

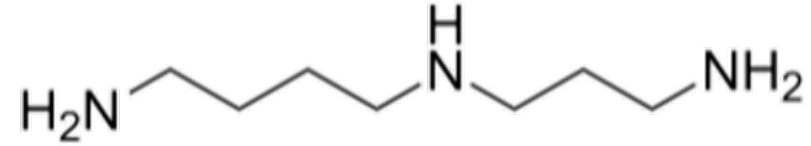


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Slow aging inside & out with spermidine

Leslie Kenny, Founder and CEO

What is spermidine?



- An organic compound consisting of two or more amino acid groups
- Present in all human tissues, but also in all animals and plants
- So crucial to all life that it is found in sperm because it allows DNA to be more tightly wound and packaged within sperm, but also in breastmilk to seal the infant gut lining



Antonie van Leeuwenhoek,
Dutch 'Father of Biology'



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Where do we get it?

- 1/3 manufactured within our tissues
- 1/3 produced by the gut biome
- 1/3 from food intake
- Declines as we age so that by the time we are 30, our levels have already begun to decline
- By our 50's we need to dramatically increase our food intake of spermidine to maintain youthful levels



Why is spermidine crucial to human health?



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It safely inhibits more hallmarks of aging than any other compound

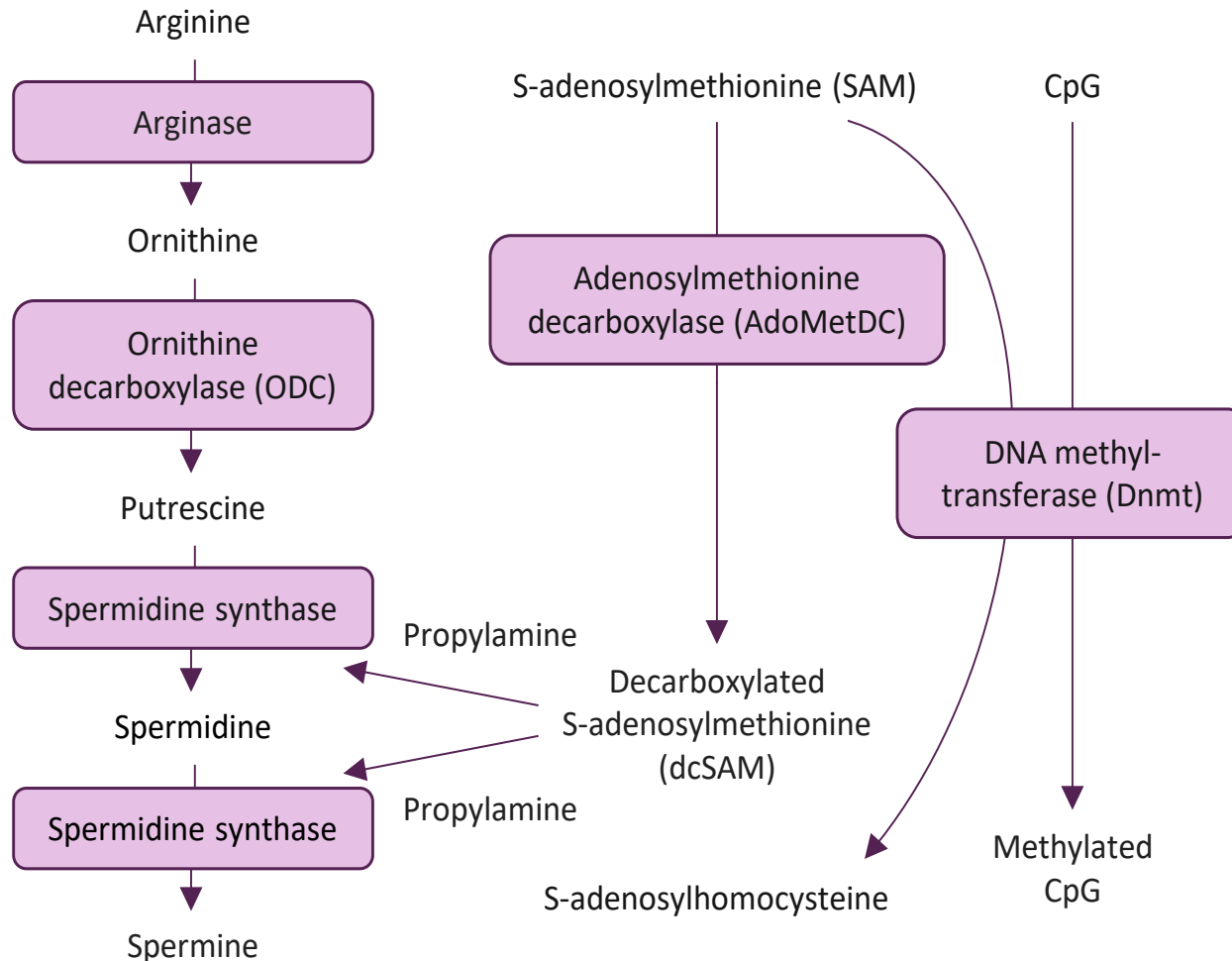
<i>Agents and their influence on hallmarks of ageing</i>	DNA damage	Eroded telomeres	Epigenetic changes	Impaired proteostasis	Mitochondr ^r dysfunction	Altered nutrient sensing	Stem cell dysfunction	Cellular senescence	Impaired intercellular Commun ⁿ
Spermidine			◆	◆ ◆	◆ ◆		◆		◆ ◆
Rapamycin				◆ ◆	◆	◆	◆ ◆	◆	◆
Senolytics								◆	◆
Metformin						◆		◆	◆
Acarbose			◆			◆			
NAD ⁺ enhancers									◆
NSAIDs						◆			◆
Lithium		◆		◆	◆				
Reverse transcriptase inhib ^r s	◆								
Systemic circulating factors			◆ ◆				◆ ◆		◆ ◆

6 hallmarks inhibited but no side effects like rapamycin

- ◆ Compound inhibits the hallmark
- ◆ Role in ageing phenotype or lifespan shown experimentally



Mechanisms of action



- Conservation of SAM-E for DNA methylation
- Conservation of arginine for nitric oxide production, needed for cardiovascular health



Spermidine enhances healthspan

- As we age, both autophagy and spermidine levels decline, but in populations that maintain high levels of spermidine, the opposite happens
- Higher spermidine intake in humans is associated with reduced mortality and increased healthspan (Minois, et al, 2011; Soda et al, 2009; Kiechl, et al, 2018)



Supports memory, cognition & brain health



- Autophagy helps brain cells clear out old and dysfunctional mitochondria and organelles for better health and function
- In a study of 28 individuals between 60-90-years-old with subjective cognitive decline, daily supplementation with 1mg of spermidine improved cognition after 3 months (Wirth et al, 2019)
- Spermidine & spermine support positive changes in the hippocampus where memories are stored & retrieved



Promotes cardiovascular health



- Preferentially taken up by cardiomyocytes, the cells responsible for heart rhythm
- Triggers autophagy & mitophagy which allow for better heart cell renewal & recycling, as well as mitochondrial repair in heart cells
- More arginine reserves = more nitric oxide production



Supports male reproductive & hormone health

- Increased nitric oxide = better erections
- Normalizes DHEA, testosterone, progesterone, estradiol (Bendera, et al, 2019)
- In men <50, T increased 49% on average
- Spermidine & spermine supplementation reduced salivary cortisol levels in both men & women by 58% in 30 days
- Correlates with stages of spermatogenesis (Lefevre, 2011)



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Supports female reproductive health



- Normalizes female sex hormones estradiol, progesterone, and testosterone
- “Spermidine induces cytoprotective autophagy in female germline stem cells in vitro and ameliorates cellular senescence of FGSC's induced by hydrogen peroxide... Our findings could be helpful for delaying aging in female germ cells due to oxidative stress and preserving female fertility.” Yuan et al, 2021



Supports the elderly immune system

- Increases memory T cells
- Reduces inflammatory cytokines
- Exciting in vitro results in elderly immune cells to be followed up by clinical trials at Oxford conducted by our scientific advisor, Oxford U Immunology Prof Katja Simon



Visible benefits of slowing the physical signs of aging

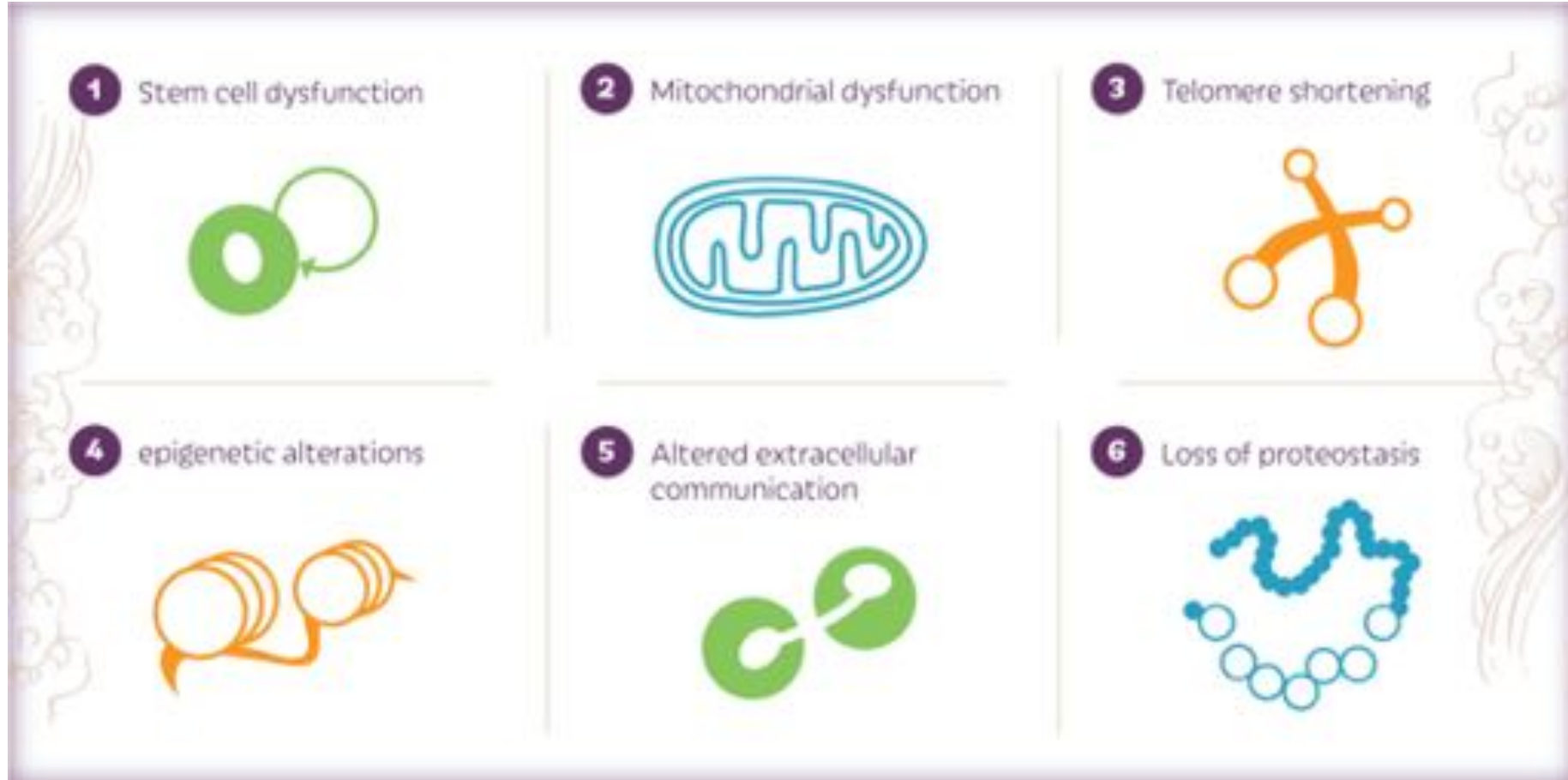


- Benefits to hair, skin & nails
- Keeps hair in the anagen or growth phase for 26% longer after 6 days of exposure
- Promotes longer eyelashes and fuller eyebrows
- Supports collagen & elastin expression
- Stronger nails



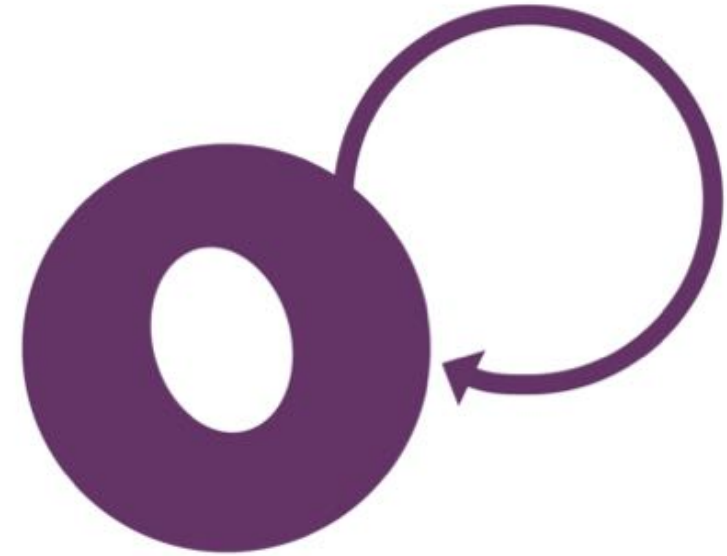
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Hallmarks of aging: spermidine inhibits 6 of the 9 hallmarks



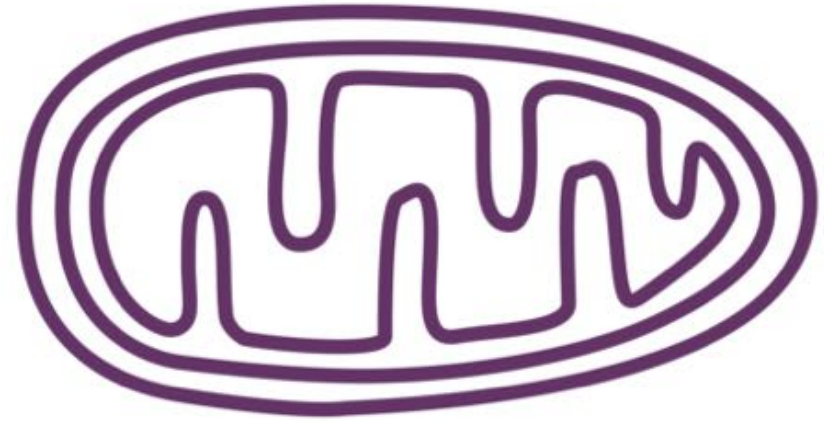
Hallmarks of aging: stem cell dysfunction

- Stem cells lose their ability to divide as we age, and we are unable to replace cells that have migrated, differentiated, or died. As a result, we show outward symptoms of aging, such as gray hair.



Hallmarks of aging: mitochondrial dysfunction

- As cells age, their mitochondria start to lose their integrity due to the build-up of oxidative stress. Compromised mitochondrial function leads to a number of adverse events, such as increased apoptosis induction, that correlate with aging.



Hallmarks of aging: telomere shortening

- Shortened telomeres are associated with aging cells that are senescent. As cells divide, the telomere ends of chromosomes get shorter. Eventually, telomerase gets silenced and the telomeres are too short for cells to divide.



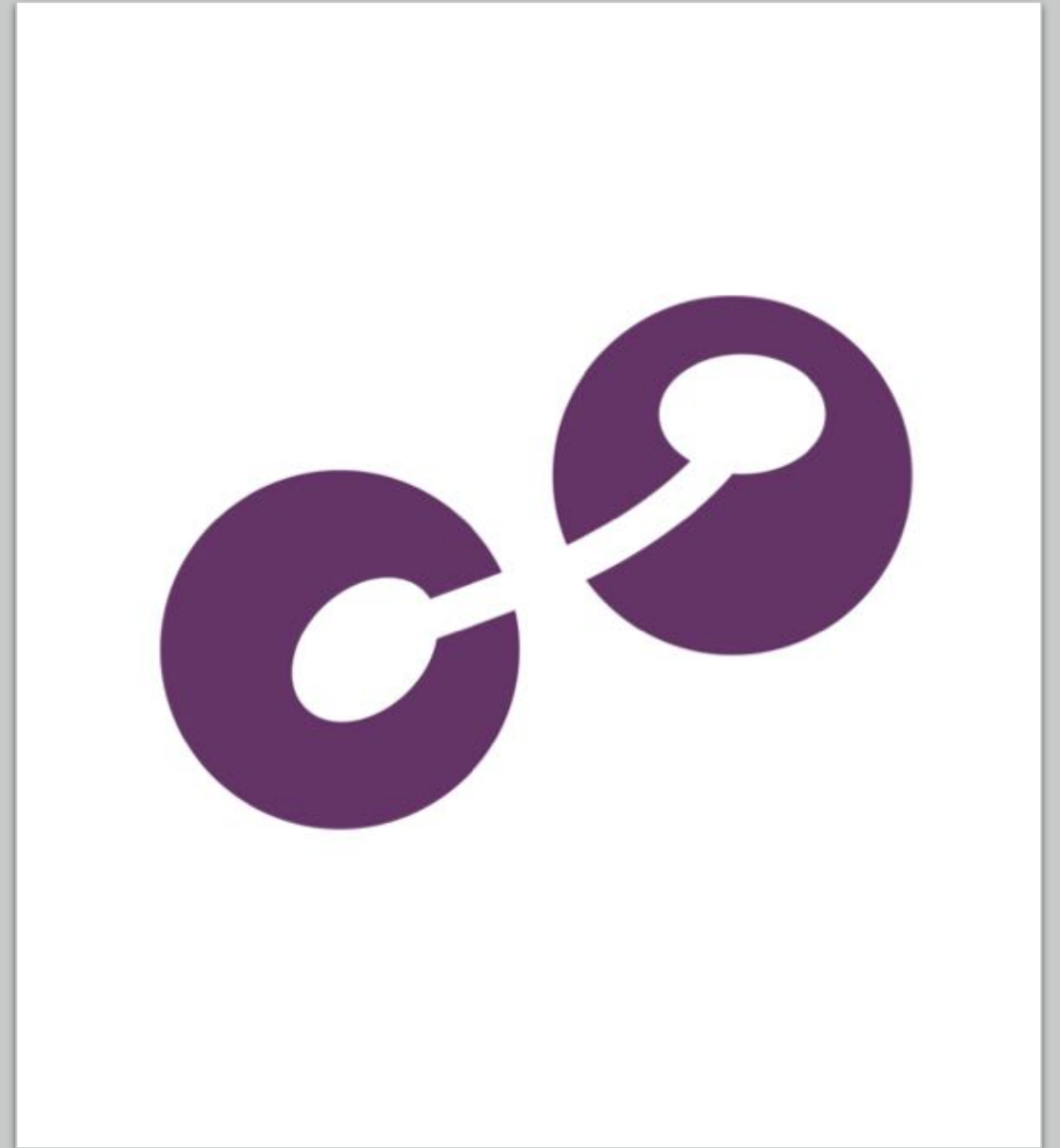
Hallmarks of aging: epigenetic alterations

- As cells are exposed to environmental factors, they are subject to changes in their genome through epigenetic mechanisms. Such changes accumulate over time and have been correlated with the decline observed in aging cells.



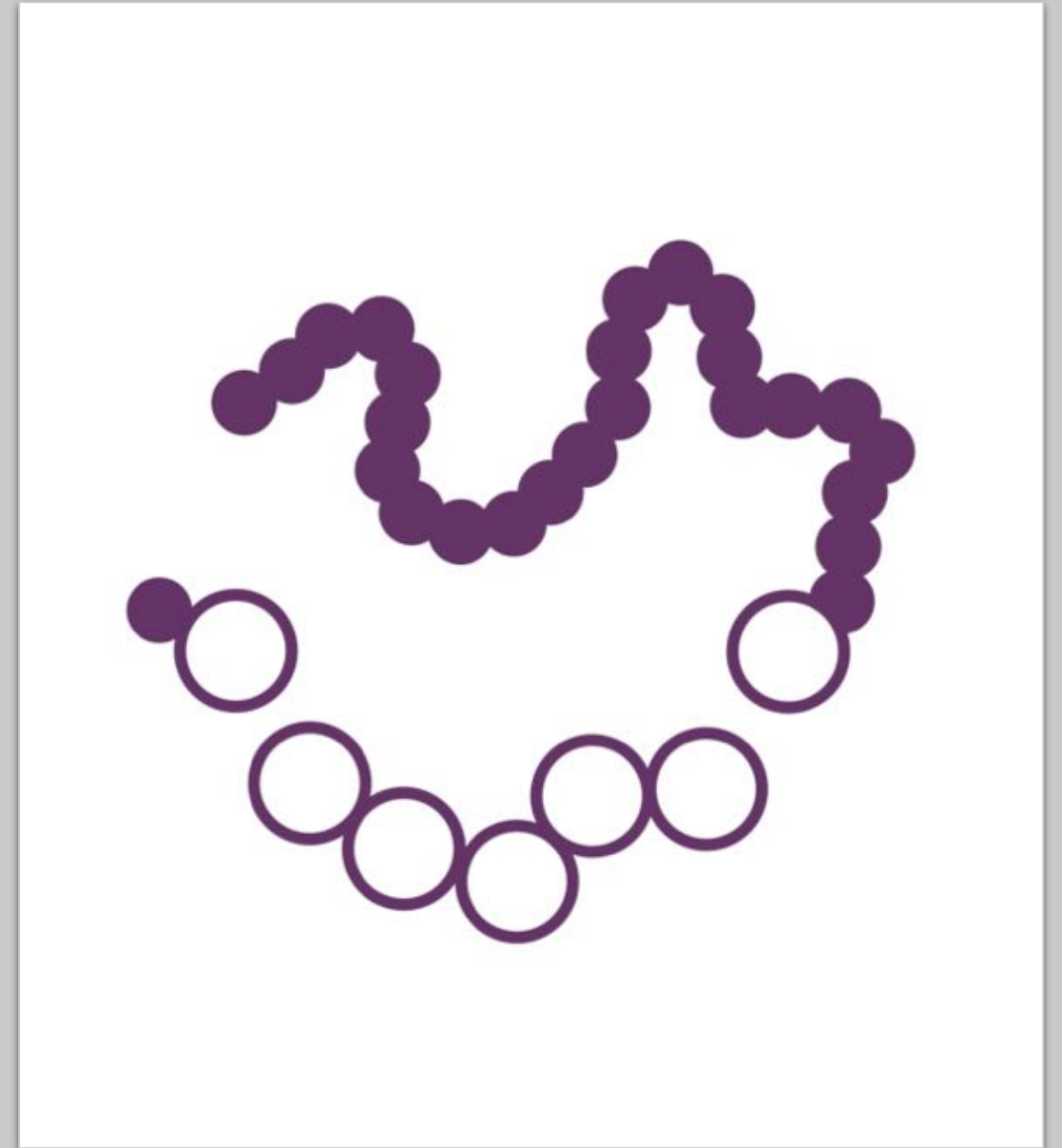
Hallmarks of aging: altered extracellular communication

- As cells age, they show an increase in self-preserving signals that result in damage elsewhere. Altered extracellular communication with aging contributes to decline in tissue health.



Hallmarks of aging: impaired proteostasis

- Misfolded proteins mean poor cellular health and function
- Spermidine triggers autophagy which enables the cleanup of misfolded proteins and the production of new properly folded proteins using recycled parts



Testimonials – Hair health



05/18/21

MOT M. Verified Reviewer



Love It

I'm very happy with spermidine. My most significant improvement is my bald spot is almost gone. This is in less than six months!
I haven't experienced the sleep improvement but I already have healthy sleeping habits so no surprise there. I absolutely love the product and highly recommend it.



05/18/21

Steve B.



One month in and I'm finding new hair...

One month in and I'm finding new hair growing at the back of my head, so to that end I'm seeing a predicted outcome. Also, I'm finding energy levels and focus are improving.



05/22/21

C. C. Verified Reviewer



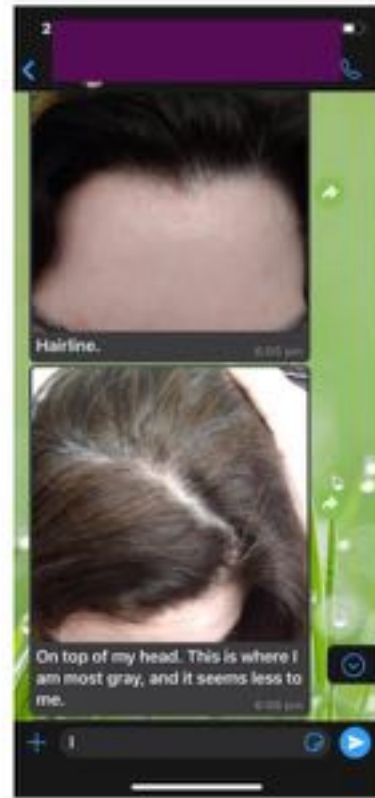
Thank you for an outstanding product!

Just want to share with you that my hair is getting thicker and smoother and much less hair falling now unlike before. Also new baby hairs are very dark brown/black like my original hair color. I'm feeling good overall, I really like these supplements!
The negative side effects I was experiencing in the beginning were herxheimer reaction from metal detox, yay!
I will continue taking these awesome supplements for sure. Thank you for an outstanding product!
Also, according to my son, have more positive mood and better sleep! [Read Less](#)



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Testimonials – Hair health



Testimonials – Overall health

I've been taking Primeadine for the past 5 months and my doctor tells me I'm in a great shape. I feel better and stronger.



Sir Christopher Ball, Guinness
World Record Holder
(10 marathons in 10 days)
United Kingdom

I love Primeadine! My hair and nails grew much stronger after I started taking it. I am sure my improved cells are responsible - they are being rejuvenated. I recommend it to anyone concerned about the effects of aging.

Primeadine - I have been taking this for around 5 weeks. I have a much deeper sense of grounded calm, better deeper and longer sleep, more stable mood and sharper focus. Certainly has been a real support during these Covid stricken times. Super interested to see hair colour changes too. Absolutely no downsides. The emergent information around this product looks more and more exciting... I am delighted to be taking it!



Testimonials – Sleep



Joe R. Verified Reviewer



05/22/21

Was surprised, but Primeadine really works!

Too many products on the market claiming incredible results, so I was not excited at first... my health is great, but my sleep is bad, too much stress, sleeping 6-7 hours with little deep sleep and was waking up 3-4 times per night...

So my girlfriend got me Primeadine... I began taking 1 tablet with my meals (3 meals per day)... was lazy about it, not taking it regularly, just when I remembered... Then my girlfriend told me I should be taking all 3 tabs with my last meal in the eve... she said it will improve my sleep... yeah, yeah... I heard such stories before... then I got Covid... hmmm. It felt just like the flu, but I tested positive for Covid... yet I had my taste and smell and all signs of the flu... anyway, nobody has flu these days, right?

So, on my second day of Covid, when I was feeling worst, I started taking 3 tabs of Primeadine in the eve... I thought I'd try something new... I took the 3 tabs at 8 pm, together with my collagen, B5, and quercetin... and I slept like a baby... woke up feeling much better... hmmm... so I thought I'd try it again... and I slept again... and then I tried it again...

Now, 3 weeks later I'm still sleeping... taking 3 tabs of Primeadine with my last meal... and soon after I get sleepy... was never sleepy before... even though I take 3mg of Melatonin before bed every night... and they say Primeadine has all these other benefits, so I guess worth taking... I have no other problems than sleep, so can't tell you what else it does, but apparently also great with Autophagy, which means great for EVERYTHING concerning overall HEALTH... so, very happy to be sleeping again... I guess sleep is also related to EVERYTHING... so I guess Primeadine is helping me with everything hehe... am happy :) [Read Less](#)

Better sleep, hair, nails

I've been using Primeadine for over 3 months now. Almost instantly, I noticed an improvement in my sleep. I take it before bed time and my sleep scores (measured on my Sleep Cycle app in my iPhone) have increased from the 70's to the high 80s / low 90s. I've noticed that I have much more vivid dreams and I wake up feeling more rested.

Additionally, my hair loss has reduced and I can see a lot more new growth - even my eye lashes are thicker! My nail are also stronger and more glossy.

I'm close to 30 days into Primadine®. Deep sleep is clear and has increased from day 1 (if taken at night). I'm also averaging 7 hours a night which is unheard of for me.



Tim Kane, CEO myHSA
Calgary



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