

Primum - Non Nocere *First - Do No Harm* Главное - Не Навреди

***i*-Rejuvenate**

Interventions and strategies to rejuvenate, reverse, or slow down aging

Substances and interventions that enable the opportunity to add 15-20 years to your healthy life

It is of paramount importance that your rejuvenation efforts, interventions, lifestyle, diet, drugs, additives, bioelectrical interventions, and even your thoughts, beliefs and fears, all stem from and obey to the Hippocratic principle: **"First - Do No Harm"**

Inspiration. If you set an altruistic goal, which is larger than yourself, if you become passionate to achieve the goal, your rejuvenation efforts will work exceptionally well. Make a detailed plan, cultivate a pattern of commitment, and work on your goal ~400 hours or so. Observe that after ~4 weeks of systematic pursuing of your goal, you will see here and there that the entire Universe is working for your plan. You will find help in places, where you never anticipated to find.

The progress on rejuvenation is fantastically fast. A revolutionary breakthrough is around the corner. In the meantime, keep in mind that 3 extraordinary longevity compounds have been already identified and they meet the requirement **"Do No Harm"**. These compounds are: **Vitamin C, DMSO, and Ivermectin**. They will help you to stay healthy, while scientists explore the mechanisms of rejuvenation in depth. If used rationally, these 3 compounds alone can add up to ~15 years to your healthy life.

Tens of thousands of scientific studies have been published on each of these compounds [see <https://pubmed.ncbi.nlm.nih.gov/>]. It is impossible to consume by mouth toxic amount of these 3 substances. There is only one problem with them - they are off-patent and inexpensive. If you are not an insider, it is difficult to imagine that the status **"off-patent and inexpensive"** creates a variety of difficult problems. Commercial medicine is not interested that you know about these remedies, because they cannot make profit. Indeed, phase 3 clinical trials, for example clinical trials of a cancer treatment, cost ~\$1.3-\$2.6 Billion, according to <https://www.sofpromed.com/ultimate-guide-clinical-trial-costs>. For non-patentable substances like Vitamin C, DMSO, and off-patent drug Ivermectin, this presents a serious hurdle. Nevertheless, these remedies are VERY efficient. Data about their efficiency have been documented in massive scientific publications. To learn more about these extraordinary and inexpensive remedies look at the literature at <https://pubmed.ncbi.nlm.nih.gov/>

Vitamin C – Ascorbic Acid

Linus Pauling, one of a few scientists who won two Nobel Prizes, studied ascorbic acid (Vitamin C), and discovered numerous therapeutic benefits of it. Extensive literature and references to ongoing studies are available at the website of Linus Pauling Institute: lii.oregonstate.edu. The daily dose of Vit C essential for your health is just ~0.1 gram. Vit C is efficient for prevention and treatment of broad spectrum of diseases. Typical therapeutic per oral dose is ~10 g or less. For anti-cancer treatment, however, L. Pauling recommended high-doses that can be administered only intravenously - up to 100 gram per infusion: <https://pmc.ncbi.nlm.nih.gov/articles/PMC7996511/>. It is impossible to obtain such large amounts in blood, if ascorbic acid is taken by mouth.

For preventing common cold, flu and some other infectious diseases, Linus Pauling suggested that 10-gram dose of Vit C is taken by mouth. In his early studies of Vit C as anti-cancer therapy Linus Pauling used intravenous 10-20 g daily doses for 10 days followed by 10 g orally indefinitely. In his studies, Pauling also found that 10-gram dose of Vit C taken orally before a common cold or influenza fully develop, efficiently prevents the disease or significantly diminishes its duration. What are the symptoms of incoming infectious disease? How do you know that an infectious disease is coming? Typically, 1-14 days before the disease develops, during the incubation period, there are minor symptoms such as supersensitive skin zones on the back, neck, inner sides of shoulders, known as Zakharin-Ged zones. If you take ~10 g of Vitamin C during this incubation period, there are 90% chances that the full-scale disease will not develop.

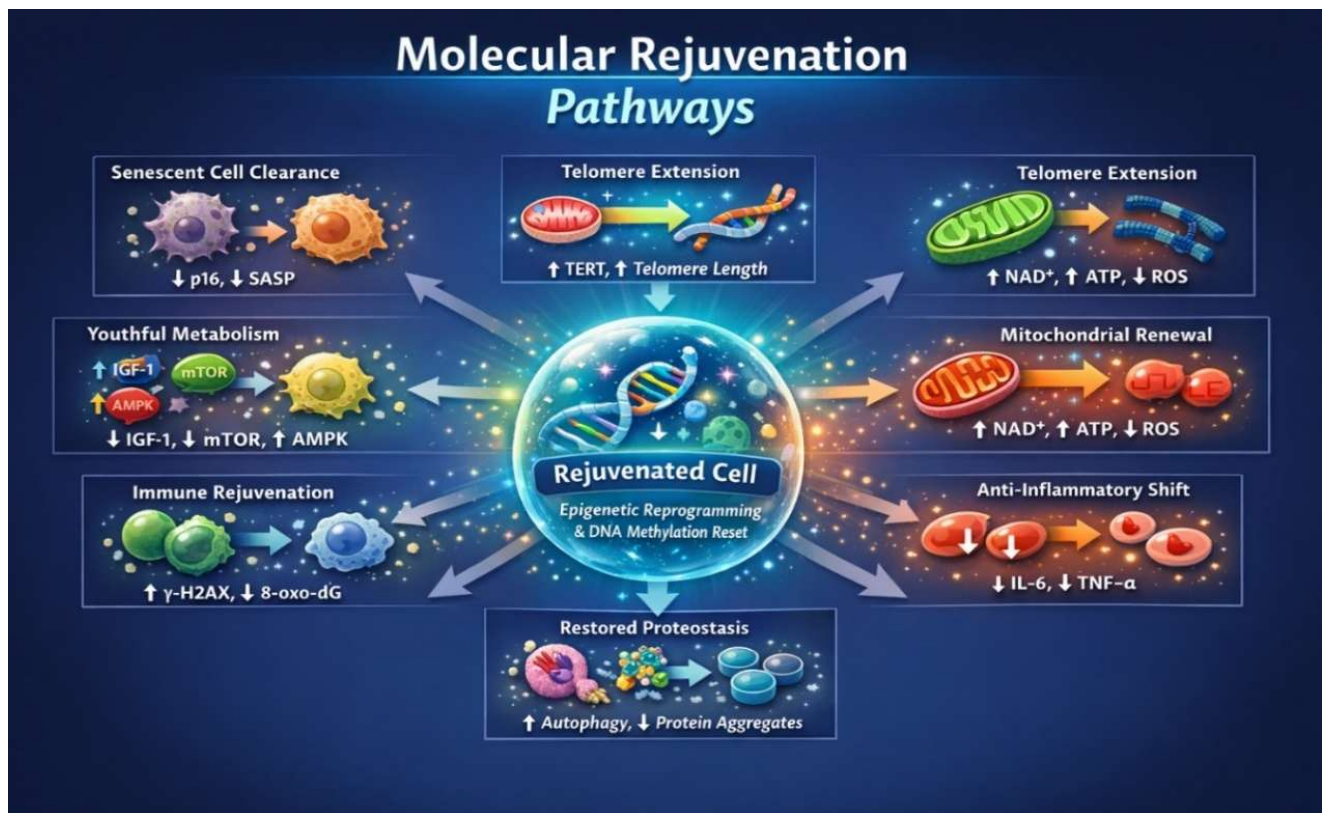
DMSO – Dimethyl Sulfoxide

DMSO – is one more miracle remedy. It is also of natural origin, obtained from wood. DMSO has been shown to be a panacea from thousands of different health problems. More than 40,000 papers were published on the greatest range of healing effects ever recorded for a single compound. In many countries DMSO is the First-Aid-Must-Have remedy on board of emergency vehicles. Among other healing properties, DMSO is a powerful antioxidant, which penetrates skin and membranes without damaging them. Refer to handbook on DMSO, “A New Paradigm...” by Fischer: https://www.google.com/books/edition/The_DMSO_Handbook/t7nijwEACAAJ?hl=en. Download free of charge the *DMSO Handbook* by Scott: <https://www.eden-shop.eu/wp-content/uploads/2020/06/Scott-Archie-DMSO-Handbook.pdf>. Its table of contents shows the broad spectrum of DMSO applications. You will find specific recommendations how to use DMSO and which dose to apply for your specific condition.

Ivermectin - Nobel-prize-winning Drug

Ivermectin is a Nobel-prize winner drug, which prevents and cures most of known RNA viruses, several DNA viruses, tuberculosis, malaria, certain cancers, epilepsy, inflammations, helminths, other parasites, and many other diseases. Ivermectin was found to be active in a broad spectrum of biological pathways, which means that there is a potential for early treatment of a broad range of different diseases. Ivermectin is difficult to consume in toxic amounts by mouth. By 2026, approximately 10,000 studies were published about medical uses of Ivermectin. They described Ivermectin as a wonder drug for prophylactics and curing infectious diseases, cancer, and more: www.ncbi.nlm.nih.gov/pmc/articles/PMC3043740; *New Microbes, New Infect*, 2021 Aug 3;43:100924. Ivermectin: a multifaceted drug of Nobel prize-honored distinction with indicated efficacy against a new global scourge, COVID-19. A Santin et al.

Vitamin C, DMSO, and Ivermectin are available from Amazon, eBay, and other vendors.



Mechanisms of Aging and Rejuvenation

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6. Avoid nocebo effects, medical errors, health misconceptions, alcohol, street drugs, tobacco, etc.
7. DMSO, ascorbic acid, other non-toxic chemical and biologically active remedies, plasmapheresis, hemosorption, bloodletting and blood transfusion
8. Established rejuvenation therapies: Rapamycin, Metformin, Doxycycline, Yamanaka factors, several peptides, modified amino acids, numerous herbal remedies...
8. Biological electric field effects: tDCS, tACS, tRNS, Lyapko applicator, Chinese acupuncture, acupuncture combined with electric current intervention, Volcano Zapper, electrochemical therapy.
9. Underwater rocks to avoid: avoid alcohol - it is toxic in any amount, avoid toxic food additives, avoid harmful medical misconceptions and fraud..., avoid medical errors – officially 3rd cause of death in the USA, just after cardio and cancer

1. INTRODUCTION

For many centuries people were in quest for the fountain of youth and the dream about everlasting life. Not surprisingly, rejuvenation is a topic as old as mankind and scientific literature on rejuvenation and longevity is gigantic and rapidly growing. The recent progress was fantastic. In 2022, several experts at the Longevity Summits in Dublin claimed that if you manage to be alive by 2040, you will have the opportunity of living 150-200 years [www.longevitysummitdublin.com]. Several rejuvenation interventions have been already discovered and proven to be efficient on yeast, animals, and humans. In particular, CR and IF diets, physical exercises, night sleep, and an array of promising drugs, including Metformin, Rapamycin, and Doxycycline, amino acids and peptides known for their potential to extend lifespan in mice, are currently being studied in dogs through the "Test of Rapamycin in Aging Dogs" (TRIAD) program. For example, Rapamycin prolongs life in yeast, worms, flies, prevents age-related conditions in rodents, dogs, non-human primates and ... humans. Rapamycin and Doxycycline are FDA-approved drugs and have been used safely for decades for other than rejuvenating purposes. Off-label use of Rapamycin, Doxycycline and other compounds have proven to be efficient for rejuvenation efforts. The purpose of this brochure and [i-rejuvenate](http://www.tirf-labs.com) page at the website www.tirf-labs.com is to share recent findings in this area.

Primum - Non Nocere. We base our rejuvenation activity on the Hippocratic Oath: "First, Do No Harm." There are numerous biohackers and misconceptions - underwater rocks you want to avoid. On the other hand, there are paradise islands you want to dwell on. And there are other ships sailing in the rejuvenation ocean. Certainly, longevity programs of Calico, Harvard University, NIH, and other big and small laboratories will result in revolutionary discoveries and practical methods of rejuvenation. There is already a substantial body of well verified, reliable, and harmless methods and cures. It is time to use them for your benefit. Right now, right here you have an opportunity to add up to ~15 years to your healthy life. This brochure will help you to avoid honest misconceptions that emerged and established due to extraordinary complexity of aging and rejuvenation. Besides, there are bad actors in this area, who are committing fraud to make profit out of your natural desire to stay healthy and live longer.

Unfortunately, as mentioned above in the area of rejuvenation there are numerous honest misconceptions, as well as intentional fraud, harmful methods, toxic substances, and bad actors to avoid. They include biohackers, who commit

honest errors. Sometimes their errors are fatal. Aaron Traywick, one of the first customers of TIRF Labs, passed away after making honest error of using dangerous DNA-based drug. He was an honest businessman and made an honest error, which turned to be fatal. It is human to err. But it is against law to commit fraud with public health. Regrettably, there are many toxic products and adverse methods that are driven to the market by for-profit purposes. For example, during last decade a group of celebrities died from experimental stem cell therapy. The advertising sounded innocently: “We take your cells, cultivate them in vitro, and inject them back into your body.” It sounded simple and attractive. But life is more complex phenomenon than we think about it. If your own cells appear in wrong place in wrong time, it can result in growth of bone tissues inside your eye, or a cancer tumor, which you did not anticipate. Such consequences have been documented. **All rejuvenation scientists agree that over-simplifications in this area may be damaging or even lethal.** Each live cell is as complex as the Universe. Human body consists of ~30 trillion live cells that are closely interconnected and interrelated with each other. We love simplifications, but should remember the principle of “Irreducible Complexity”, a term coined by Michael Behe, which refers to a biological system composed of several interacting parts. Removal of any one part causes the system to cease functioning. The purpose of this brochure is to share our findings in the area of rejuvenation, while keeping in mind the basic principle: “First - do no harm”. We welcome your comments and your thoughts. Please email to alex.asanov@tirf-labs.com.

2. MULTIPLE DIMENSIONS OF HUMAN BEING. TWELVE HALLMARKS OF AGING

Scientists are striving to understand the mechanism of aging and rejuvenation. When we look under the microscope at a live cell, we experience a spiritual feeling of appreciation to the supreme intelligence which created life. The trial-and-error approach of natural evolution, in principle, cannot result in such fantastically complex machine, which functions properly most of the time and is capable of reproducing itself. Besides, living creatures are capable of healing wounds and even regenerating lost body limbs and organs. At the molecular level rejuvenation means reversing back “the clicking time of aging” not just slowing down. Aging, longevity, rejuvenation are extremely complex multidimensional phenomena that scientists only recently began to study in depth.

3. COMPLEX MECHANISMS OF AGING AND REJUVENATION

DNA methylation, telomere shortening, clogging of blood vessels, mitochondria decline, cellular reprogramming, epigenetic regulation decay, accumulation of senescence cells, suppression of senescence-associated secretory phenotype – are just a few of numerous molecular mechanisms of aging. Stem cells-associated factors, calorie restriction, intermittent fasting, immune rejuvenation and heterochronic transplantation, rejuvenation therapy extended to cancer



Fig. 1. Human body is encoded by ~25,000 genes that produce ~2 million unique proteins to build ~10 trillion of our own cells. We share our body with ~20 trillion bacterial cells and ~100 trillion bacteriophages - viruses that control bacteria. Each mammalian cell is as complex as the Universe. Images at right show simplified ideas about molecular machinery of live cells. Amazing design, isn't it? The most amazing part is that this machinery functions properly and we are healthy most of the time!

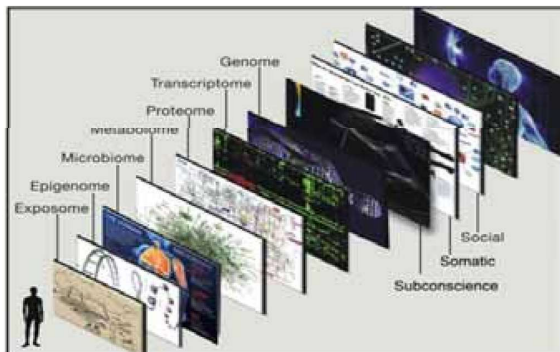
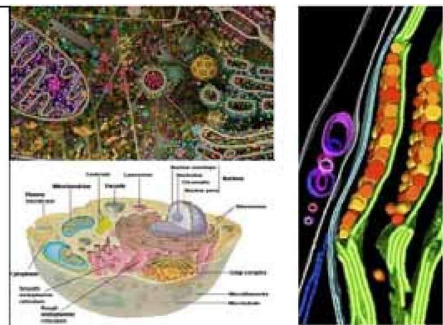


Fig. 2. There are multiple dimensions of human body, numerous systems, subsystems, organs, tissues, cells, organelles, extracellular matrix, and molecules that are related to each other, interact and depend on each other. To simplify studies, scientists created distinct disciplines, such as genomics, proteomics, microbiomics, that systematically accumulate knowledge about genes, proteins, microbes. Another nature does not care about the boundaries between disciplines. All of them closely interact and depend on each other. Certain areas, such as genomics, are in advanced state, in comparison with proteomics. Genes encode, but proteins actually rule our body. DNA are more stable than proteins. For this reason genomics received abundant funding over the last decades, while proteomics and other “dimensions” still await the stage of explosive growth. Several areas are still in the stage of their infancy. One of them is the dimension of “subconsciousness.” The effects of placebo and nocebo occur in the dimension of subconsciousness. However, the mechanisms are still not clear. Over decades pharma blocked funding of studies in this field.

treatment, induced pluripotent stem cells (iPSCs) in vitro via Yamanaka transcription factors – are the hallmarks of longevity and rejuvenation area.

To initiate the discussion, I would like to share with you my practical findings about the longevity drugs, substances, food additives, and lifestyle. I have analyzed and assembled the literature and other sources on the effects of different substances on longevity from the standpoint “do no harm”. When I am ranking rejuvenation substances and interventions, I base my assessments on the principle that at the first place they should not be toxic or harmful. Below is my list. Later, I will add more details, literature references, figures, video, and summary of your comments, if you send them to me: alex.asanov@TIRF-Labs.com.

Every human being is unique and uniquely responds to medications, substances, and other stimuli. In the perfect world all medical interventions should be personalized. Moreover, unique personalized response should change with time, depending on many internal and external factors. The literature on the effects of senolytic and rejuvenation drugs such as Dasatinib, Quercetin, Rapamycin, Fisetin, Navitoclax, Yamanaka factors, Doxycycline, only recently was published. Several independent studies demonstrated that Rapamycin and Doxycycline in small doses are capable of reprogramming cellular aging; short-term course – 3 week of Doxycycline 2-day/w; long-term rejuvenation - 10-months of Doxy 2 d/week. Evidently, the list will be complemented with new substances and new methods of intervention. Below is the list of longevity/rejuvenation interventions and substances known by the beginning of 2026.

Longevity Interventions number 1 – Calorie Restriction and Intermittent Fasting. Calorie restriction (CR)—the practice of reducing total caloric intake by 20–40% without malnutrition and Intermittent Fasting (IF) - long periods of fasting to trigger biological "cleanup" and repair processes that are often suppressed by constant eating. Instead of just focusing on weight loss, CR and IF approach aims to slow or even reverse biological aging. CR and IF are widely considered the most potent and consistent non-pharmacological “do-no-harm” interventions for extending lifespan, rejuvenation and improving health biomarkers in various species. And the bottom line – they are free of charge – just require strong will and determination. CR has been shown to work in a variety of species, including yeast, fish, rodents, and dogs to decelerate the biological aging process, resulting in longer maintenance of youthful health and an increase in both median and maximum life-span. This effect appears to be related to reduced oxidative stress. There is overwhelming evidence that CR and IF effectively slow the rate of biological aging and in certain instances promote rejuvenation. CR and IF trigger survival metabolic responses that reduce oxidative stress, lower fasting insulin, improve DNA repair mechanisms, and reduce concentration of senescence—the "zombie cells" that drive chronic inflammation (inflammaging). In mice, CR and IF have been shown to rejuvenate muscle stem cell function, allowing older tissues to repair damage as efficiently as younger ones. Fasting Mimicking Diet (FMD) has shown the ability to "reboot" the immune system and stimulate hippocampal neurogenesis (growth of new brain cells). CR is different from malnutrition; it requires sufficient amounts of micronutrients (vitamins and minerals) to be safe and effective.

Feature	Calorie Restriction (CR)	Intermittent Fasting (IF)
Primary Goal	Sustained metabolic slowdown	Metabolic "switching" (Fat to Ketones)
Adherence	Difficult (High dropout in trials)	Moderate (Easier for many to sustain)
Main Benefit	Maximum lifespan extension	Improved insulin sensitivity/weight loss
Best For	Extreme longevity enthusiasts	General health & metabolic maintenance

Longevity substance number 2- We have mentioned above **Vitamin C** - ascorbic acid. Vitamin C is a highly potent antioxidant. It has been shown to protect against various forms of cancer, and to extend lifespan in laboratory animals. Vitamin C appears to be a uniquely non-toxic compound. It is difficult if not impossible to obtain toxic concentration in blood by mouth. Moreover, very high concentrations in blood that were obtained by intravenous (IV) infusion of Vitamin C have been shown to be nontoxic to healthy cells and tissues, while selectively destroyed cancer cells. High IV doses of

Vitamin C might be a sensible alternative to toxic and expensive anti-cancer chemotherapies. Its low cost, off-patent and off-label status are behind the fact that official medicine has not approved it for anti-cancer treatments. The cost of clinical trials for anti-cancer drugs is of the ~\$2 billion order of magnitude. New government mechanisms are necessary to overcome this hurdle on the way of efficient anti-cancer remedy to standard medical practice.

Vitamin C has many other benefits for health, including: 1) anti-oxidation effect, as mentioned above, –it protects cells from damages caused by free radicals that are produced in food metabolism and may contribute to the development of cancer, heart disease, and arthritis. 2) Vitamin C is necessary for the growth, development, and repair of all body tissues, including bones, cartilage, blood vessels, and muscle. 3) Ascorbic acid supports the proper functioning of the immune system. 4) Ascorbic acid helps the body to absorb iron from plant-based foods. 5) Studies suggest that high vitamin C intake protects intellectual capabilities and memory. Low levels of vitamin C correlate with impaired thinking and memory. 6) Vitamin C promotes healthy gums, reduces allergy-related responses and the effects of sun exposure.

Human body doesn't produce and doesn't store Vitamin C. It's important to get it from your diet regularly. It helps to make collagen, which is important for wound healing, healthy skin, cartilage, tendons, ligaments, and blood vessels. You can get ascorbic acid from fruits and vegetables, and it's also available in pill form. As mentioned above, Linus Pauling, winner of two Nobel Prizes, studied Vitamin C and discovered numerous therapeutic benefits of this natural compound. Literature references, as mentioned above, are available here: ipi.oregonstate.edu. High-dose intravenously administered vitamin C is widely used in cancer patients by complementary and alternative medicine practitioners [www.pmc.ncbi.nlm.nih.gov/articles/PMC7996511].

Longevity substance number 3 - DMSO – Dimethyl Sulfoxide. DMSO – is a unique miracle compound of natural origin obtained from wood, which meets the requirements – “Do-No-Harm”. It has been shown to be a panacea from numerous health problems. More than 40,000 research articles have been published on the greatest range of healing effects ever recorded for a single compound. The handbook on DMSO, “A New Paradigm in Healthcare” by Dr. H. A. Fischer and Dr. S. Dafydd, is available here: https://www.google.com/books/edition/The_DMSO_Handbook/t7nijwEACAAJ?hl=en. In many countries DMSO is a must-have-first-aid liquid in emergency vehicles. One more handbook by Archie H. Scott, iUniverse, LLC, Bloomington, 2015.02.01 can be downloaded free of charge here: <https://www.eden-shop.eu/wp-content/uploads/2020/06/Scott-Archie-DMSO-Handbook.pdf>. The table of contents shows the broad spectrum of DMSO applications.

Longevity substance number 4- Melatonin - is the most documented anti-aging therapy. The literature on Melatonin is vast and rapidly growing. Similar to Vitamin C, Melatonin is a highly potent antioxidant, which protects us against neurological aging. There are data showing that Melatonin protects against every known age-related disease. It has been shown to extend lifespan in laboratory animals. Melatonin also regulates night sleep and other circadian rhythms. Melatonin is involved into molecular machinery of numerous hallmarks of aging, demonstrating the principle that molecular pathways of different hallmarks are closely interrelated. Although there has been no evidence of toxicity in any of the published studies on Melatonin, my personal experience showed some discomfort if I took more than 5 mg/day. If I took 3 mg before bed, it resulted in good night sleep and no discomfort, while taking 10 mg gave me a minor headache in the morning. In Europe Melatonin is a prescription drug. In the U.S. you can buy it as a food additive.

Longevity substance number 5 - Acetyl-L-carnitine. There is an explosion of publications about acetyl-L-carnitine for life extension. This is a modified amino acid compound, which enters the bloodstream and penetrates cell membranes more effectively than regular L-carnitine. Acetyl-L-carnitine, 2 gram/day dose is beneficial to heart muscle cells, immune system, and probably enhances energy production in every cell of the body. The multi-faceted benefits of acetyl-L-carnitine in brain cells makes it the single most important supplement we can take to maintain and improve overall neurological health. Acetyl-L-carnitine has been shown to improve neurological function even after we stop taking it, which suggests that acetyl-L-carnitine may reprogram neuronal and neurotransmitter functions to enable the brain to function in a more youthful, energetic state. Healthy individuals are recommended to take at least two 50-day cycles (2 capsules each day – 2x0.5 g= 1.0 g) of acetyl-L-carnitine supplementation every year. If you can afford to take acetyl-L-carnitine more often, this should produce greater benefits.

Longevity substance number 6 - Deprenyl, also known as **Eldepryl**. Deprenyl is a potent inhibitor of MAO-B, the type of MAO protein that damages brain cells during normal aging. Taking Deprenyl results in dramatic life extension effects in animals. However, it appears that Deprenyl alone will not do as well in humans. In laboratory rats, the elevation of monoamine oxidase (MAO) plays a greater role in the aging process than in humans. Some patients take Deprenyl to help prevent Parkinson's disease and the symptoms of aging that are very similar to those suffered by Parkinson's patients. There is substantial body of evidence, which suggests that Deprenyl protects many types of brain cells from premature aging and death. There is also evidence that Deprenyl boosts cellular production of SOD and catalase, the natural antioxidant enzymes that are depleted in aging. Typical protocol suggests 2-5 Deprenyl tablets (5 mg) a week for those in their 40s. The older you are, the more Deprenyl you should take, but it is advisable not to take more than one 5-mg tablet (or capsule) of Deprenyl a day unless you have the early symptoms of Parkinson's or Alzheimer's disease. In this case, you should take 10 mg of Deprenyl a day under the supervision of a physician.

Longevity substance number 7 - Metformin. Metformin is an FDA approved first-line drug for the treatment of type 2 diabetes. Recently, FDA approved Metformin for extended studies on human subjects for its effect on lifespan extension. Metformin has been known for its beneficial effects on glucose metabolism. Evidence from animal models and *in vitro* studies suggest that in addition to its effects on glucose metabolism, Metformin may influence metabolic and cellular processes associated with the development of age-related conditions, such as inflammation, oxidative damage, diminished autophagy, cell apoptosis. As such, Metformin is of particular interest in clinical translational research in aging since it may influence fundamental aging factors that underlie multiple age-related conditions. The investigators proposed a study to examine the effect of Metformin on the biology of aging in humans, namely, whether treatment with Metformin will restore the gene expression profile of older adults with impaired glucose tolerance (IGT) to that of young healthy subjects. Metformin is a prescription drug.

Longevity substance number 8 - Phosphatidylserine (PS) is an essential component in phospholipid membranes of certain cells. It is sold as a drug in Europe at outrageously high prices, despite this being a phospholipid, which is easy and inexpensive to produce, for example from sunflower seeds. In the U.S. Phosphatidylserine is available as a dietary supplement. There is extensive evidence about the anti-aging benefits of Phosphatidylserine. Phosphatidylserine may produce a cumulative effect that could enable people to reduce their dosage of the drug after attaining the desired cognitive enhancing benefits.

Longevity substance number 9 - Centrophenoxine. Longevity studies have documented anti-aging properties for the combination of DMAE and p-chlorophenoxyacetate. These two ingredients make up Centrophenoxine - a potent life extension drug sold under several names, including Lucidril. Centrophenoxine has been shown to extend the lifespan of laboratory mice. It reduces a type of cellular debris called lipofuscin (aging pigment) in the neurons that populate our brain and central nervous system. The excessive accumulation of lipofuscin with advancing age has been linked to age-related neurologic diseases. Centrophenoxine speeds up information processing in the brain and enhances brain cell uptake of glucose. Brain cells use glucose to produce the energy they need to perform their neurological functions and to maintain cell viability. Some people cannot tolerate even one tablet a day of Centrophenoxine, while others can take 1-4 tablets a day and experience dramatic cognitive and energy enhancing effects. Centrophenoxine is available from sources in Europe and the U.S. at affordable prices.

Longevity substance number 10 - GH3 and KH3. GH3 and KH3 are popular longevity compounds. Their active agent is procaine, an anti-aging drug discovered in the 1950s by Romanian physician Ana Asian. Both GH3 and KH3 suppress monoamine oxidase (MAO) levels. Elevated MAO destroys the essential neurotransmitters dopamine and norepinephrine. GH3 or KH3 also suppress elevated serum cortisol levels, which has been linked to several of the degenerative diseases of aging. GH3 and KH3 can be taken every day including the days you take Deprenyl, which is a selective MAO inhibitor. An appropriate dose of these drugs is one to two GH3 or KH3 tablets daily. Some doctors believe you should take a five days break from these drugs once a month to avoid too much monoamine oxidase suppression.

Longevity substance number 11 - Piracetam. It is the most frequently used off-label nootropic drug to boost short-term memory and overall cognitive function. There are more than 800 published studies documenting that Piracetam promotes youthful neurologic function, including enhanced cellular protein synthesis, interhemispheric and intercellular communication. Stroke victims might avoid paralysis, if given piracetam after entering the hospital. Even in patients who suffered stroke-induced brain cell injury years ago, there is evidence that piracetam may help to improve the functioning of these damaged cells. Piracetam is available in Europe and the U.S. at affordable prices.

Longevity substance number 12 Vitamin D3 - Vit D3 is considered one of the most cost-effective and efficient longevity factors because it acts as a hormone that regulates over 1,000 genes, many of which are directly involved in the hallmarks of aging. While scientists hesitate to call any single supplement "essential" for everyone, breakthrough data from 2025 has solidified its role as a key modulator of biological age. The 2025 "Telomere Breakthrough" recent results from the VITAL study (a large-scale, 5-year randomized trial) published in late 2024 and early 2025 provided the first high-level evidence that Vitamin D can slow cellular aging in humans. *Telomere Protection:* Participants taking 2,000 IU of Vit D3 daily experienced significantly less telomere shortening over four years compared to the placebo group. The "3-Year" Effect - researchers calculated that this preservation of telomeres was equivalent to slowing biological aging by approximately 3 years. Unlike many other supplements, this was a "gold standard" double-blind trial, making it one of the strongest links between a vitamin and a biological aging clock. *Efficiency in Mortality and Disease Reduction:* Vitamin D's efficiency is most visible in its ability to reduce the risk of the leading causes of death. *Cancer Mortality:* A meta-analysis of over 100,000 participants confirmed that Vit D3 supplementation reduces the risk of cancer death by 15%. It appears more efficient at preventing fatal cancer than preventing the initial occurrence of the disease. *All-Cause Mortality:* Deficiency (levels below 20 ng/mL) is strongly linked to a higher risk of early death. However, supplementation is most efficient for those who are initially deficient; for those with already high levels, the extra longevity benefit is marginal. *Epigenetic Clock:* Studies using Horvath's Clock (DNA methylation) have shown that 4,000 IU/day can significantly decelerate epigenetic aging, especially in individuals with high body mass index. *Key Longevity Mechanisms* - Vit D doesn't just "fix bones"; it targets several hallmarks of aging, including genomic stability. It enhances DNA repair mechanisms, preventing mutations. *Inflammaging:* It suppresses the NF-κB pathway, reducing the chronic, low-grade inflammation that accelerates aging. *Proteostasis:* It helps the body clear out toxic misfolded proteins, a process that usually fails in neurodegenerative diseases like Alzheimer's.

To maximize Vit D's efficiency as a longevity factor - target for blood levels between 40–60 ng/mL. The dose: 2,000 IU/day is the dose proven to protect telomeres, but many experts suggest up to 4,000 IU if you are deficient. Co-factors: always

Factor	Vitamin D3	Metformin	Calorie Restriction
Primary Mechanism	Gene Regulation/DNA Repair	Metabolic Signaling (AMPK)	Autophagy/Sirtuins
Longevity Impact	High (in deficiency)	Moderate (under study)	Very High
Rejuvenation Potential	Moderate (Telomeres)	Low (Slowing only)	High (Stem cells)
Cost/Risk	Extremely Low	Low (Prescription only)	Hard to sustain

take it with Vitamin K2 (to ensure calcium goes to bones and not arteries) and a fat-containing meal for absorption.

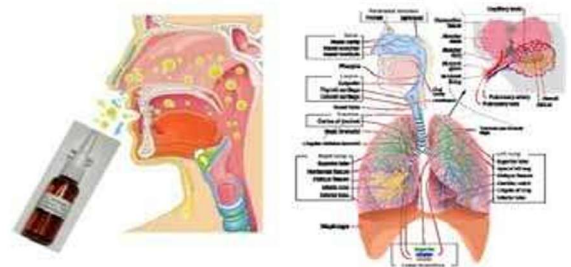
Longevity substance number 13 - Human Growth Hormone. Growth hormone deficiency is a major reason for the decline in immune function and protein synthesis with aging in both muscle and neurologic tissues. Injections of synthetic human growth hormone have been used by geriatric physicians to rejuvenate aging men by increasing their muscle mass, strength, flexibility, and coordination. Growth hormone is highly potent rejuvenation drug. Recent studies suggest that growth hormone may be an effective treatment for Alzheimer's disease and Parkinson's patients. Unfortunately, human growth hormone is artificially overpriced. The current price of synthetic human growth hormone ranges from \$12,000-225,000 annually, while its cost is \$200-300/year. FDA restricts its sale in the United States.

Producing synthetic growth hormones is as inexpensive as to synthesize insulin. Without FDA interference, most Americans could afford injections of growth hormone in an effort to slow aging.

Longevity substance number 14 - Rapamycin. The drug Rapamycin, known for its potential to extend lifespan in mice, is being studied in dogs through the Dog Aging Project's "Test of Rapamycin in Aging Dogs" (TRIAD) clinical trial, with the goal of potentially extending healthy lifespan in dogs and gaining insights into human longevity. Rapamycin also prolongs life in yeast, worms and flies, and it prevents age-related conditions in rodents, nonhuman primates and humans. Rapamycin and its analog, Everolimus, are FDA approved for human use and have been used safely for decades. For humans Rapamycin is currently considered the gold standard pharmacological intervention in geroscience. While originally an FDA-approved immunosuppressant for organ transplants, it is now globally recognized for its potential to both extend lifespan and rejuvenate aging biological systems. As of early 2026, it remains the most reliable drug for extending the maximum lifespan of every animal species tested to date. Rapamycin's primary claim to fame is its consistency. Unlike many other "miracle" supplements, it has passed rigorous testing in diverse labs. *Animal Consistency:* In the National Institute on Aging's Interventions Testing Program (ITP), Rapamycin consistently increased the median lifespan of mice by 10–25%, even when started in "middle age" (equivalent to a 60-year-old human). *The 2025 Meta-Analysis:* A major study published in Aging Cell in 2025 confirmed that Rapamycin is the only drug that mirrors the life-extending effects of Calorie Restriction (CR) across eight different vertebrate species, essentially acting as a "CR mimetic" in pill form. *Rejuvenation Potential* refers to making old tissues function like young ones. Rapamycin achieved several breakthroughs in this area between 2024 and 2026: *Immune Rejuvenation:* A landmark 2026 Oxford study showed that low-dose Rapamycin directly protects the genome of aging human T-cells. It reduced DNA damage markers and suppressed cellular senescence (the "zombie cell" state), effectively making the immune system more resilient against infections and cancer. *Muscle & Physical Function:* The PEARL Trial (2025)—the longest human trial to date—found that low-dose, weekly Rapamycin significantly improved lean muscle mass and reduced chronic pain in aging women, suggesting it can partially reverse the frailty associated with age. *Skin Rejuvenation:* Topical Rapamycin has been shown to increase collagen production and reduce the number of senescent cells in human skin, leading to a visible reduction in wrinkles and age spots in clinical trials.

How Rapamycin works: it is a mTOR switch. Rapamycin inhibits mTOR, a protein that acts as the body's primary "growth vs. repair" switch. When mTOR is high: The body is in "growth mode" (building protein, dividing cells). This is good for youth but bad for aging, as it accumulates cellular junk. When Rapamycin inhibits mTOR, the body turns into repair mode, which triggers autophagy—a cellular recycling process, where the body destroys damaged proteins and organelles, effectively cleaning the cells from the inside out. Rapamycin is highly efficient at triggering the body's repair systems (autophagy) and reducing inflammation (inflammaging). It is currently the leading candidate for a true anti-aging drug. But it is best viewed as a tool for delaying disease and maintaining function rather than a magic pill for immortality. *Warning on Side Effects:* At high doses Rapamycin can cause mouth sores, high blood lipids, and insulin resistance. Longevity enthusiasts typically use low-dose, intermittent (once-weekly) protocols to avoid these issues.

Longevity substance number 15 - Ivermectin. Ivermectin, as mentioned above, a Nobel-prize-winning miracle drug, has found numerous applications, including - prevention and curing many RNA viruses, several DNA viruses, tuberculosis, malaria, certain cancers, epilepsy, inflammations, helminths, and many other diseases. As it frequently happens with natural compounds, ivermectin was found to be active in broad spectrum of biological pathways, which means potential use for prophylactics and treatment of different diseases. After its discovery in 1975, several areas of applications were found for Ivermectin. Unlike most of other substances, including over-the-counter drugs like aspirin that toxic in large doses, it is too difficult if not impossible to consume toxic amounts of Ivermectin. Biomedical experts concur that Ivermectin is a genuine miracle drug developed by nature. By 2026, 10,000+ studies were published about use of Ivermectin that



For prophylactics of Corona, flu, and other RNA viruses apply one spray, which is ~1.5 mg of Ivermectin, into your mouth. Do not swallow; inhale the vapor into your lung; exhale through your nose to populate sinus with Ivermectin vapor. This breath works for 3-4 hours as prophylactics against RNA viruses. For treatment of Corona and flu apply 10 sprays (~15 mg) into your mouth and swallow.

describe it as a real wonder drug [www.ncbi.nlm.nih.gov/pmc/articles/PMC3043740; *New Microbes, New Infect*, 2021 Aug 3;43:100924. Ivermectin: a multifaceted drug of Nobel prize-honored distinction with indicated efficacy against a new global scourge, COVID-19. A Santin et al].

Longevity substances and methods number 16 - Aromatherapy. Frankincense, Eucalyptus, Lemon, Peppermint, Rosemary, Lavender, and other essential oils are likely a secondary tool, not a primary longevity pill like the Metformin or Vitamin D mentioned above. Aromatherapy is the most efficient when used for symptom management (stress, sleep, focus), rather than as a direct method to slow the biological clock. In the longevity landscape of 2026, aromatherapy has evolved from a "general wellness" category into a specialized field known as Olfactory Enrichment. While it lacks the "brute force" efficiency of Rapamycin or Calorie Restriction for extending maximum lifespan, it has secured a critical place in health span (quality of life) through its peer-reviewed impact on brain aging and stress resilience. The most significant data supporting aromatherapy as a "high-efficiency" longevity tool comes from olfactory-cognitive link research.

- The 226% Memory Boost: Landmark trials (U.C. Irvine, 2024–2025) found that older adults exposed to nightly rotating scents for two hours experienced a 226% improvement in memory performance.

- Direct Neural Pathways: Unlike supplements that must survive digestion and cross the blood-brain barrier, aromatic molecules have a "shortcut" to the limbic system and hippocampus (memory center) through the olfactory bulb.

- Brain Resilience: In 2026, losing the sense of smell is recognized as one of the earliest biomarkers for Alzheimer's. Regular "smell training" is now used in longevity clinics to maintain neural plasticity and "pre-hab" the aging brain.

Biological Mechanisms. Aromatherapy doesn't "fix" aging cells in the same way as the senolytics do, but it mitigates Allostatic Load (the cumulative wear and tear on the body):

- HPA Axis Regulation: Essential oils like Lavender and Sandalwood are clinically used to lower cortisol levels, preventing the chronic inflammation ("inflammaging") that high stress causes.

- Telomere Protection: Preliminary 2025-2026 studies on Rosemary and Holy Basil (Tulsi) suggest they may reduce the expression of *TERF-1*, a protein that suppresses telomere length, though this is currently considered "indirect" protection.

- Mitochondrial Quality: New research into the Nrf2 pathway shows certain aromatic compounds can trigger antioxidant defense systems in vascular cells, potentially slowing the aging of the circulatory system.

Current 2026 Clinical Protocols. If you are looking for aromatherapy for longevity, the 2026 clinical standards are: The "Nightly Rotation" Protocol: Using a device (like Memory Air) to rotate 7 different scents (Rose, Orange, Eucalyptus, Lemon, Peppermint, Rosemary, Lavender) for 2 hours each night. This prevents "habituation" and keeps the brain's sensory centers active. Using Rosemary or Peppermint during deep work sessions to increase beta-wave activity and focus, effectively "biohacking" cognitive performance for those over 50. Aromatherapy alone will not make you live to 120, but it is one of the most efficient, low-risk ways to ensure your brain function matches your extended lifespan.

Longevity method of interventions number 17 – Electric Field: tDCS, tACS, tRNS, Lyapko applicator, Volcano Zapper, other methods of electric field, electromagnetic and electrochemical polarization in biological systems. Lyapko applicator, Volcano Zapper, tDCS, LifeWave.com. Studies and applications of the effect of electric field and electrochemical polarization is already enormous and rapidly growing area. US military successfully employs transcranial direct current stimulation (tDCS) is a noninvasive brain stimulation technique that uses weak electrical currents to modulate brain activity. tDCS device does not inject any substances into human body, but stimulates brain to enhance memory and intelligence skills of military staff. Study paves the road for personnel such as drone operators to have electrical pulses sent into their brains to improve effectiveness in high pressure situations. [www.theguardian.com/science/2016/nov/07/us-militarysuccessfully-testselectrical-brain-stimulation-to-enhance-staff-skills]. In 2017 DARPA funded studies of electrical brain stimulation to speed learning [www.defense.gov/News/News-Stories/Article/Article/1164793/darpafundsbrain-stimulation-research-to-speed-learning]. DARPA-funded studies demonstrated the effect of tDCS even in dogs and monkey, excluding the placebo effect. The literature on tDCS and similar effects is enormous. There are numerous other biologically active

Page 10 of 14 [Vitamin C, DMSO, Ivermectin, and several other substances and methods can add 20+ years to your healthy life](#)



methods that employ electric and electromagnetic field, electrochemical effects, photonic devices based on lasers and LEDs. Some of them are used golden standards of scientific studies and double blinded clinical trials to prove reproducibility of the results. On the other hand, there are many products at the market that have no scientific studies and clinical trials to support their effectiveness. *Related methods*: reflexotherapy, acupuncture, electric pulse stimulators, Lyapko applicator with galvanic pairs. This section requires additional insights and references.

Longevity method number 18 – Non-dairy, no cow milk diet – Dr. Jane Plant, UK, cured her stage 4 breast cancer. Her case is documented in scientific literature. China, Japan, several other Asian countries that traditionally do not consume cow milk enjoy exceptionally low rate of breast and prostate cancer, unlike Western countries, where cow dairy products are traditionally popular.

Longevity substances number 19 – **Microbiome, probiotic, prebiotic**, fibers, microbiome implants... This section awaits to be populated with additional subsections on different applications and literature references.

Longevity substance number 20 - Doxycycline – reprogramming short-term – 3 week of doxy 2-day/w; long-term rejuvenation 10-months of doxycycline 2 d/week. This section will be populated with additional subsections on different applications and literature references.

Longevity substances number 21 - NAD+, Hydrogen. This section will be populated with additional subsections on different applications and literature references.

Longevity methods number 22 - plasmapheresis, hemosorbition, hemodialysis and hemoperfusion. This section requires additional subsections on different applications and literature references. www.gemos.ru

Anti- Longevity Substance number 1 - Ethanol - alcohol. There is no safe dose of ethanol. Numerous studies demonstrated that even small doses of ethanol consumed with wine or beer result in systematic pathological changes in cell membranes, increase of extracellular calcium, pathological changes in ECM (extracellular matrix) and damages to cellular organelles, including mitochondria. Short-term abstinence from alcoholic beverages results in decrease of ethanol concentration in blood and other bodily fluids. However, elevated levels of extracellular calcium, cell membrane composition, and many other alcohol-dependent biomarkers stay high during 6-8 weeks after the last dose of ethanol was consumed. If you apply for a job at the FBI or CIA, your blood analysis will reveal your alcohol consumption or abstinence during the last 6-8 weeks. 2% of ethanol metabolites into a phospholipid-AZX, which affects ionic sensitivity of membranes in the entire body. While major ethanol metabolites such as acetone, aldehydes, and acetates are removed from your body in 4-8 hours, it takes 6-8 weeks to metabolite out ethanol-related phospholipid-AZX. This phospholipid systematically alters cellular membranes all around your body, including brain. While drastic impairment, which is not compatible with operating machinery, lasts 4-8 hours, the systematic changes to cellular membranes continues 1.5-2 months, after the last dose of alcohol was consumed. Extracellular calcium, phospholipid-AZX, phosphatidylethanol (PEth) are molecular markers for heavy drinking. They can detect heavy drinking from the past 1–2 weeks. Ethyl Glucuronide (EtG) can be measured in hair to assess consumption over several months. Fatty Acid Ethyl Esters (FAEE) - products of ethanol reacting with fatty acids, often found in the liver, fat tissues, and hair. They are useful for distinguishing social drinkers from heavy drinkers. The markers listed below reflect the body's physiological "strain" or damage caused by chronic alcohol exposure.

- Carbohydrate-Deficient Transferrin (CDT): Alcohol interferes with the way sialic acid attaches to the protein transferrin. High levels typically indicate heavy drinking (approx. 5+ drinks/day) over the previous 2 weeks. It is the only FDA-approved lab test for monitoring heavy alcohol consumption.

- Gamma-Glutamyl Transferase (GGT): A liver enzyme that increases with chronic drinking. While common, it is less specific because other liver conditions or medications can also raise GGT levels.

- Mean Corpuscular Volume (MCV): Chronic alcohol use often causes red blood cells to enlarge (macrocytosis). This is a late-stage marker, typically changing only after 4–8 weeks of heavy use.

- **AST/ALT Ratio:** Elevated liver enzymes where AST is significantly higher than ALT (often a 2:1 ratio) is a classic molecular signature of alcohol-induced liver injury.

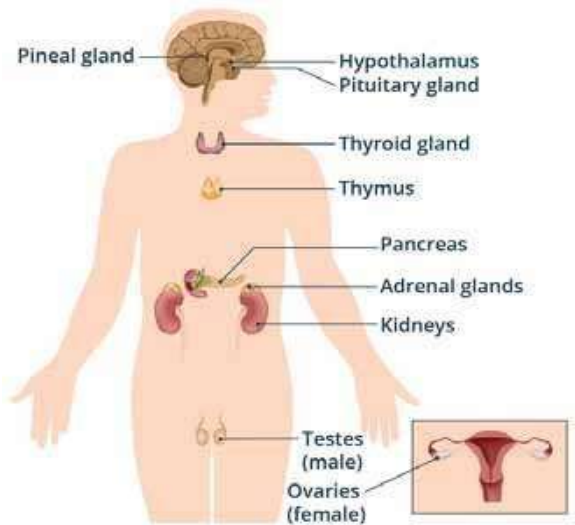
ALCOHOL ACCELERATES AGING and leaves its marks on DNA and gene expression, which may predispose individuals to addiction or indicate long-term Alcohol Use Disorder (AUD).

- **DNA Methylation:** Chronic alcohol use causes global and gene-specific changes in DNA methylation (often hypomethylation), particularly in brain regions like the amygdala and prefrontal cortex.
- **Histone Modifications:** Alcohol-induced changes in histone acetylation and methylation can alter how genes are "read," contributing to the brain plasticity associated with dependence.
- **MicroRNA (miRNA):** Alcohol alters miRNA expression profiles, which can impact pathways related to inflammation and neuronal signaling.

Anti- Longevity Substances number 2-.....n -- TBD: toxic food additives, synthetic dyes, preservatives, conservatives, taste enhancers, MSG, residual amounts of Roundup other herbicides and pesticides, etc. The U.S. Secretary of Health and Human Services RFK Jr. claims that ~10,000 food additives are approved by FDA for use in the USA, but are forbidden in Europe.

Topics Related to Rejuvenation

Placebo and Nocebo effects exhibit gigantic positive and negative potentials for rejuvenation, respectively. In clinical trials 65% of tested respond to placebo pill of neurological drugs similar to that for real substance. The average placebo rate for all drugs, including aspirin, is 15%. What is the "problem" with these 65% and 15%? It is good problem to have? They respond to a non-toxic sugar pill the same way as for toxic drug, but without the inevitable adverse side effects of real drug. Without any substances their bodies respond to their faith that they are taking the real drug the same way as for those with the real toxic drug circulating in their blood? In fact, the response of placebo-effect-actors is even much better that that with real drug – they do not need toxic substances for their response. Why 65 and 15% and not 100%-100%? The answer is in Faith. Not everyone believes that your Faith, your thoughts can stimulate your endocrine system better than a toxic pharmaceutical substance. Pineal, pituitary and other glands in your brain can be stimulated via psychic directives, meditation, self-hypnosis, sub-conscious and mindful sentiments to produce equal or better response in the entire body. It means that placebo responders produce in their bodies natural compounds that are as efficient as real drugs, but have no toxic side effects. Placebo effect awaits careful attention and fundamental studies. The factor of faith is an imperative constituent of the placebo effect. If you do not trust, a sugar pill will not work for you. It appears that many marginal technologies exploit the placebo effect. Pharmaceutical companies do not want to hear about placebo. It should be the task for the government to transfer the placebo into the field of desirable and useful medical intervention effects.



Nocebo is an even more powerful effect than placebo. It is an effect of a sugar pill or harmless treatment which is administered to a patient and the patient is told that the pill is associated with undesirable or harmful side effects. Up to 80% of patients experience nocebo effects. Students of medical schools often experience nocebo effect: "What we study - is what we are sick with". Unlike placebo, the nocebo effect involves Fears – more powerful biological reactions. Subconscious fears and negative expectations produce the effect similar to toxic drug or harmful treatment.

Other topic to be considered for Rejuvenation:

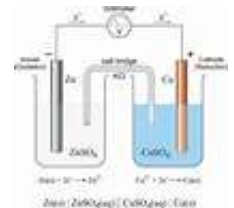
- Meditation, Reiki practice, Chinese medicine, Acupuncture, Herbal prescriptions, Massage, Sauna, Eye of Revelation: The Ancient Tibetan Rites of Rejuvenation rituals, Chinese gentle exercises called Qi Gong, Over-diagnosing /under-diagnosing, Over treatment/under treatment, Ageing biomarkers panel, Blue longevity zones, Chemistry of happiness, Longevity and rejuvenation workshops, senolytic drugs – Quercetin, Doxycycline, Yamanaka factors,

Doxycycline – reprogram short-term – 3 week of doxycycline 2-day/w; long-term rejuvenation 10-months of doxy 2 d/week; Electric-field effects – no toxic chemicals; Herb remedies; Perform the best diagnosing of yourself: listen to the responses of your body 24/7/365; unique response – unique treatment; fast and slow responses: 0-3 days, 0-4 weeks, 1 month – 10 years; Look at you family history, your genes; young blood transfusion; blood vessels cleaning; Self-hypnosis;

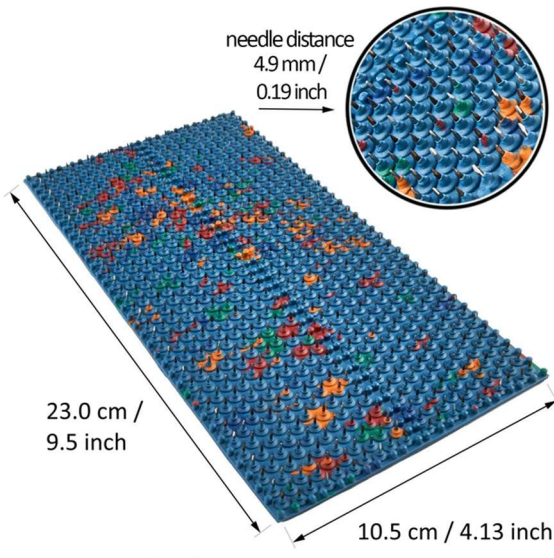
- How to avoid Medical errors – 3rd cause of death in the USA, avoid pharma corruption - 30% useless, toxic drugs, \$15B/year industry; toxins in food, drinks, water.

At Longevity Summit Dublin 2022 several internationally renowned speakers claimed: If you manage to survive till 2035, you will have the opportunity to live 150-200 years in good health. The progress in the area of longevity explodes with rejuvenation studies. Scientists are capable not only of slowing down aging, but reversing the process back.

The Phase 2 clinical trials for the tooth-regrowing drug (TRG035/anti-USAG-1 antibody) are scheduled to begin in **2025** in Japan following the completion of safety testing in adults: <https://newatlas.com/medical/tooth-regrowing-human-trial/>



Lyapko applicators use electrochemical polarization which occurs between galvanic couples of nails coated with different metals. Small electric current, which flows through the skin causes healing effects.



“Emerging” Electric Field Interventions: In fact, existing for long time and widely used are grounding bedsheets, Lyapko applicators, tDCS, tACS, tRNS, Volcano Zapper devices, etc. They use the effect of electric field and electrochemical polarization on biological systems. This section requires additional subsections on different applications and literature references.

