

2024

MAX 5 Super Mix

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MAX 5 SUPER MIX

Spermidine 98% - 25.0 mg

Ergothioneine 99% - 30.0 mg

Urolithin A 97% - 1000.0 mg

Ca-AKG 100% - 800.0 mg

NMN 99.5% - 600.0 mg

Quick context by ingredient

- **Spermidine 25 mg (98%)** – Commercial “high strength” products now use 10–25 mg/day and market this as a maximal dose, 25 mg is aggressive but in line with newer formulations^{[7][8]} Human PK (pharmacokinetic) work shows 25 mg is within the high end of tested intakes.^[22]
- **Ergothioneine 30 mg (99%)** – Reviews consider up to 30 mg/day safe; human studies have typically used 5–25 mg/day, so 30 mg sits at the top of the studied range but still in the accepted safety window.^{[4][1]} ET has an unusually long whole-body half-life on the order of weeks, with tissue and erythrocyte accumulation and very slow clearance, so once-daily (or even less frequent) dosing is fully adequate for steady-state.^{[23][24][21]}
- **Urolithin A 1000 mg (97%)** – RCTs in humans show mitochondrial and performance benefits at both 500 mg and 1000 mg/day, with 500 mg sometimes giving equal or even slightly better mitophagy biomarker responses; 1000 mg is therefore a “high but studied” dose.^{[2][5]}
- **Ca-AKG 800 mg (100%)** – Human longevity-oriented protocols and commercial products generally cluster around 300–1000 mg/day of Ca-AKG, so 800 mg is well within typical practice and below multi-gram doses used clinically for other indications.^{[9][10]} Longevity-oriented protocols and commercial guidance typically use 300–1000 mg taken once in the morning (often fasted).
- **NMN 600 mg (99.5%)** – In the RCT that compared 300, 600, and 900 mg/day, 600 mg/day produced the best NAD⁺ increase and functional outcomes, with no added benefit at 900 mg; Human RCTs suggest a plateau of benefit around 600 mg/day vs 900 mg/day, and pharmacokinetic work indicates a relatively rapid rise then decline in plasma NMN with downstream NAD⁺ effects unfolding over hours, which is consistent with single daily dosing.^{[20][29][30]}

MAX 5 Super Mix hits multiple hallmarks of aging.

The MAX 5 Super Mix mostly targets **8–9 of the 12 hallmarks of aging**, with strongest effects on mitochondrial dysfunction, disabled macroautophagy, altered nutrient sensing, and chronic inflammation. [\[191\]\[192\]\[193\]\[194\]\[195\]\[196\]\[197\]\[198\]\[199\]](#)

The 12 hallmarks (2023 update)

Commonly listed 12 hallmarks are: [\[192\]\[197\]\[191\]](#)

1. Genomic instability
2. Telomere attrition
3. Epigenetic alterations
4. Loss of proteostasis
5. Disabled macroautophagy
6. Deregulated nutrient sensing
7. Mitochondrial dysfunction
8. Cellular senescence
9. Stem-cell exhaustion
10. Altered intercellular communication
11. Chronic inflammation (“inflammaging”)
12. Dysbiosis of the gut microbiome

Where this stack has the strongest mechanistic coverage

Hallmark of aging	How your combo interacts
Mitochondrial dysfunction	Urolithin A induces mitophagy and improves mitochondrial respiration and muscle function; NMN restores NAD ⁺ , supporting mitochondrial biogenesis and DNA repair; ergothioneine concentrates in mitochondria and reduces mitochondrial ROS; Ca-AKG supports TCA cycle flux and mitochondrial metabolism. ^{[194][198][196][199]}
Disabled macro autophagy	Spermidine is a classic autophagy inducer (EP300 inhibition, AMPK activation, mTOR modulation), restoring macro autophagy and lysosomal function; Ca-AKG and Urolithin A also interact with autophagic/mitophagic pathways. ^{[192][193][195][198]}
Deregulated nutrient sensing	Spermidine and Ca-AKG converge on AMPK/mTOR signaling; NMN raises NAD ⁺ and activates sirtuins, another nutrient-sensing axis; together they act on several key metabolic sensors (AMPK, mTOR, sirtuins). ^{[192][193][195][196]}
Chronic inflammation / altered intercellular communication	Urolithin A reduces pro-inflammatory cytokines and improves immune cell mitochondrial fitness; Ca-AKG and spermidine reduce inflammaging via improved proteostasis/mitophagy; ergothioneine dampens chronic oxidative and inflammatory signaling. ^{[193][198][194]}
Loss of proteostasis	Spermidine-driven autophagy enhances clearance of misfolded proteins and damaged organelles; improved mitophagy from Urolithin A and better redox control from ergothioneine indirectly stabilize proteostasis. ^{[193][195][198]}
Cellular senescence	Urolithin A improves mitophagy and reduces senescence markers (p53, p21, SASP genes) in preclinical models; Ca-AKG and spermidine reduce senescence-associated inflammatory and metabolic signals. ^{[193][194][198][195]}
Epigenetic alterations	Ca-AKG and spermidine influence histone and DNA-modifying enzymes (α -KG-dependent dioxygenases, acetylation state via EP300), and NMN-driven NAD ⁺ supports sirtuin-mediated deacetylation and epigenetic maintenance. ^{[193][195][196][199]}
Stem-cell exhaustion	Better mitochondrial quality (UroA, NMN), reduced inflammation (UA, Ca-AKG, spermidine, ergothioneine), and improved proteostasis create a more supportive niche for tissue stem cells, even though direct stem-cell data are still early. ^{[193][194][198][196]}

Hallmarks touched more indirectly or weakly

- **Genomic instability:** NMN-mediated NAD⁺ supports PARP-dependent DNA repair, and improved mitochondrial function reduces ROS-driven DNA damage, but none of these are direct DNA-repair drugs.^{[196][199]}
- **Telomere attrition:** There are only indirect links (less oxidative/inflammatory stress may slow telomere loss); MAX 5 Super Mix is not a telomerase-targeted protocol.^{[197][191]}
- **Gut dysbiosis:** Urolithin A is itself a gut-microbial metabolite, and Ca-AKG/spermidine can influence gut environment, MAX 5 Super Mix is not directly using pre/probiotics or FMT-type interventions aimed at microbiome remodeling.^{[198][191][192]}

MAX 5 Super Mix is particularly strong for **mitochondrial dysfunction, macro autophagy, nutrient sensing, inflammaging, proteostasis, and senescence**, with secondary coverage of epigenetic stability, stem-cell environment, and genomic stability.

MAX 5 Super Mix targets chronic inflammation and proteostasis

This combo clearly targets **both** chronic inflammation and proteostasis (mainly via autophagy), through different components working together.^{[206][207][208]}

Chronic inflammation

- **Urolithin A** lowers pro-inflammatory cytokines and modulates innate immune pathways (NF-κB, cGAS–STING) in preclinical and human data, improving “inflammaging-linked” markers.^{[209][210][208]}
- **NMN** raises NAD⁺ and directly suppresses inflammatory signaling in immune and endothelial cells, reducing IL-6, IL-1β, TNF-α, and COX-2/PGE₂ in models of chronic activation.^{[211][212]}
- **Ca-AKG** is proposed to reduce chronic inflammation by shifting cytokine balance (e.g., increasing IL-10 and lowering pro-inflammatory mediators) in aging models.^{[213][214]}
- **Ergothioneine** acts as a targeted antioxidant and anti-inflammatory, reducing oxidative stress and inhibiting inflammatory factor production in tissues.^{[215][216]}
- **Spermidine** indirectly reduces inflammation by restoring autophagy and mitophagy, which alleviates cellular stress and dampens pro-inflammatory signaling.^{[217][206][209]}

Proteostasis (via autophagy/mitophagy)

- **Spermidine** is a well-characterized autophagy inducer, enhancing macroautophagy and lysosomal degradation of damaged proteins and organelles; this directly addresses loss of proteostasis.^{[218][219][217]}
- **Urolithin A** induces mitophagy, selectively clearing damaged mitochondria; mitophagy is part of the wider proteostasis network and reduces proteotoxic/oxidative burden.^{[220][221][209]}
- **Ca-AKG** and **NMN** improve cellular energy and NAD⁺/AMPK–sirtuin signaling, which support proper protein quality control and autophagic flux, indirectly supporting proteostasis.^{[222][223][206][213]}
- **Ergothioneine** protects proteins from oxidative modification (carbonylation, cross-linking), helping maintain correctly folded and functional proteins.^{[216][215]}

MAX 5 Super Mix is strongly aimed at **chronic inflammation** and **proteostasis** simultaneously, primarily via autophagy/mitophagy, NAD⁺/AMPK–sirtuin signaling, and targeted antioxidant/anti-inflammatory effects.^{[207][208][214][206][217][211][218][220]}

The synergies within this combination

This combo hits multiple of the 12 Hallmarks of Aging at once, with mechanistic complementarity rather than redundancy.^{[34][35][36][37][38][39][40][41]}

Pathway coverage and complementarity

- **Mitophagy + general autophagy:** Urolithin A is a targeted mitophagy inducer via PINK1/Parkin and related pathways, improving mitochondrial turnover and function in muscle, joints, and immune cells. Spermidine drives broader autophagy through AMPK, SIRT1, and related nutrient-sensing pathways, giving global cleanup (proteostasis, organelles, membrane components). Together you get focused mitochondrial recycling layered on top of whole-cell autophagy, which reviews explicitly highlight as overlapping but **distinct** actions with potential to be used in combination.^{[35][36][42][43][44][39][41][34]}
- **NAD⁺ axis + autophagy axis:** NMN raises NAD⁺ and supports sirtuin activity, DNA repair, and mitochondrial biogenesis, while spermidine provides autophagy that NAD⁺ boosters do not directly engage. Longevity-stack articles point out that NMN-type NAD⁺ restoration plus spermidine-induced autophagy hits two separable aging drivers (NAD decline vs defective cellular recycling) in a way that is more comprehensive than either alone.^{[38][45]}

Mitochondrial function, redox, and inflammation

- **Urolithin A + ergothioneine + NMN:** Urolithin A improves mitochondrial respiration and reduces mitochondrial ROS by removing damaged mitochondria, with human and preclinical data in muscle, cartilage, and immune cells. Ergothioneine accumulates in mitochondria via OCTN1, strongly buffers mitochondrial oxidative stress, preserves mitochondrial DNA, and supports ATP production efficiency. NMN restores NAD⁺, feeding oxidative phosphorylation and sirtuin-mediated mitochondrial maintenance. Mechanistically that gives a three-layer synergy: better quality mitochondria (UroA), better protection of those mitochondria (ET), and better fuel/cofactor availability (NAD⁺ via NMN).^{[46][37][39][40][45][41][47][48][38]}
- **Ca-AKG + Urolithin A + spermidine:** Ca-AKG influences mitochondrial metabolism, AMPK signaling, and systemic inflammatory tone, with human and animal work showing reduced pro-inflammatory cytokines and improved metabolic flexibility. Mitophagy induction by UroA and broad autophagy by spermidine further relieve mitochondrial and proteotoxic stress; mitophagy reviews explicitly discuss using UroA alongside other agents that modulate autophagy/mitochondria to promote healthy ageing. That stack converges on mitochondrial quality, energy metabolism, and inflammaging from partially independent angles.^{[43][49][50][51][34][35]}

System-level effects (muscle, brain, immune)

- **Muscle and physical function:** Urolithin A trials show improved muscle endurance and mitochondrial fitness; NMN trials suggest better aerobic capacity and muscle energy metabolism. Ca-AKG and spermidine each have preclinical data for improving physical performance and reducing frailty markers via reduced inflammation and enhanced autophagy, suggesting additive or synergistic effects on muscle quality and recovery when combined with UroA and NMN.^{[39][41][52][53][34][35][43]}
- **Brain and cognitive ageing:** Ergothioneine is emerging as a “longevity vitamin” for the brain, mitigating neuroinflammation, oxidative damage, and preserving mitochondrial dynamics; reviews now cover its potential for cognitive resilience. Spermidine has observational and early interventional data for cognitive and cardiovascular benefits via autophagy and metabolic regulation, and NAD⁺ restoration via NMN complements this by supporting neuronal energy metabolism and sirtuin-mediated neuroprotection. That yields a fairly coherent neuro-mitochondrial protection motif (ET + NMN + spermidine) superimposed on systemic mitochondrial renewal (UroA + Ca-AKG).^{[37][40][34][46][38]}

Example: how the stack might play out in a cell

In a metabolically stressed myocyte or neuron, NMN raises NAD⁺ and activates sirtuins for DNA repair and mitochondrial biogenesis; urolithin A selectively tags and removes damaged mitochondria; spermidine ramps up autophagy to clear protein aggregates and damaged organelles; Ca-AKG biases metabolism and signaling away from pro-inflammatory, pro-senescent states; ergothioneine limits ROS damage to the remaining and newly formed mitochondria.^{[40][41][34][35][43][37][39]}

For mitochondrial performance (muscle/brain)

- Anchor on **urolithin A + NMN** as the main levers for mitochondrial function: RCTs with UA show improved muscle strength, endurance, and mitochondrial gene signatures; NMN (and related NAD⁺ boosters) improve aerobic capacity and muscle energetics in human studies.^{[57][64][62][56]}
- **Spermidine, Ca-AKG, and ergothioneine** support this by enhancing mitophagy/autophagy, metabolic flexibility, and ROS control, which together preserve or restore mitochondrial quality especially in endothelial, muscle, and neural tissues.^{[58][59][61][63]}

For systemic inflammaging / biological age

- **Ca-AKG and spermidine** are your principal anti-inflammaging tools: both have animal and early human data linking them to lower pro-inflammatory cytokines and improved healthspan, and AKG-based products have reported reductions in epigenetic age in small human cohorts.^{[59][61][65][66][67][58]}
- **Urolithin A and ergothioneine** add systemic anti-inflammatory and redox effects; UA trials show modest CRP and cytokine reductions alongside mitochondrial improvements, while ET blunts chronic oxidative and inflammatory stress in vascular and neural tissues.^{[68][60][69][56]}

How to operationalize “both” in practice

- For **performance**, track subjective and objective endpoints: perceived stamina, VO₂-type proxies (time to fatigue at a fixed workload), HRV, and cognitive endurance (sustained attention, working memory) over 8–12 weeks after starting the stack.^{[62][56][57]}
- For **inflammaging/biological age**, pair this with periodic labs and clocks where possible: hs-CRP and IL-6 as cheap inflammaging proxies, plus at least one DNA-methylation or proteomic age test before and 6–12 months into the protocol to see whether Ca-AKG/spermidine/UA are moving the needle.^{[70][71][63][56][58]}

The following is an analysis of price to dose value presented in the MAX 5 Super Mix.

Consumers buy into the hype of studies and often understand the importance of dose. Marketing takes advantage of this fact. Internet influencers often take advantage of this fact as well.

Quite often dietary supplements are sold at doses that do not meet what was proven to work in studies. This is a marketing and consumer pricing issue. Marketing knows the consumer will only pay a certain amount for a bottle of supplements monthly. This determines the retail price per bottle. The dose is adjusted to meet that pricing. Typically, the dose goes down, never up.

Quality retail brands for consumer-ready capsules of compounds included in the Max 5 Super Mix. ^{[152][153][154][155][156][157][158][159][160][161][162][163][164]}

Urolithin A (target 1000 mg/day)

- **Mitopure (Timeline / [Mitopure.com](https://mitopure.com))** – Flagship UA brand, high purity, strong clinical backing; softgels and powders around 500 mg/day, usually taken once daily.^{[155][164]}
- **Augment Life Urolithin A 500 mg** – 60 capsules at 500 mg each; 2 caps/day gives your 1000 mg target.^[156]
- **SuperSmart Urolithin A** – 250 mg caps; 4 caps/day to reach 1000 mg, but good reputational quality.^[154]

Spermidine (target 25 mg/day)

- **Double Wood / CanadianVit 10 mg 99% Spermidine HCl (120 caps)** – 10 mg per capsule; 2–3 caps/day to reach 20–30 mg.^[157]
- **Neurogan Health Spermidine 10 mg (120 tablets)** – 10 mg/tablet, purified spermidine, 3rd-party tested; again 2–3/day hits your range.^[160]

Ergothioneine (target 30 mg/day)

- **MitoPrime-based products (NNB Nutrition)** – Several brands use **MitoPrime L-ergothioneine**, a nearly 100% L-isomer, 5–10 mg per capsule; you'd take 3×10 mg or similar to hit 30 mg.^{[165][161][166]}
- **California Gold Nutrition L-Ergothioneine (iHerb)** – Uses branded ET (often MitoPrime) in 5–10 mg doses; scale capsules to reach 30 mg/day.^{[161][167]}

Ca-AKG (target 800 mg/day)

- **Decode Age Ca-AKG** – 1 capsule daily (dose around 1000 mg) after breakfast or lunch; 1 cap/day approximates your desired 800–1000 mg.^[162]
- **Codeage Liposomal Ca-AKG** – Liposomal Ca-AKG in capsule form, once-daily dosing; dose per cap typically near your range.^[158]

NMN (target 600 mg/day)

- **Doctor's Best NMN 400 mg (60 caps)** – 400 mg per serving (usually 2×200 mg capsules); 2 caps/day delivers 400–500 mg, 4 caps/day approaches 800 mg.^{[168][169][170]}
- **PartiQlar, Omre, GenuinePurity, etc.** – High-purity (≥98–99%) NMN capsules reviewed favorably, often 250–500 mg/serving; adjust capsules to reach 800 mg/day.^{[171][163][172]}

Compare retail price using high quality brands at 97%+ purity providing the same daily dose as the MAX 5 Super Mix

Per-ingredient retail cost for same daily dose

Compound	Example product (97%+ purity retail)	How many per day to match clinical dose	Bottle details & price	Approx daily cost	Approx 30-day cost
Urolithin A 1000 mg	Augment Life Urolithin A 500 mg, 60 caps ~€120 ≈ CA\$175 ^{[174][175][176]}	2 caps (1000 mg)	60 caps = 30 days	~CA\$5.80	~CA\$175
Spermidine 25 mg	Double Wood Spermidine 10 mg, 99%+, 120 caps US\$39.95 ≈ CA\$55 ^{[177][178]}	3 caps (30 mg)	120 caps = 40 days at 3/day	~CA\$1.40	~CA\$42
Ergothioneine 30 mg	MitoPrime L-ergothioneine 10 mg, 30 caps US\$43.99 ≈ CA\$60 ^{[179][180]}	3 caps (30 mg)	30 caps = 10 days at 3/day	~CA\$6.00	~CA\$180
Ca-AKG 800 mg	Decode Age Ca-AKG, 30 caps ≈ CA\$44.39, dose ~1 g/cap ^{[181][182]}	1 cap (≈1000 mg)	30 caps = 30 days	~CA\$1.48	~CA\$44
NMN 600 mg	Typical mid-priced NMN caps 400 mg, 60 caps ~CA\$60 (e.g., Doctor's Best/Neurogan-type) ^{[183][184][185]}	2 caps (800 mg)	60 caps = 30 days	~CA\$2.00	~CA\$60

Total estimated monthly retail cost

Adding the 30-day costs for these representative 97–99% products:

- Urolithin A ~CA\$175
- Spermidine ~CA\$42
- Ergothioneine ~CA\$180
- Ca-AKG ~CA\$44
- NMN ~CA\$60

Total ≈ CA\$500 per month to hit the **MAX 5 Super Mix** doses using high-purity, consumer-ready capsule brands.

[174][175][176][177][179][184][180][182][183][185]

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