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WHAT HAS BEEN IS REMOTE AND EXCEEDINGLY MYSTERIOUS. WHO CAN DISCOVER IT?
(Ecclesiastes 7:24)

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Intake Recommendations for Dr. Aardsma's Anti-Aging Vitamins

by Matthew Aardsma, PhD

This version updates the recommended daily intakes for the anti-aging vitamins, while retaining and organizing important information from previous versions in one place for ease of access.

This information is to help individuals make an informed decision of how much of Dr. Aardsma's Anti-Aging Vitamins to consume. This is not intended to supplant the advice of a medical or nutritional professional.

Key Points

- Intake of vitamins MePA and MePiA must be in adequate amounts to cure Aging 0 disease, cure Aging 1 disease and prevent Aging 2 disease in children, and possibly reverse Aging 2 disease in teens and adults.
- Adequate intake for children appears to be especially critical to prevent potentially irreversible mitochondrial damage.
- A risk versus benefit analysis of the intake level of the anti-aging vitamins versus the potential for negative effects shows that the risk is overwhelmingly on the side of inadequate supplementation.
- An increased recommended daily intake is presented to reduce the risk of inadequate supplementation.
- The concentration of MePA and MePiA in Dr. Aardsma's Anti-Aging Vitamins has been increased to leave the number of drops per day similar to what they were previously. See Table 1 for specific values.

Table 1: Estimated daily intake of *Dr. Aardsma's Anti-Aging Vitamins* dietary supplement (2.5 μg MePA and 2.5 μg MePiA per drop) rounded to the nearest drop.

Category	Male	Female
Age, years		
0-3	0	0
4-8	4	4
9-13	5	5
14-18	7	5
19 and older	8	6
Reproductive Status		
Pregnant		7
Breast-feeding		8

Lifespan as a Function of Intake

Intake of vitamins in the human diet must be in sufficient quantities to meet the physiological demand for each vitamin. If the intake of any vitamin is insufficient over a period of time, the negative effects of the particular vitamin deficiency disease will appear and grow worse over time. How quickly the deficiency disease becomes debilitating or even lethal depends on intake amounts of the particular vitamin. The anti-aging vitamins are no different. Computer modeling of ancient Biblical human lifespan data shows that human longevity before Noah's Flood was dependent on intake amounts of a vitamin¹, which we now know to be vitamin methylphosphinic acid (MePiA)².

¹Gerald E. Aardsma, *Aging: Cause and Cure* (Loda, IL: Aardsma Research and Publishing, 2017), pages 84-88. www.BiblicalChronologist.org.

²Gerald E. Aardsma, *Addendum to Aging: Cause and Cure* (Loda, IL: Aardsma Research and Publishing, July 26, 2019). www.BiblicalChronologist.org.

Human Aging Today

To discuss the optimal intake of the anti-aging vitamins we first must have a clear understanding of the aging syndrome that we face. Unfortunately, aging today is more complicated than pre-Flood because of the current global lack of the anti-aging vitamins from birth onward. Our current understanding of modern human aging is that human aging is comprised of three separate diseases:³

- Aging 0: congenital vitamin methylphosphonic acid (MePA) deficiency disease.
- Aging 1: congenital vitamin MePiA deficiency disease.
- Aging 2: a mitochondrial genetic disease induced by Aging 1.

Vitamin MePA can be thought of as the “general health” vitamin. This is evidenced by the many and varied health improvements that people supplementing their diets with MePA report.⁴ MePA deficiency disease (Aging 0) appears to manifest itself in the gradual loss of physiological function with age that many people begin to notice between age 30 and 40. Adequate intake of vitamin MePA appears to gradually cure Aging 0 regardless of the age that supplementation begins.

MePiA deficiency disease (Aging 1) results in oxidative damage to mitochondrial DNA due to the lack of the protective antioxidant MePiA. The adequate intake of MePiA in individuals who have not yet entered Aging 2 will cure Aging 1 and effectively prevent Aging 2, dramatically prolonging expected lifespan.

Aging 2 appears to be initiated when the cells of the body run out of functional undamaged mitochondrial DNA. The initiation of Aging 2 has been estimated at age 10 years.⁵ For individuals greater than age 10 it is currently unknown if the accumulated oxidative damage to mitochondrial DNA (Aging 2 disease) can be reversed through

³Gerald E. Aardsma, “Human Aging is a Two-Phase Disease”, *The Biblical Chronologist* 10.8 (May 13, 2020), pages 5-6. www.BiblicalChronologist.org.

⁴http://www.biblicalchronologist.org/products/vitamin-MePA_testimonials.php

⁵Gerald E. Aardsma, “Human Aging is a Two-Phase Disease”, *The Biblical Chronologist* 10.8 (May 13, 2020), page 5. www.BiblicalChronologist.org.

adequate intake of vitamin MePiA. However, it is known that there is currently no chance of reversing Aging 2 without adequate intake of MePiA.

Adequate Intake

The best way to determine how much of the anti-aging vitamins are needed by the human body is by titration experiments with humans to determine the retention of the anti-aging vitamins by the body. Unfortunately, determination of the optimal daily intake for vitamins in general is no trivial task. Scientists today are still working to fine tune the daily recommended intake of vitamins discovered several generations ago. The empirical determination of the optimal daily intake for the anti-aging vitamins is also not a trivial undertaking, and is a key priority for Aardsma Research & Publishing (ARP). Until these results are available, Table 1 is our best estimate of the amounts needed to ensure an adequate intake. The origin of Table 1 values are elaborated below.

Adequate Vitamin MePA Intake to Cure Aging 0

General health is something that individuals can sense about themselves. When there is improvement in physiological function in areas such as sleep quality we are often able to perceive the change. Anecdotal data over the last several years from individuals supplementing with vitamin MePA at various levels has indicated that an adequate daily intake is likely between 1 and 10 μg per day for an adult male. The rapid and dramatic health improvements reported at 1 μg per day⁶ make it clear that 1 μg per day is within the beneficial range, so it is expected that the adequate daily intake is not far away. Also informative was the September 16, 2018 testimonial from Joey Contreras Sr.,⁷ who experimented with reducing his daily vitamin MePA intake from 6 to 4 μg per day. The results clearly indicated that, for this mature male, 6 μg vitamin MePA per day

⁶Gerald E. Aardsma, *Aging: Cause and Cure* (Loda, IL: Aardsma Research and Publishing, 2017), pages 113-118. www.BiblicalChronologist.org.

⁷http://www.biblicalchronologist.org/products/vitamin-MePA_testimonials_Contreras.php

was better than 4. While other individuals have supplemented with vitamin MePA at levels above 6 μg per day, there have been no additional reports of benefits at higher intakes. Therefore, it appears unlikely that the daily need for vitamin MePA is above 10 μg per day. This places the adequate daily intake of vitamin MePA between 1 and 10 μg per day for an adult male. This is still a large range, and needs further refinement.

The environment probably provided more MePA than needed by the human body pre-Flood in some instances. This is because: (1) rainfall would have supplied water sources with both MePiA and MePA, (2) from experiments conducted in the ARP lab (unpublished data) we know that MePiA in water slowly converts to MePA, and (3) because MePA is environmentally persistent, continual evaporation of water from drinking water sources would leave behind increasingly concentrated MePA. This suggests that at least some pre-Flood humans were routinely consuming more MePA than they needed, with the excess being eliminated from the body in urine. This leads to the conclusion that the current recommended daily intake of MePA should tend towards the upper range of the estimated physiological need (10 μg per day) rather than the lower end (1 μg per day).

Additional important information is that the concentration of MePA was probably equal or greater than the concentration of MePiA in pre-Flood drinking water. This is because MePiA is not as chemically stable as MePA (which is why MePiA functions effectively as an antioxidant), and will not tend to accumulate in drinking water over time. Therefore, MePiA can be expected to be present in lower amounts than MePA pre-Flood. Thus, a reasonable approach to mimic what was happening pre-Flood is to supplement with at least as much MePA as the amount of MePiA needed by the body as long as the best estimate for the adequate intake of MePiA intake exceeds 10 μg per day. Taking this approach reduces the risk of inadequate intake of MePA, and any excess MePA will be eliminated in the urine as it was pre-Flood. (See the “Risk Versus Benefit” section below for additional details on risk of inadequate intake versus risk of negative effects due to more than adequate intake.)

Adequate Vitamin MePiA Intake to Cure Aging 1

Mitochondrial DNA oxidative damage is not something that we can sense like general health can be sensed. This means that, unlike MePA, the determination of the adequate daily intake of MePiA cannot be addressed by anecdotal evidence like testimonial data. Therefore, an alternate estimation method is needed. One method based on calculation of the extreme ends of the body pool for MePiA yields 0.033 μg as the lowest intake level and 20 μg as the highest level.⁸ While this is a large range, it does provide a useful place to start.

Risk Versus Benefit

Most vitamins have a large safety range of intakes around the physiological requirement. This is likely why vitamin supplements are readily available without a prescription or extensive regulation, unlike drugs which typically have a much smaller safety range around the recommended intake. This means that for vitamins the risk of inadequate supplementation is typically greater than the risk of over supplementation. If this is also true, as expected, for vitamins MePiA and MePA, then the rational approach is to supplement at the higher end of the estimated intake range.

The risk of insufficient supplementation with MePiA is clearly substantial. All one has to do is compare the healthy and productive lifespans of nearly a millennium enjoyed by people pre-Flood to the lifespans of less than a century of today. The risks associated with insufficient MePiA are especially dire for those approximately age 10 and under who are at risk of induction of Aging 2 disease. Getting it wrong here with a child could mean the difference between a 80 and a 800 year lifespan. Even for those already in Aging 2, the risk of under supplementation is still substantial due to the possibility of a reversal of Aging 2 disease over time via MePiA.

What are the risks associated with intakes of MePiA and MePA at the higher end of the estimated physiological need? Fortunately, both

⁸Gerald E. Aardsma, *Aging: Cause and Cure* (Loda, IL: Aardsma Research and Publishing, 2017), page 111. www.BiblicalChronologist.org.

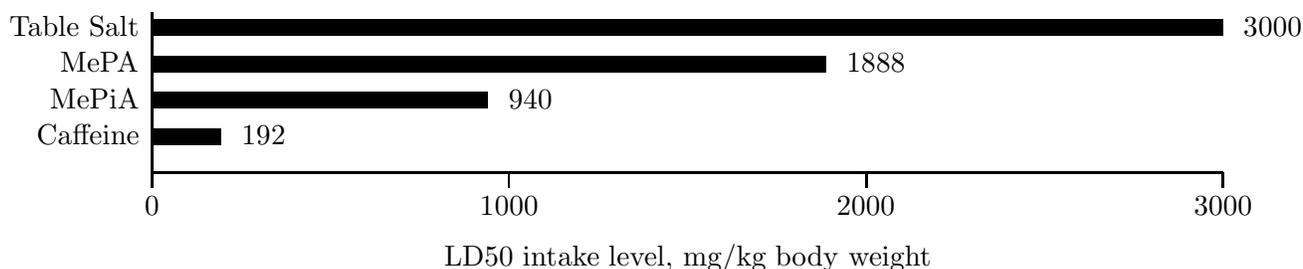


Figure 1: Oral toxicity data in rats, illustrating the low toxicity of MePA and MePiA. Note that the highest RDI in Table 1 ($20 \mu\text{g}$ per day for an adult male, which is 0.0003 mg/kg) is too small by a factor of more than ten thousand to even be seen on the scale of this graph.

MePiA and MePA have been evaluated in studies with rats to evaluate their toxicity.⁹ The study evaluated the amount of either MePA or MePiA given orally that was required to kill 50% of the rats. This generates what are called lethal dose 50% (LD50) values for both MePA and MePiA. While humans and rats are obviously different in many ways, this type of data may be used to evaluate the general safety of a substance on a per unit of body weight basis. Virtually all substances are toxic at high enough intakes, and the LD50 of the ubiquitously consumed substances table salt¹⁰ and caffeine¹¹ are helpful reference points. The results in Figure 1 show that even at the upper intake of $20 \mu\text{g}$ per day of either MePiA or MePA for an adult male (73 kg body weight), we are nowhere even close to an intake that is high enough to raise concerns of negative effects. This validates that MePA and MePiA have a large safety range around their physiologically effective intake range just like the other vitamins.

With substantial risk of inadequate supplementation and no apparent risk of adverse effects at the upper estimated intake level for MePiA, the rational conclusion is to minimize the risk of inadequate supplementation. Therefore, an intake of $20 \mu\text{g}$ per day of MePiA for an adult male has been adopted pending further experimental data

⁹Watson, Rebecca E., Hafez, Ahmed M., Kremsky, Jonathan N., Bizzigotti, George O. Toxicity of binary chemical munition destruction products: Methylphosphonic acid, methylphosphinic acid, 2-diisopropylaminoethanol, DF neutralent, and QL neutralent. *International Journal of Toxicology* Vol 26, pg 503-512, 2007.

¹⁰<https://pubchem.ncbi.nlm.nih.gov/compound/5234#section=Non-Human-Toxicity-Values>, accessed June 1 2020

¹¹<https://pubchem.ncbi.nlm.nih.gov/compound/2519#section=Acute-Effects>, accessed June 1 2020

allowing further fine tuning of the recommendation.

Adequate Intake of MePiA and Aging 2

The estimated amount of MePiA to cure Aging 1 is our current best estimate of the amount needed to have the potential for curing Aging 2. This is because, in order to cure Aging 1, the intake of MePiA has to be at a high enough rate to keep up with potentially damaging free radical production rate. As long as intake levels are able to keep up with free radical production, stopping the “free-radical inferno”¹², gradual repair of damaged DNA responsible for Aging 2 appears possible. As such, an intake of MePiA above the level needed to cure Aging 1 will not likely be of extra benefit. Therefore, the recommendations for the intake of MePiA to potentially reverse Aging 2 are the same as the recommendations to cure Aging 1 (Table 1).

Calculation of Intake Recommendations by Age and Sex

To summarize, an intake of $20 \mu\text{g}$ of MePiA per day is being recommended for an adult male. Since this is greater than $10 \mu\text{g}$, the intake of MePA will be matched to the intake of MePiA, also at $20 \mu\text{g}$ per day. To apply this to other ages and sexes, a few assumptions are required:

1. The amount of the anti-aging vitamins that pre-Flood people consumed was determined by the concentration of the vitamins in the drinking water and how much water they consumed each day.

¹²Gerald E. Aardsma, “Human Aging is a Two-Phase Disease”, *The Biblical Chronologist* 10.8 (May 13, 2020), page 10. www.BiblicalChronologist.org.

2. While the concentration of the anti-aging vitamins in pre-Flood drinking water probably varied from week to week depending on factors such as water freshness (e.g., time elapsed since the last rainfall) and environmental conditions, levels can be assumed to have been reasonably constant over a physiologically relevant period of weeks or months. This means that consumption of the anti-aging vitamins would have been a function of daily water intake.
3. The total non-food derived water intake of people today is similar to that of pre-Flood people.
4. Infants and toddlers pre-Flood consumed water primarily through breast-milk through age 3.

The non-food derived water intake for people at various ages and physiological states was obtained from the National Academies of Science Electrolyte and Water Summary Table.¹³ This serves to approximate the water intake of pre-Flood peoples. This information alone yields relative pre-Flood anti-aging vitamin intake differences between, for example, males and females, simply based on differences in water intake between the sexes. By taking 20 μg of vitamin intake and dividing by the drinking water intake of an adult male (2.96 L per day), a concentration of 6.76 μg per L drinking water is obtained. Multiplying this concentration by the water intakes from the National Academies of Science yields the values shown in Table 1. The number of drops per day has not changed substantially relative to the previous recommendation because the concentrations of MePA and MePiA have each been increased from 0.8 μg per drop to 2.5 μg per drop in the supplement bottle.

Further Details On Intake Recommendations

Infants and toddlers

It is assumed that pre-Flood mothers would have nursed their babies through the toddler stage as is

¹³<http://nationalacademies.org/hmd/Activities/Nutrition/SummaryDRIs/DRI-Tables.aspx>, accessed Feb 15 2019.

common in cultures not impacted by technologies such as infant formula and prepared baby food. Since MePA and MePiA are both water-soluble, it is believed that both MePA and MePiA were likely passed from the mother to the infant or toddler in the breast-milk pre-Flood. Therefore, any need of the infant or toddler for MePA and MePiA would have been satisfied simply by nursing. As the toddler began to wean and consume drinking water, the dietary supply would have shifted away from the mother's milk and towards water intake. The calculated intake levels from Table 1 assume that weaning is an abrupt event complete by age 4, which is why the supplementation rate increases from 0 drops per day from age 0 to 3 years to 4 drops per day at age 4. Since weaning is typically a more gradual process, a slow increase in *Dr. Aardsma's Anti-Aging Vitamins* intake concomitant with a gradual decrease in nursing may more closely replicate what children experienced pre-Flood. (See the "A Personal Note" section below for more discussion of supplementing the diet of children with the anti-aging vitamins.)

Children (4 through 8 years of age)

In this age range, pre-Flood children are presumed to be weaned and therefore consuming water as their primary source of hydration. Given the small size of children in this age range, water intake at this stage is understandably lower than in an adult, and this difference is reflected in a lower estimated anti-aging vitamin supplementation rate than in an adult.

Pre-teen through early teenager (9 to 13 years of age)

Many children increase in body weight and size rapidly during these years, resulting in an increase in water intake over that of younger children. This is reflected in the increase in the anti-aging supplementation rates over that of younger children.

Teenager through adult (14 years of age and older)

Males, reaching mature body weight somewhat later than females, have a gradual increase in water

intake (and thus supplementation rate) throughout their teen years, reaching an adult supplementation rate at 19 years of age. Females tend to have an earlier plateau in body weight, and supplementation rate remains stable until reaching an adult supplementation rate at 19 years of age. Water intake does not change after 19 except for pregnancy and breast-feeding for women, so supplementation rates remain stable thereafter.

Pregnant and breast-feeding women

Women who are or may become pregnant or who are breast-feeding are encouraged to discuss Dr. Aardsma's Anti-Aging Vitamins supplementation with their physician or medical care provider prior to use, as is recommended for all nutritional supplements.

Recommended non-food water intake is increased during pregnancy and breast-feeding. This translates into an increase in supplementation rate over that for a non-pregnant or non-breast-feeding woman.

Pregnancy is a sensitive time for the developing baby, and the newness of the discovery of vitamin MePiA makes it difficult to make recommendations about its use during pregnancy or lactation. While a limited number of women have reported their experience taking vitamin MePA during pregnancy and lactation¹⁴, there are currently no testimonials from women who have supplemented with both MePiA and MePA during pregnancy or lactation. It is up to the individual woman to decide whether to take *Dr. Aardsma's Anti-Aging Vitamins* during pregnancy or lactation. The intake levels given in Table 1 are simply mathematical output using the assumptions that women pre-Flood were consuming water which contained MePA and MePiA, and that pregnant and lactating women pre-Flood had increased water intake similar to pregnant and lactating women today. Common sense is needed in the application of these mathematically calculated values, and ARP desires that women who are or may become pregnant or are lactating have the best information available to make an intelligent informed decision. A few relevant points are as follows:

1. The safety of MePA and MePiA is well documented (Figure 1). In addition, both MePA and MePiA have been tested by ARP for safety and there is currently no indication of harm at any intake level. This includes laboratory animals consuming MePA or MePiA daily for months at a time in drinking water at greater than 10,000 times more MePiA per unit of body weight than the intakes given in Table 1.
2. The theory supporting that women pre-Flood consumed MePiA and MePA in drinking water is quite strong. Therefore, it appears that all people born before the Flood were born to mothers who were consuming MePA and MePiA. People born before the Flood lived much longer on average than people today. The Two-Phase Theory of aging¹⁵ suggests that it is possible that part of that long life was due to individuals receiving MePA and MePiA from their mothers during their early developmental years (i.e., placental transfer and breast-milk transfer).
3. Free radical damage in the mitochondria of an organism begins whenever the cells of a developing embryo begin to use oxygen. According to the Two-Phase Theory of aging, prevention of mitochondrial damage is key to preventing the onset of the potentially incurable Aging 2 disease.
4. Esther, the first known woman to consume MePA during pregnancy, used a common sense strategy of taking a very small amount of MePA (1 μg) per day.¹⁶ Low levels of even acutely toxic compounds can often be safely ingested during pregnancy. Again, caffeine is a useful reference point. Unlike MePA or MePiA, caffeine is moderately toxic (Figure 1) and consumption of coffee or other sources of caffeine during pregnancy is controversial. However, after much research, the consensus is that about 1.5 cups of coffee per day (about

¹⁴http://www.biblicalchronologist.org/products/vitamin-MePA_testimonials_pregnancy.php

¹⁵Gerald E. Aardsma, "Human Aging is a Two-Phase Disease", *The Biblical Chronologist* 10.8 (May 13, 2020). www.BiblicalChronologist.org.

¹⁶http://www.biblicalchronologist.org/products/vitamin-MePA_testimonials_Esther.php

200 mg or 200,000 μg of caffeine) is regarded as reasonably safe for the developing baby.¹⁷ Thus, the estimated safe level of the moderately toxic compound caffeine during pregnancy is about 10,000 times higher than the suggested daily intake of MePA and MePiA for pregnant or breast-feeding women in Table 1.

A Personal Note

Making recommendations about intake of a relatively new dietary supplement for children is not an easy task, but it is important for parents to be equipped with the information they need. Unfortunately, most children are not even able to make healthy breakfast cereal choices for themselves, and so parents end up making important nutritional choices for their kids every day. Here, at the conclusion of this update, I want to share my personal experience as a father of three wonderful kids who are old enough to consume the anti-aging vitamins.

As part of my 8-to-5 job, I have delved more deeply into questions regarding the safety of MePA and MePiA than probably any other person. As a research scientist with a background in animal physiology and nutrition I conduct experiments supplementing the diets of laboratory animals with MePiA and MePA and personally evaluate the response over time. My job puts me in a better position than probably anyone else to know the truth about the safety of dietary supplementation with the anti-aging vitamins. My conclusion is that the evidence for safety is very, very strong. Meanwhile, the evidence for the risks of not supplementing with the anti-aging vitamins has only grown over the last several years. Out of a desire to do what is best for our kids and concerns for the potential negative effects of not receiving the anti-aging vitamins, my wife and I decided to begin supplementing the diets of our children with the anti-aging vitamins (at first only MePA, later adding MePiA after it's discovery) at low levels over a year ago. As my confidence in the safety data grew from strong to overwhelming, we grad-

ually increased their supplementation rate to be on par with the current recommended daily intakes. With the recent discovery of Aging 2 disease, I am very thankful that we did.

Along with questions of safety, I periodically wrestle with questions about dietary intake recommendations for the anti-aging vitamins, as I am doing in this update. As makes good sense when dealing with something new, intake recommendations started out conservatively low.¹⁸ As a naturally cautious person who dislikes risks, I was at first very comfortable with that. But gradually, in the absence of safety risks, the main risk I was faced with was the looming concern that supplementation rates may be inadequate and real people (including very dear people like my kids or my spouse) may suffer as a result. One day several weeks ago I returned home after mentally reviewing the safety data for MePA and MePiA once again, and as I recall I said something like this to my wife "This is crazy, there is no risk of taking too much of the anti-aging vitamins that I can see from any angle as long as we are talking about μg per day intakes, and yet there is a substantial risk if we don't get enough. We need to increase our supplementation from "probably enough" to "confidently enough". She agreed, and this father sleeps better at night knowing his kids are getting "confidently enough" of the anti-aging vitamins to keep them from entering Aging 2 disease. I will now sleep even better knowing that the "confidently enough" values of Table 1 are available to the general public.

Sincerely,
Dr. Matthew Aardsma \diamond

¹⁷<http://americanpregnancy.org/pregnancy-health/caffeine-intake-during-pregnancy/>, accessed February 19 2019

¹⁸Gerald E. Aardsma, *Aging: Cause and Cure* (Loda, IL: Aardsma Research and Publishing, 2017), page 112. www.BiblicalChronologist.org.

The Biblical Chronologist is written and edited by Gerald E. Aardsma, a Ph.D. scientist (nuclear physics) with special background in radioisotopic dating methods such as radiocarbon. *The Biblical Chronologist* has a fourfold purpose:

1. to encourage, enrich, and strengthen the faith of conservative Christians through instruction in biblical chronology and its many implications,
2. to foster informed, up-to-date, scholarly research in this vital field,
3. to communicate current developments and discoveries stemming from biblical chronology in an easily understood manner, and
4. to advance the growth of knowledge via a proper integration of ancient biblical and modern scientific data and ideas.

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