



ANTI AGING THERAPY: VARIOUS ALIGNMENTS TO CONTROL PREMATURE AGING

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ABSTRACT

Aging changes occur to molecules (DNA, proteins, lipids), to cells and to organs. Diseases of old age (diseases which increase in frequency with age, such as arthritis, osteoporosis, heart disease, cancer, Alzheimer's Disease, etc.) are often distinguished from aging per se. Some gerontologists prefer to use the word senescence because "aging" implies that the passage of time necessarily results in deterioration (biological entropy) which is certainly not true during the early, developmental, time of life (before the age of 10 or 12 in humans). Human beings reach a peak of growth and development around the time of their mid 20s. Aging is the normal transition time after that flurry of activity. Although there are quite a few age-related changes that tax the body, disability is not necessarily a part of aging. Health and lifestyle factors together with the genetic makeup of the individual, and determines the response to these changes.

KEYWORDS

Aging, biological entropy, time-sequential, osteoporosis, Alzheimer's disease.

INTRODUCTION

Aging refers to the time-sequential deterioration that occurs in most animals including weakness, increased susceptibility to disease and adverse environmental conditions, loss of mobility and agility, and age-related physiological changes. Aging is usually understood to include reductions in reproductive capacity. It is assumed that aging includes changes in reproductive capacity including behavioral patterns such as "reproductive vigor" or strength of the urge to mate. Reproductive capacity and aging have similar theory issues as will be discussed later. Aging is a syndrome of changes that are deleterious, progressive, universal and thus far irreversible. Body functions that are most often affected by age include:^{1, 2, 3-8}

Hearing, which declines especially in relation to the highest pitched tones. The proportion of fat to muscle, which may increase by as much as 30%. Typically, the total padding of body fat directly under the skin thins out and accumulates around the stomach. The ability to excrete fats is impaired, and therefore the storage of fats increases, including cholesterol and fat-soluble nutrients.

- The amount of water in the body decreases, which therefore decreases the absorption of water-soluble nutrients. Also, there is less saliva and other lubricating fluids.
- The liver and the kidneys cannot function as efficiently, thus affecting the elimination of wastes.
- A decrease in the ease of digestion, with a decrease in stomach acid production.



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- A loss of muscle strength and coordination, with an⁹ accompanying loss of mobility, agility, and flexibility.
- A decline in sexual hormones and sexual functioning.
- A decrease in the sensations of taste and smell.

Changes in the cardiovascular and respiratory systems, leading to decreased oxygen and nutrients throughout the body^{4, 7, 9, 10, 11, 12}.

- Decreased functioning of the nervous system so that nerve impulses are not transmitted as efficiently, reflexes are not as sharp, and memory and learning are diminished.
- A decrease in bone strength and density.
- Hormone levels, which gradually decline. The thyroid and sexual hormones are particularly affected.

Declining visual abilities. Age-related changes may lead to diseases such as macular degeneration.

A compromised ability to produce vitamin D from sunlight¹⁴.

A reduction in protein formation leading to shrinkage in muscle mass and decreased bone formation, possibly leading to osteoporosis.

Wellness and Antiaging

Skin damage caused by exposure to the sun, loss of skin elasticity, wrinkles, skin blemishes, and an overall lack of energy are all symptoms of the natural aging process. Using a variety of tests and anti aging treatments, Dr. Caldron can help you turn back the hands of time by reversing skin damage and restoring the vitality that you have lost over time to return you to optimal health.

- The age related medical conditions common with middle aged persons.... & the same conditions that can severely alter a post middle aged person's life.
- AGING: Symptoms, Causes and Cures
- By Rosha Roush
- Premature aging can be sped up or slowed down

depending on your lifestyle. Hate, anger, resentment and negative thoughts speed up our biological time bomb while love, laughter, and positive thoughts slow down the aging process. A type "A" personality, who is on the go all the time, and cannot slow down for recreation or relaxation may have an early heart attack and speed up the aging process.

- Hearing loss also is a sign of aging. High fat in the blood can cause hearing problems and some doctors feel that hearing loss is one symptom of future heart disease.
- Other symptoms associated with aging are: Autoimmune Diseases, Autointoxication, Constipation, Degenerative Diseases, Lack of Exercise, and Nutritional Deficiency.
- As we reach maturity, at about age 19, there are cells in our body that stop reproducing. They are sensor cells in the intestinal tract, the nervous system, including the brain cells and the myocardial, and muscles of the ear cells that stop reproducing and gradually lose their functional potential.
- Free radicals disrupt at the cellular level and cause diseases such as cancer, immune disorders, inflammatory conditions and more. Free radicals are similar to an acid burning a cell which creates a chain reaction and causes all kinds of disruptions. These free radicals are caused by many things such as alcohol, tobacco, radiation, drugs, over the counter drugs, diet, food additives, stress, air pollution, which contains lead, cadmium and mercury, and even the lack of exercise¹⁵⁻¹⁸.

Therapy

Nutritional Therapy

- Exercise is important. Lack of exercise causes loss of bone and muscle mass and inevitable physical degeneration. Food assimilates better when we exercise. Good nutrition and exercise protects the cardiovascular system, maintains

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circulation and oxygen to the cells and tissues. A lack of exercise can speed up the aging process.

- The following foods contain nucleic acid, which protects against aging. These foods also regulate metabolism and cell structure and promote proper enzyme action and hormone balance. They are: Asparagus, beets, bran, brewer's yeast, buckwheat, chickpeas, honey, kidney beans, lentils, lima beans, millet, navy beans, nuts (especially almonds), sardines, salmon, soy beans, split peas, tuna, vegetables, wheat germ, and yogurt, are all beneficial. Sprouts contain all the essential amino acids.

Herbs that help slow the aging process are;

Ashwaganda – It is rejuvenating, balancing, strengthening, and calming to the nervous system. Helps relieve fatigue, nervous exhaustion, and memory loss. It also promotes tissue regeneration and slows the aging process.

Bee Pollen - High in aspartic acid, an amino acid that is able to stimulate the glands to promote a feeling of physical rejuvenation. Helps build resistance to diseases. Helps the hormonal system. It normalizes the activity of the intestines. Helps to boost healing powers and provides the body with energy.

Ginkgo – Is a gift for the aging. It increases oxygen and blood flow to the brain and extremities, improves mental clarity and inhibits free radical scavengers from destroying cells.

Ginseng – Stimulates the entire body energy to overcome stress, fatigue and weakness, especially mental fatigue. Improves the brain cells, heart and circulation, normalize blood pressure, reduce blood cholesterol, and prevent arteriosclerosis. Also improves vision and hearing activity.

Theoretical Disclaimer

While thinking about these theories, one must remember the differences between cause and effect. Some are based on observations of aging cells.

While the following theories may be valid causes of aging, they may also simply note an effect of the aging process. For example, gray hair is found primarily in the elderly, but does not play an active part in the aging process. Also keep in mind that individually, these explanations do not account for the complex process of biological aging. Thus, aging may be most accurately described by the synthesis of several of the following theories^{6, 8, 21, 19}.

Current theories can, in general, be separated into two groups:

DNA Damage Theories

Aging is caused by accumulated damage to DNA, which in turn inhibits cells' ability to function and express the appropriate genes. This leads to cell death and overall aging of the organism.

DNA Damage/Repair Theory, Free Radical/Oxidation Theory, Mitochondrial DNA Theory

Radiation Theory, Built-in breakdown theories. Aging is a direct consequence of genetic programming. The causes for aging are directly built into the genome and cellular structure, as a sort of molecular clock.

DNA DAMAGE THEORY

DNA damages occur continuously in cells of living organisms. While most of these damages are repaired, some accumulate, as the DNA Polymerases and other repair mechanisms cannot correct defects as fast as they are apparently produced. In particular, there is evidence for DNA damage accumulation in non-dividing cells of mammals. These accumulated DNA damages probably interfere with RNA transcription. It has been suggested that the decline in the ability of DNA to serve as a template for gene expression is the primary cause of aging. Most damage comes in the form of oxidative damage, and hence is likely to be a prominent cause of aging²⁰⁻²².

Free Radicals and Anti-Oxidants

Free Radicals : In general, a free radical is any



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molecule with one or more unpaired electrons in its valence shell. In the discussion of aging, the free radicals of importance are oxygen-based molecules such as superoxide (O_2^-), hydroxy radical (OH), singlet oxygen (O), hydrogen peroxide (H_2O_2), and hypochlorous acid (HOCl). Free radicals, though attractive and charming, are damaging to the body because they are extremely reactive; they tend to rip electrons off of other molecules in order to pair off their lone electrons. In other words, free radicals are strong oxidizing agents. Unfortunately, free radicals cannot be avoided since they are byproducts of essential reactions in the body, such as the process of metabolizing oxygen. Free radicals can also be found in abundance in the environment: air pollution, tobacco smoke, radiation, toxic waste, and certain chemicals.

Free radicals wreak havoc at a cellular level since they are able to:

- break off cell membrane proteins, thereby destroying cellular identity.
- fuse membrane lipid & proteins, hardening the cell membrane and leading to brittle and nonfunctional cells.
- disrupt the nuclear membrane. Free radicals may expose genetic material in the nucleus, leaving the DNA open for mutation or destruction.
- burden the immune system by damaging immune cells.
- cause chronic diseases.

These effects are known as oxidative stress, and may lead to DNA mutations, cell death, and disease, all of which contribute to the overall effects of aging. To prevent oxidative stress, one should reduce environmental burdens in the body (chemicals/heavy metals), reduce stress, improve the quality of one's food supply, and (if possible) increase one's antioxidant mechanisms.

Antioxidants

Antioxidants are the body's solution oxidative stress with extra electrons. These molecules neutralize free radicals by supplying them reactivity of the free radical and leaving the antioxidant itself with an unpaired electron. The structure of an antioxidant, however, is not damaging to the body since it is stabilized through chain reactions with other antioxidants.

Known antioxidants include:

- Enzymes such as glutathione peroxidase, catalase, superoxide dismutase.
- Nutrients including vitamins C and E, beta carotene, selenium, cysteine, uric acid.
- Synthetic molecules such as DMSO, BHT, and BHA.

The Free Radical / Oxidation Theory: This, perhaps one of the most respected and well-studied theories, rests on the fact that oxidants induce a variety of distinct biochemical changes in target cells. Hydrogen peroxide is considered one of the more troublesome oxidants, as it diffuses into target cells where site-directed hydroxyl radical formation injures specific targets. DNA is particularly sensitive to hydroxyl radical-induced damage: both DNA strand breakage and base hydroxylation's can be detected. The breakage of the DNA strand activates a DNA binding protein (poly (ADP-ribose) polymerase), which forms polymers of ADP-ribose bound to various nuclear proteins using NAD as its substrate. NAD turnover under these circumstances increases so dramatically that it affects ATP synthesis, to the point where high enough concentrations inactivates mitochondrial ATP synthesis. These pathways will lead to cell death, and, therefore, hydrogen peroxide-induced alterations will not be passed on to if the concentration of hydrogen peroxide is high enough, future generations. If, however, cells are exposed to sub-lethal concentrations of hydrogen peroxide, the ensuing injury could cause permanent and transmissible cellular alterations which could be

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biologically detrimental. For instance, if hydroxyl anion-induced DNA damage fails to be repaired or is improperly repaired, this DNA damage could lead to genetic alterations such as mutations, Deletions, and rearrangements. Moreover, if these genetic alterations occur in critical genes that are involved in cell growth and differentiation, they could lead to deregulated cell growth and differentiation and ultimately contribute to the malignant transformation of cells. Hence, the growing number of free radical diseases includes the two major causes of death, cancer and arteriosclerosis²²⁻²⁷.

Since hydrogen peroxide easily diffuses through cell membranes, hydroxyl anion formation may occur extra- or intracellular, depending on the availability of transition metals. Because of its high reactivity, the hydroxyl radical will always cause site- directed damage at the site of its formation. However, the body does possess some natural antioxidants in the form of enzymes which help to curb the dangerous build-up of these free radicals, without which cellular death rates would be greatly increased, and subsequent life expectancies would decrease.

Mitochondrial DNA Theory: This theory suggests that the loss of effectiveness of one of the cell's key organelles paves the way for age-related degenerative diseases. The mitochondria, which are the energy-producing bodies within a cell, have their own genome (mtDNA). This mtDNA is synthesized at the inner mitochondrial membrane near the sites of formation of highly reactive oxygen species. Mitochondrial DNA seems unable to counteract the damage inflicted by these by-products of respiration because, unlike the nuclear genome, it lacks advanced repair mechanisms. Thus, the cell loses its ability to produce energy, and gradually dies. This theory is supported by observations confirming the genomic instability of mitochondria, as well as widespread mtDNA deletions and other types of injury to the mitochondrial

Disposable Soma Theory: Soma, or somatic cells, is all the cells in the body except gametes and cells

involved in gamete formation. This theory suggests that because of the requirement for reproduction, natural selection favours a strategy that invests fewer resources in maintenance of somatic cells than are necessary for indefinite survival. Therefore, energy will be spent to ensure minimum damage to molecular structures such as DNA, and to ensure that the animal remains in sound condition through its natural life expectancy in the wild, where accidents are the predominant cause of death. Since longevity is costly energy- wise, and since with age there is no longer any ability to reproduce and hence pass genetic material onto subsequent generations, there is simply no reason to keep an organism alive past its time of procreation.

Genetic Theory: Experiments have shown that human cells will divide less than 100 times outside the body. Also, there is an inverse correlation between the number of cell divisions and the age of the person from which the cells were taken. This theory suggests that cell senescence is an active process, as even though they are unable to divide, senescent cells are actively metabolizing. It has been suggested that senescence is genetically programmed, and that its phenotype is dominant, illustrated by the fact that when normal and immortal human cells were fused, they showed limited division potential. Senescent cells express highly abundant DNA synthesis inhibitory mRNA's and produce a surface membrane associated protein inhibitor of DNA synthesis not expressed in young cells. Thus, this theory suggests that aging is predetermined in the genome, and that it is a dominant condition, although the onset of the phenomenon is still unknown.

Immunological Theory: It is well documented that the effectiveness of the immune system peaks at puberty and gradually declines thereafter with advance in age. This seems to be based primarily on T-cells, and it is generally associated with an increase in susceptibility to infections as well as in incidence of autoimmune phenomena in the elderly. T-cells lose effectiveness in early life due to the

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decay of the thymus gland. In other words, the quality and quantity of T-cells begins to decline after puberty. Therefore, as one grows older, certain antibodies lose their effectiveness, and fewer new diseases can be combated effectively by the body, which causes cellular stress and eventual death^{23, 24-27}.

Telomere Theory: This theory suggests that cell death is caused by the shortening of telomeres, which are "caps" on the ends of chromosomes. It has been observed that with each cell division the telomeres are shortened by approximately 65 base-pairs. Telomeres function by permitting complete replication of eukaryotic chromosomes, and by protecting chromosome ends from recombination. It has been shown experimentally that cell strains with shorter telomeres undergo significantly fewer doublings than those with longer telomeres. These observations suggest that telomere length is a biomarker of somatic cell aging in humans and is consistent with a causal role for telomere loss in this process. When the telomeres get too short, the cell stops replicating at an appreciable rate, and so it dies off, which eventually leads to the death of the entire organism.

Radiation Theory: This theory is focused primarily on the aging of skin cells, radiation. Radiation can create free radicals in cells, as the radiation strikes surrounding water molecules and other proximal targets. Thus the aging process goes back to the free radical theory on aging mentioned above, with radiation serving to increase its rate. Experimental studies have recently shown that the shorter, more energetic spectrum of the ultraviolet range (UVB) is responsible for the dermal connective tissue destruction observed in photo aged skin. Also, it has been shown that UVA and infrared radiation contribute significantly to photo aging, producing, among other changes, severe elastosis. Thus, even small amounts of radiation are enough to accelerate the aging process, although this theory is, as they say, only skin-deep.

Diseases Involving Accelerated

Ageing: Several diseases have the effect of rapidly increasing the rate at which the carrier ages. For example, patients afflicted by progeria suffer from arteriosclerosis, coronary artery disease, congestive heart failure and non-healing fractures by the age of seven. Degeneration of hair follicles leads to balding. Most progeria sufferers die by the age of 30. Several other diseases are known to have similar effects, including Cockayne syndrome and Werner's syndrome.

Possibilities of Increased Lifespan: As things stand, the maximum human lifespan is about 120 years. As a whole, human knowledge is increasing at an exponential rate. By this logic, some scientists believe the human lifespan could be increased to between 400 and 1,000 years within the next 20 years. (Of course, we wouldn't really know for 400 more years...)

The following are some theories on increasing the human lifespan: By increasing the amount of antioxidants in one's system, one will have less damaging free radicals in the body. The necessary antioxidants can be found in several sources: Multivitamin pills, especially Vitamins C and E. Beta cerotene, Zinc, Selenium, Calcium, Magnesium, Chromium Picolinate.

External Factors That Cause Aging

Listed below are the major external factors that cause aging in skin

Sun: The sunrays consist of many light spectrums. Out of these, Ultra Violet Rays damage the skin most. Both UVA and UVB are responsible for skin damage. Aging due to sun is called photo-aging. Sunrays break down the collagen and elastin in the skin. The skin loses its elasticity and firmness and develops premature wrinkles. Photo-aging depends on the skin color and the amount of sun exposure over the years. Dark-skinned individuals show less sun damage while fair-skinned people show more sun damage for the same exposure. **Smoking:** It has been found that smokers develop wrinkles sooner

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than non-smokers. Tobacco narrows the blood vessels in the outer layers of skin. This reduces blood flow to the skin and nutrients don't reach the skin in required amount. In addition to this, the expression smokers make while inhaling the smoke also causes wrinkles. Smokers also develop a yellow hue to their skin. By quitting smoking, this damage can be stopped to a certain extent.

Facial Expressions: While we make facial expressions, we use facial muscles and the skin forms lines. In young age the skin pulls back perfectly to position because of collagen and elastin. As we age the skin loses its ability to spring back and the lines become permanent. Sleeping position also contributes to wrinkles. When you adopt a position for long, you get wrinkles on that side of the face. Click to learn more about wrinkles.

Washing Routine: Hot water strips the skin of its oils. While taking bath, avoid taking very long baths and use warm water. Avoid hot water. Avoid strong cleansers or soaps. Treat the skin gently. Don't rub dry after taking bath, but pat dry your skin. The more gently you care for your skin, the younger it will remain. **Improper Management of Dry Skin:** Some people don't moisturize the skin, even if they have dry skin. Moisture keeps the skin supple and young. Test your skin for dryness. If you have dry skin, you need to use a moisturizer to pack the moisture in.

Intrinsic Skin Aging Causes

Collagen and Elastin Production Slows: As we age, collagen (a structural protein in the skin) and elastin (another structural protein) production within the skin slows down and therefore the skin loses its firmness and elasticity (elastic behaviour). It does not snap back as readily as it used to and it is much thinner and susceptible to damage. **Production of New Skin Cells Decreases:** Skin cells do not regenerate as quickly as we age. Therefore, dead skin cells do not shed as quickly leading to rough dull looking skin.

Number of Pigment Containing Cells Decreases: As part of the aging processes, the number of pigment containing cells decreases and the remaining ones increase in size leading to skin blotchiness. **Loss of Fat:** One of the skin aging causes is the loss of body fat underneath the skin. This causes the loss of skin firmness and hollowed cheeks and eye sockets. The skin looks less plump and less smooth. The slowing down in activity of oil and sweat producing glands also causes the skin to dry and lead to a host of dry skin care problems such as flaky and itchy skin. **Shrinking Bones:** Another one of the skin aging causes is that bones in the human body undergo a certain amount of shrinkage with age. This results in sagging. **Fragile Blood Vessels:** Blood vessels become more fragile with age and this causes purpura and bruising (bleeding under the skin) and cherry angiomas (small bright red raised bumps). Related to this are varicose veins (blue bulging veins in the legs)^{29, 30}.

Antiaging Therapy

Scientists agree that one of the most significant factors contributing to aging is **chronic inflammation**. As we age, we tend towards a number of identifiable inflammatory diseases. Chronic inflammation damages the cells of our brains, heart, arterial walls, and other body structures. Heart disease, Alzheimer's senility, Parkinson's, rheumatoid arthritis, psoriasis, prostatitis and stroke are just a few of the "**diseases of aging**" attributed to chronic inflammation. Anti-aging therapy is actually a combination of different therapies used to slow and/or reverse human aging. One of the fastest growing segments of medicine today is anti-aging and longevity medicine. The methods showing scientific promise in slowing the aging process and extending the lifespan in mammals is caloric restriction, decreasing cellular inflammation due to free radicals, exercise and the power behind social relationships.

Antiaging Treatment



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Blown Horse" Syndrome: These patients' work capacity and life quality sharply decreased due to stresses and work overload. This group usually includes company executives and top managers bearing high responsibility, making decisions, often flying abroad, working long hours in front of the computer, etc.

The "Baked Apple" Syndrome: This group is usually comprised of slim and lean people with skinny and wrinkly face, who have high exercise capacity and often practice sports. However, if one takes close look at their face, one can see that "the air is lacking in the container", and there are more wrinkles than there could be. Within several months after the anti-aging course, the skin of these "baked apples" smoothens, their eyes sparkle, their gait becomes more confident, and they gain 1–2 kg which makes them just perfect.

The "Burnt by the Sun" Syndrome: These patients look well, they are usually tanned and spend a lot of time recreating, but their psychological problems make them take care of their health and keep in shape. They often have psycho-asthenic and astheno-neurological manifestations, sometimes also alcohol or tobacco addiction. Their endorphin level is high, but subcortical centers of satisfaction require new and larger dose. Anti-aging therapy of the "absolutely" healthy patients leads to pronounced results. Creativity.

Aging patients with serious and advanced diseases
The group consists of seniors with serious life-threatening diseases, such as tumours, degenerative diseases of the nervous system (ALS, Parkinson's disease, etc.), autoimmune diseases, impaired haematopoiesis, and respiratory and cardio-vascular dysfunctions.

After the anti-aging therapy with stem cells, the patients of this group report restoration of blood parameters, cell-mediated immunity, decrease in or disappearance of circulatory insufficiency symptoms, and respiration normalization. For many patients, this therapy allows to stay alive and avoid serious complications³¹⁻³³.

Anti-aging stem cell therapy is the most effective method of revitalization available now. Anti-aging effects of the stem cell treatment are far beyond the capacity of any other modern method.

Antiaging Formulation

Five Best Ingredients:

The ingredients that make me look twice at an anti-aging potion come with good pedigrees.

Spin trap (phenyl butyl nitron): Phenyl butyl nitron was developed by laboratory researchers who wanted to be able to isolate free radicals in petri dishes. The answer was a molecule that latches on to free radicals that are spinning out of control and stops them before they can create cellular havoc (cancer, aging skin etc). Assuming that spin traps act in the same way after they have been mixed in a potion and slathered on skin, the idea is that they will actually prevent the signs of aging. Prevention is always a better option than waiting for a cure. Spin trap is the signature ingredient in the Your Best Face line and you know how I feel about their eye cream. It is also used by Glo Therapeutics, a brand that I have only just started to get to know (too soon to pass judgement, but look out for a review in a few weeks).

Carnosine: Glo Therapeutics is also enamored of carnosine and with good reason. It is a natural amino-acid that is a potent anti-oxidant. The thing I find exciting is that Australian researchers claim it can extend the HayFlick Limit. The HayFlick Limit is the name given to the sad fact that our cells will only divide and reproduce 52 times before dying altogether. Carnosine may give us up to another 10! It seems to me that carnosine, then, is a much better anti-aging option than peeling (chemical peels or using a retinol cream). Surely every peel is simply speeding up the arrival of the HayFlick Limit. One of the ways that carnosine works is by preventing the cross-linking of collagen and other proteins, one of the causes of wrinkling and loss of elasticity^{34, 35}.

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Astaxanthin: Copley switched us all on to this one. When tested against common antioxidants, astaxanthin has demonstrated exceptional performance in combating singlet oxygen, one of the strongest ROS, which directly damages biological lipids, proteins, and DNA. A clinical research study by Dr. Debasis Bagchi at Creighton University demonstrated that astaxanthin can eliminate free radicals 6,000 times more effectively than vitamin C, 800 times more than CoQ10, 550 times more than vitamin E and green tea, 75 times more than Alpha Lipoic Acid, and 20 times more than beta-carotene.

Syn-tacks (and Matrixyl 3000): Syn-tacks is a synthetic peptide made by combining two peptides: palmitoyl dipeptide-5 diaminobutyloyl hydroxythronine and palmitoyl dipeptide-6 diaminohydroxybutyrate. According to the manufacturer of Syn-tacks, these two peptides interact with the most relevant protein structures of the dermal-epidermal junction and stimulates a broad spectrum of things responsible for youthful skin – laminin V, collagen types IV, VII and XVII and integrin – all at once. Collagen IV activity is increased by 190%, according to the manufacturer. However, as yet, there are no independent tests to verify this.

Ferulic acid: is borderline botanical since it is found in the cell walls of plants such as wheat, rice, peanuts, oranges and apples. It is an antioxidant that can seek and destroy several different types of free radical – ‘superoxide’, ‘hydroxyl radical’, and ‘nitric oxide’ – according to a 2002 Japanese study. A 2004 Italian study concluded that ferulic acid is a more powerful antioxidant than alpha-tocopherol (vitamin E), beta-carotene, and ascorbic acid (vitamin C). Meanwhile, Duke University researchers blended it with vitamin C and E and proclaimed it a “potent ubiquitous plant anti-oxidant”. Mixing ferulic acid with a vit C cream is a great DIY solution and seems to be very helpful for fading sun damage.

Natural anti aging

Exfoliation: This is possibly one of the most important things we can do for aging skin. The older we get our skin becomes slower at creating new cells which give our skin a younger smoother look. When we exfoliate our skin we help remove the dead skin cells on the surface and encourage our skin to more rapidly create new cells for a more youthful appearance.

Natural Anti-Aging Creams and Lotions: A really amazing array of ingredients such as green tea, pomegranate, fruit enzymes, essential oils, sea weed, vitamins, minerals and more are being used in natural anti-aging skin care products.

Facial Exercises: Exercises for facial muscles have been around for a long time. If you practice yoga you may already be familiar with some of the facial poses but there are also other exercise programs developed specifically to tighten sagging skin or smooth wrinkles^{21, 25, 33}.

Acupressure: This is a fascinating technique of applying gentle pressure to specific points on the face and holding the pressure for a matter of seconds. This technique, practiced for thousands of years in China, tones and tightens the skin. Who knows it may even be an inexpensive alternative to cosmetic surgery.

Most popular choices for anti aging ingredients

The list below contains anti aging ingredients that are currently the most popular choices for our skin care. New ones are being found all the time. Many of these anti aging ingredients will work well for lines and wrinkles but for skin that is losing its tone DMAE and Ester show the most promise.

Vitamin A (Retinol, Tretinoin and Retinyl Palmitate): When this is added to a product in the right concentration it has been found to be very effective at reducing fine lines and wrinkles, improving skin tone and exfoliating the skin.

Vitamin E (Tocopherol): This skin softening and healing ingredient is a popular addition but its effectiveness too depends on quantity and quality of Vitamin E used. It can be synthetically derived. Look for natural Vitamin E with a high potency.



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Vitamin

This natural anti aging ingredient has been finding its way in to our skin care product lately for its ability to diminish dark circles and even out skin tones. **Alpha-Hydroxyl Acids(AHA's)**: Commonly seen as glycolic acid from sugar cane, lactic acid from dairy products, tartaric acid from grapes, malic acid from fruit and citric acid from citrus fruits and antioxidant ellagic acid from raspberries, cranberries pomegranates etc. These anti aging ingredients are commonly used for their exfoliating properties. They also provide a skin tightening effect that diminishes fine

lines. The FDA has set guidelines for safe use of this product at concentrations of 10% or less which is the highest concentration available by consumers and pH of at least 3.5%. **Beta Hydroxy Acids(Salicylic Acid)**: An acid that comes from willow bark. This gentler form is for those with sensitive skin and since it has the ability to penetrate deeply is good for oily or acne prone skin. It offers the same exfoliating qualities along with the ability to unclog pores. **Beta Hydroxyl Acids (Salicylic Acid)**: An acid that comes from willow bark. This gentler form is for those with sensitive skin and since it has the ability to penetrate deeply is good for oily or acne prone skin. It offers the same exfoliating qualities along with the ability to unclog pores. **Co Q 10 (Ubiquinone)**: This antioxidant may help repair skin damaged by the elements and improve collagen. The levels of CoQ10 in our bodies lessen with age causing our skin to be more easily damaged by free radicals and more prone to less elasticity. CoQ10 creams may repair some of this damage as it has the ability to easily penetrate skin cells. Freshness and the proper concentration are important. **DMAE**: DMAE is a popular choice for natural anti aging products. It has been receiving interest for several years now. Many people swear by it. It doesn't seem to have much research behind it so it is difficult to say if it is as effective as claimed. **Ellagic Acid**: Anti oxidant rich ellagic acid found in raspberries, cranberries pomegranates etc.

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Pomegranate in particular is being studied for its effectiveness on aging skin. It is believed to have the ability to achieve moderate thickening of the epidermis, improve elasticity and collagen. Time will tell as to its true worth but so far looks promising. **Green Tea**: While this antioxidant and anti-inflammatory ingredient needs more research, studies have shown that green tea has some ability to provide sun protection³⁵⁻³⁸. It is being used in more products all the time and many of them anti aging. It shows promise as a natural way to slow the effects of aging and is quickly becoming one of the most popular of the anti aging ingredients. **Hyaluronic Acid**: This natural ingredient is very important for helping our skin hold more water and some studies show it may help to stimulate the growth of healthy skin cells. Hydrated skin is smoother, softer and plumper looking. **Sea Buckthorn**: A popular ingredient used throughout the world for healing the skin such as that affected by Rosacea but has also been found to be very beneficial for anti aging³⁹. It is loaded with vitamins and nutrients to help feed dry or aging skin. It is said to combat wrinkles and dryness. **Oils**: Certain oils with a high percentage of essential fatty acids have been found to work very well on mature, dry or damaged skin. Borage, Evening Primrose and Almond oil have all been found to be effective anti aging ingredients. **Essential Oils**: Essential oils are popular anti aging ingredients added to skin care products. Quite a few different essential oils have been used for years for their rejuvenating and restorative effects on aging skin. Sandalwood, Geranium, Frankincense, Rose and Neroli are often found in anti aging creams and serums. **Sheabutter**: Has been found to not only to moisturize and eliminate rough dry skin which makes any wrinkles less noticeable. It is believed to help improve skin tone and elasticity. A high concentration of at least 20% shea butter is the most beneficial. Unrefined shea is the best choice as it still retains a high level of vitamins and nutrients^{40, 41}.

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Antiaging Treatment and Prevention: A healthy lifestyle, caloric restriction with adequate nutrition (CRAN), and perhaps even supplements can do no more than slow the aging process or extend mean lifespan. Aging is unavoidable, but major physical impairment is not. People can lead a healthy, disability-free life well through their later years. The most common drugs used by the elderly are painkillers, diuretics or water pills, sedatives, cardiac drugs, antibiotics, and mental health drugs. (A few of those anti-aging drugs are Procaine, Deanol, Deprenyl, Levodopa, Phenformin and Phenytoin). Estrogen replacement therapy (ERT) is commonly prescribed to postmenopausal women for symptoms of aging. **Caloric restriction:** The only known method that might be able to delay human aging is caloric restriction (CR). Caloric restriction simply means a diet with fewer calories that still delivers the required nutritional content. **Nutritional supplements:** Consumption of a high-quality multivitamin is recommended. Common nutritional deficiencies connected with aging include B vitamins, vitamins A and C, folic acid, calcium, magnesium, zinc, iron, chromium, and trace minerals. **Hormonal therapies:** Many hormones' levels go down with age. Assuming these hormonal changes are important in aging some of the most popular anti-aging treatments emerged. The most famous of these involves human growth hormone (HGH). **Telomerase therapy:** Telomere shortening contributes to mortality only in a few tissues. Neurons & muscle cells are non-dividing and are thus not affected by telomere shortening. Telomere shortening may contribute to mortality most significantly for immune system cells & arterial epithelial cells. **Herbal therapies:** Garlic (*Allium sativa*) is helpful in preventing heart disease, as well as improving the tone and texture of skin. Garlic stimulates liver and digestive system functions, and also helps in dealing with heart disease and high blood pressure. Siberian ginseng (*Eleutherococcus senticosus*) supports the adrenal glands and immune functions^{39, 42}.

The Latest in Anti-Aging Treatments:

Thread Lift: This cutting-edge face-lift technique actually requires no cutting edges. Instead, tiny strings, which act as pulleys, are inserted underneath the skin and attached to the facial tissues. During an hour-long procedure, the strings are stretched, which causes the skin to pull on itself. Dr. Grossman says it's for a patient who's not quite ready for a facelift. "The perfect candidate for thread-lift is someone with mild jowling and a little looseness in the neck," she says. "The threads actually stay underneath the skin. And the nice thing is later, if you begin to age a little, you tighten them or put another one back in and lift it break up. **Fat Transfer:** Many women find their faces sink with age; one of the new ways to plump back up is an innovative procedure called fat transfer. Fat is removed from a place you don't want and is injected into specific places in your face to emphasize bone structure and reduce sinking skin. **Hylaform:** For those who worry about the thinner lips, feather wrinkles and nasal labial folds that come with age, there is a new FDA-approved filler called hylaform. Made from hyaluronic acid, hylaform plumps the skin.

Non-invasive Anti-aging Treatments:

Botulinum Toxin: Botulinum toxin is a type of muscle relaxant originally used to treat muscle spasm. Today, it is also a popular anti-aging product and sold under the brand name Botox, Dysport and Myobloc. Essentially, Botox, Dysport and Myobloc work by paralyzing muscles that cause repetitive facial movements such as frowning and smiling. These are said to be effective for treating frown lines, forehead lines, crow's feet and neck lines. **Intense Pulsed Light:** Intense pulsed light is commonly used for hair removal from the body but has also been successfully used for skin treatments, particularly pigmentation and broken capillaries. During an intense pulsed light treatment, varying wavelengths of light are applied on the problem



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areas. The treatment may cause mild redness and bruising but these usually subside a few days later. **Plasma Skin Resurfacing:** Plasma skin resurfacing was developed as an alternative to the classic ablative resurfacing which literally burns off some of the skin. It works by damaging the skin in a controlled manner, resulting in the healing response and collagen production, which in turn allows the skin to remodel and rejuvenate. The damaging agent used is plasma, a high energy ionized gas that does not burn off skin. Instead the skin will turn bronze and begin to peel four days after treatment, taking two to four weeks to heal completely. Plasma skin resurfacing is often used for eliminating wrinkles, sun damage, acne scarring and superficial skin lesions. **Thermage:** Thermage is a non-invasive skin tightening and contouring technique using radio frequency waves. It tightens the skin, smoothes out wrinkles and renews facial contours by causing immediate collagen contraction followed by new collagen production over a period of time. Results are usually visible four to six months after treatment. Thermage can also treat moles, warts and small surface blood vessels. **Fraxel Laser Treatment:** The Fraxel laser has been used to treat various skin conditions such as sun damage, acne scarring, wrinkles and melasma. It works by penetrating fractions of skin spot by spot without breaking the skin's protective outer barrier. The nature of the treatment allows the skin to heal and regenerate much faster than if the entire skin area were treated all at once.

Anti-aging medicine incorporates many of the principals of ortho-molecular medicine to retard aging and rejuvenate the body, in addition to the following discipline: nutrition, biochemistry, cell biology, physiology, general medicine, immunology, allergy, endocrinology, pharmacology, toxicology, neurology, gastroenterology, nephrology, and physical medicine. Through the wonders of modern innovation and medical technology, anti aging medicine may be able to increase the body's immune

system and encourage cell growth and regeneration. Anti aging medicine can be found in different substances and formulas and are beneficial to a degree.

One of the areas of greatest concern in aging is the brain. This central command organ is perhaps the most overlooked organ today in terms of nutrition. This is compounded by the fact that the brain contains a unique protective sheath called the "brain blood barrier." The improvement and correction of brain function has been achieved with the use of nootropic nutrients and drugs, the so-called Smart Drugs.

It is held by some anti-aging researchers that Deprenyl and other drugs can be used to halt the decline in mental functioning that is the hallmark of aging. The advent of better "smart drugs" may provide a breakthrough in enhancing the quality of our later years.

Cosmetic aspects of rejuvenation deserve attention here, too. Conscientious application of improved techniques of dermatology and plastic surgery (always used in conduction with appropriate lifestyle modification,) can create a meaningful anti-aging "makeover." Newer less invasive techniques such as laser surgery and natural skin treatments now enhance the repertoire of longevity specialists.

Anti-aging products, supplements and nutrients:

Supplements are a critical component for health and disease prevention. Supplementing your diet with vitamins, minerals and herbs will significantly increase your life span. These agents to diet cannot replace proper nutrition, but aid and abet a healthy life extension. Not all nutrients are anti-aging supplements per se. Anti-aging supplements address and prevent any possible deterioration in the cells that may accelerate the aging process

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Human Growth Hormone: Human growth hormone (or hGH) is a polypeptide that is synthesised by somatotroph cells of the anterior lobe of pituitary gland. The genes for human growth hormone are localized in the q22-24 region of 17 chromosome and they are closely related to human chorionic sommatotropin (hCS) genes. **Progesterone:** Progesterone - functions in many capacities. It is often taken to counter the effects of estrogen, normally used by women during postmenopausal. It also goes by the prescription . **Estrogen:** Estrogen represents an entire family of female related hormones. For one it reduces heart diseases and controls LDL cholesterol. It is often used to prevent hot flashes and mood swings associated with menopause. Other benefits include: the preventing of heart disease and rapid decline of bone density after menopause, the improvement of body composition, protecting against Alzheimer and stimulating GH^{21, 34, 41}.

Melatonin is a hormone produced by the pineal gland, which is located beneath the brain. Melatonin is a highly potent antioxidant, which has been described as the pacemaker of the aging clock in humans. Melatonin's main use has been to regulate sleep and circadian rhythms and allow the individual to feel more refreshed and alert the following day. As melatonin is directly involved with sleep regulation, the supplement's use in the treatment of age-related sleep disorders, jet lag or shift work is impressive. **Acetyl-L-Carnitine (ALC)** Acetyl-L-carnitine plays a key role in maintaining acetylcholine level and neuroprotective function during aging. Acetyl-L-carnitine is a naturally occurring compound that supports normal brain and nerve function during aging through various mechanisms. These include its actions on acetylcholine synthesis, cellular membrane stability, nerve growth factor production, and cerebral blood flow. **Coenzyme Q10** Coenzyme Q10 is present in all body cells, with the heart and liver containing the greatest amount. A major function of Coenzyme Q10 is to act as the catalyst in the production of

energy at the cellular level. **Alpha-Lipoic Acid** Alpha Lipoic Acid is a powerful antioxidant and actually regenerates free radicals back to their protective antioxidant state. Many of the benefits of Alpha Lipoic Acid is from its' antioxidant properties and the associated ability to fight free radicals and regenerate other antioxidants. Unlike vitamins C and E which only work in water and fat, ALA neutralizes free radicals in both fat and water. **Cysteine** Cysteine is a powerful free radical destroyer by itself, but works best when vitamin E and selenium are present. It helps detoxify and protect the body from radiation damage, so it is often used in conjunction with chemotherapy and radiation cancer treatments. **NADH (Nicotinamide Adenine Dinucleotide)** NADH or Nicotinamide Adenine Dinucleotide is a coenzyme - the active part of a vitamin - in this case the active part of vitamin B3. NADH is involved in the process of creating ATP (energy). **Lycopene** Lycopene is a member (along with beta-carotene) of a family of plant pigments called carotenoids. Lycopene may be the best free radical scavenger among carotens - it is at least twice as effective an antioxidant as beta carotene. In addition to protecting cells from free radical damage, lycopene may produce its beneficial effect by other means, such as improving the function of cell-to-cell junctions and some aspects of cell metabolism. **Vitamin E** Vitamin E is a fat-soluble nutrient that that body stores in the liver, and fat tissue. Vitamin E is a potent antioxidant. Antioxidants neutralize free radicals, which are highly reactive chemical substances that can cause cellular damage if left unchecked, leading to premature aging and disease. **Vitamin B5 (Pantothenic Acid)** as with the other B Vitamins, Pantothenic Acid is a crucial nutrient for energy metabolism. It also makes brain neurotransmitters and natural body steroid hormones. **Vitamin B6 (Pyridoxine)** Vitamin B6 functions in the formation of body proteins and amino acid metabolism, chemical transmitters in the nervous system, red blood cells, and prostaglandins. Vitamin B6

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(Pyridoxine) is vital for metabolizing the amino acids tyrosine and phenylalanine. It is an essential co-factor (along with vitamin B12 and folic acid) in the body's fight against elevated homocysteine levels, which are linked to arteriosclerosis, heart disease, and stroke. Vitamin B6 plays an important role in many life processes. **Vitamin C (Ascorbic Acid)** Vitamin C has been shown to inhibit the deposit and growth of atherosclerosis on artery walls, directly protect the heart muscle from infection and free radical damage, delay or prevent cataract formation, help prevent cancer and infection in skin.

Gingko Biloba Gingko biloba is considered the "brain herb" in traditional Chinese medicine. Along with being a powerful antioxidant and a powerful free radical-scavenger, this herb protects the integrity of cells. **Selenium** Selenium is an essential mineral nutrient for both humans and animals. Selenium is said to help preserve elasticity in body tissues, slow the aging process, improve the flow of oxygen to the heart, and help prevent abnormal blood clotting. Selenium is an antioxidant, **DMAE (Dimethylaminoethanol)** DMAE, or dimethylaminoethanol, is a compound found in high levels in anchovies and sardines. Small amounts of it are also naturally produced in the human brain. **Vinpocetine** Vinpocetine is a vasodilator, in other words it improves brain blood flow with a unique non-steal affect, that is to say it only affects areas that need to be improved. Accordingly, by improving brain blood flow, vinpocetine has been shown to help improve hearing (particularly tinnitus), eyesight and even alleviate the problems involved with menopause. **Chromium Picolinate** Chromium picolinate promotes efficient function of the hormone insulin. Good insulin activity is important for hunger control, for stimulating metabolism, and for building and retaining muscle and vital organ tissue^{13, 23, 32, 42}.

CONCLUSION

A broad definition of 'anti-aging' is any intervention intended to preserve and extend one's lifespan. All time honored health promoting behaviors such as good hygiene and various safety measures are 'anti-aging' in that they prevent premature death from disease or accident. Diet, exercise and stress reduction are 'anti-aging' by virtue of their ability to increase well being and lifespan. Current research on anti-oxidant supplementation and hormone replacement therapy is gathering evidence of 'anti-aging' activity through their ability to prevent and reverse cellular degeneration associated with aging.

Anti-aging medicine is the stimulation and addition of "natural" human elements to help ensure that the body is able to repair and regenerate itself, utilizing the same chemicals it relies on day in, day out, but to make their availability greater in older age. In short, anti-aging is the supplementation of the body's needs as we age, to help it continue to perform as well as it did when we were in our twenties.

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