Choose whole berry or whole fruit — not isolated pigments
- Cold-processed or freeze-dried preserves fragile anthocyanins
- No added sugar, artificial colors, or fillers
- Organic preferred — berries are in the Dirty Dozen for pesticide residues
- Store in a cool, dark place — light and heat degrade anthocyanins

Eat the rainbow — especially the dark end. The deep purples, reds, and blues in berries and dark fruits are among the most therapeutic compounds in the plant kingdom. Daily anthocyanins are an investment in your capillaries, your cells, and your long-term vitality.