



TheElite Training Group track club

## Expanding the area of what is possible

In Track & Field Distance Running & Competent Self-Care in medicine and psychology

[www.theetgtrackclub.com](http://www.theetgtrackclub.com)

# mechanisms of aging

**A major part of TheETG mission** is to expand the area of what is possible in competent self-care in medicine and psychology. TheETG's primary method of achieving that is to proliferate applied science based information by way of \$free packets containing plain language info for anyone seeking to move themselves or others forward in these areas.

### TheETG packets attempt to address the following;

".....the benefits that US health care currently deliver may not outweigh the aggregate health harm it imparts."  
[Journal Of The American Medical Association...Volume 302 #1..July 1, 2009...page 89 - 91]

"Not enough doctors adapt appropriately to new scientific findings.....An insufficient number of medical faculty members are well prepared, effective educators, and too few medical schools prepare their students for a lifetime of learning and change."  
[J.Hilliard, et al. -- The Lancet -- Volume 385 #9969 -- February 21, 2015 -- page 672]

"....takes an average of 17 years to translate 14% of original research into benefit.....average of 9 years for interventions recommended as evidence-based practices to be fully adopted."  
[M.Tinkle, et al -- Dissemination and Implementation -- Nursing Research and Practice -- Volume 2013]

".....1.5 million U.S. residents are harmed or killed each year because of medication errors, according to an Institute of Medicine report."  
[Nature Medicine -- Volume 12 #9 -- September 2006 -- page 984 - 985....News In Brief]

"It is estimated that more than 700,000 individuals are seen in hospital emergency departments for adverse drug events each year in the United States."  
[Centers For Disease Control -- 2015]

"Most drugs are only effective for a small percentage of people who take them."  
[Michael Leavitt -- U.S. Secretary of Health & Human Services 2005 - 2009]

".....A recent study for example, found that only half of all cardiac guidelines are based on scientific evidence."</p>
<p>[President Barack Obama -- Speech to the American Medical Association -- June 15, 2009]

"All the good things....they don't teach us in medical school, because the drug companies pay for our education."  
[Dr. John Sessions M.D.]

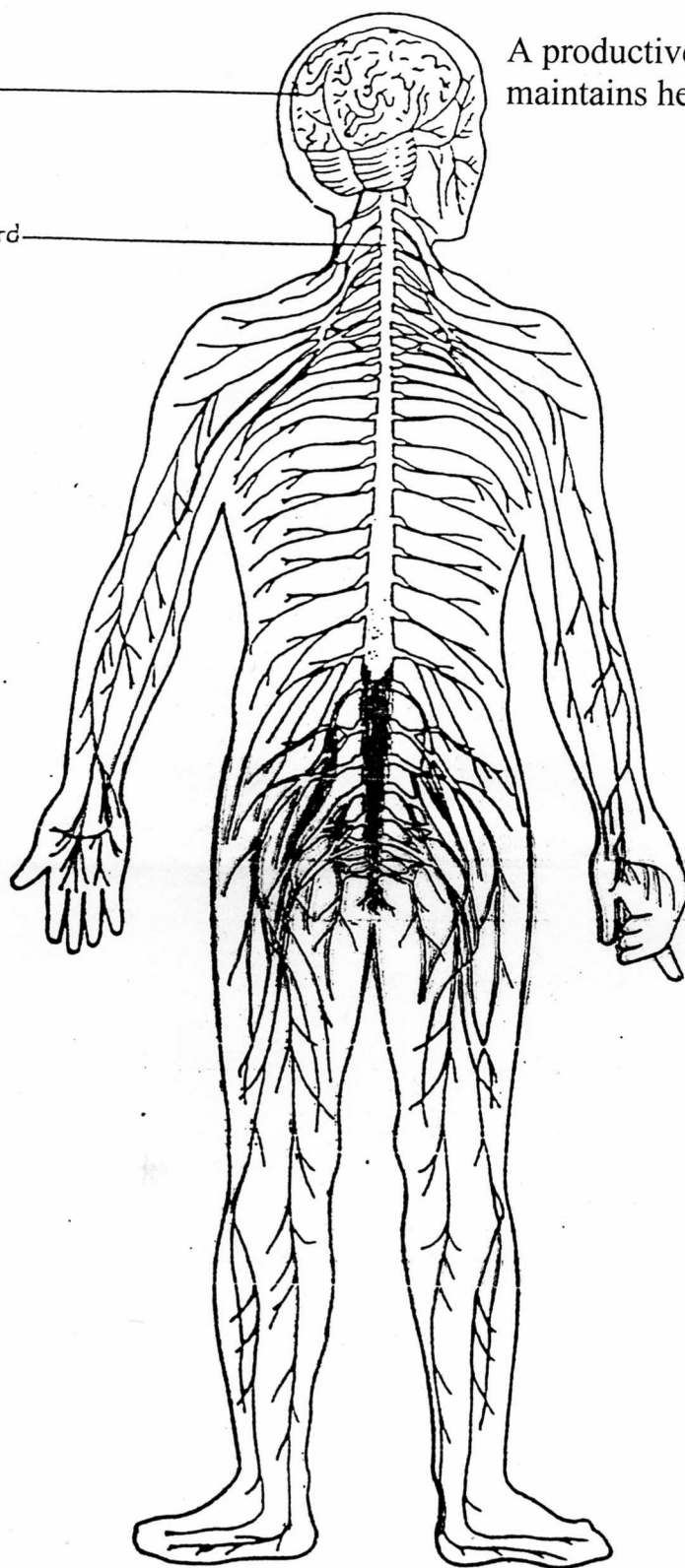
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# Train The Brain & Nervous System

A productively active nervous system maintains health and slows aging.

Brain

Spinal cord



"Until now, the assumption that the maximum human life span is fixed has been justified. Recent advances in cell biology, genetics, and our understanding of the cellular processes that underlie aging, however, have shown that this assumption is invalid...."

"We may soon be able to extend the maximum human life span and postpone or prevent the onset of diseases associated with aging."

D.A. Banks, M. Fossel

Telomeres, Cancer, and Aging Altering the Human Life Span

Journal Of The American Medical Association.....Volume 278 #16....October 22, 1997....page 134

"Loss of neurons is thought to be irreversible in the adult human brain, because dying neurons cannot be replaced."

"Our results further indicate that human hippocampus retains its ability to generate neurons throughout life."

P.S. Erikson

Nature Medicine....Volume 4 #11....November 1998...page 113

".....much of the decline in functional capacity with advancing age in physically inactive people is due to progressive disuse atrophy rather than the aging process per se."

Sport Science Exchange Round Table

Gatorade Sport Science Institute.....Winter 1992

"These results demonstrate that lifelong high-intensity physical activity could potentially mitigate the loss of motor units associated with aging well into the seventh decade of life."

G.A. Power, et al

Motor unit number estimates in masters runners: use it or lose it?

Medicine & Science in Sports & Exercise.....Volume 42 #9.....September 2010....page 1644 -1650

"The way you think, the way you behave, the way you eat, can influence your life by 30 to 50 years."

[Dr. Deepak Chopra]

"Frailty is what causes premature death. We don't walk, we don't carry our own suitcases. When we don't exercise we get frail."

[Dr. Mehmet Oz...Professor of Surgery, Columbia University]

# The Norm = Dramatically Accelerated Aging

In our country, extraordinarily little of our experiences that we attribute to age and aging is due to age and aging.

Once you set yourself on the path of 2 to 4 decades of disuse atrophy and 2 to 4 decades of doing or consuming things that dramatically accelerate brain, muscle, and immune cell death.....you provide the 2 to 4 decades of stimuli that produce the outcomes that we attribute to age and aging.

Most of the physical decline we see in the elderly is the highly predictable outcome of 4 to 6 decades of disuse atrophy and accelerated brain, muscle, and immune cell death. In many areas of health and wellness or lack thereof, we tend to try to attribute our experiences to the least threatening explanations. The one's that allow us to feel the least need to move in a different direction or change things about our lives that we value.

Can't explain it, therefore, "its genetic". A practice that even researchers in our science community have engaged in until sufficient levels of information make their way into the lay public, forcing them to stop. Dramatically accelerated aging is viewed as the norm, a fact of life, genetically set in stone.

Life expectancy being around 80-ish, Americans tend to live less than half a life time. Becoming shriveled, frail, weak, with loss of cognitive and memory function is not a physiological requirement or function of age or aging. It's a function of how much time one has invested in disuse atrophy, nutrient supply deficits, and mind-body issues that cause and/or accelerate deterioration and decline in multiple tissues [ie skin, brain, nervous system, immune system]

By the age of 50 the average American has about 30 - 35 years of alcohol and coffee consumption behind them. Thus by age 50 the average American has about 30 - 35 years of elevated oxidant production thus 30 - 35 years of elevated DNA strand breaks. Elevated programmed cell death, elevated requirement for cell division to replace cells killed off, thus elevated rate of telomere shortening. Telomere shortening in the present day science of human physiology is the gold standard of biological aging in humans.

By age 50 the average American has about 30 - 35 years of induction of cell death of immune system cells, liver cells, pancreas cells, fibroblast cells in the skin that produce collagen, elastin, etc [ie. induction of skin wrinkles].

**The norm is not normal.**

By the age of 50 the average American has about 30 - 35 years of disuse atrophy of multiple cell types across muscle cells, brain cells, immune system cells, anabolic hormone producing cells. This disuse atrophy is due to the gradual reduction in exercise levels for 30 - 35 years. Human cells are -not- designed in a way that they are able to respond well to that. As a result many cells in humans experience lowered production of anti-oxidant enzymes, lowered production of DNA repair enzymes, increased programmed cell death, increased stress on the immune system because many cells that lack production of DNA repair enzymes won't be able to engage in programmed cell death...they'll go cancerous and the immune system cells must track them down and kill them.

By the age of 50 the average American has about 30 - 35 years of living stress as a life style. As a result they have 30 to 35 years of elevated stress hormone ["cortisol"] and adrenalin production. As a result they have 30 - 35 years of cortisol induced low immune function, 30 - 35 years of lowered skin cell production of collagen, elastin, etc. [ie. skin wrinkles]. The 30 - 35 years of elevated adrenalin production results in elevated beta-amyloid production in the brain [ie. brain cell death, dementia, Alzheimer's], decreased adrenal gland function, decreased immune system function, dramatically accelerated aging and dramatically shortened life span.

**The norm is not normal.**

If we want longer lives we can have longer lives without spending them in a wheel chair or nursing home, or as a weak, dependent, shriveled prune. Different people have different definitions of tasting life. Life is all about choices and free choice. Physiologically, so is mind-body medicine, in that when you chose the behavior you choose the consequences.....they go in either a good or bad direction.

Most Americans die in highly painful, medically expensive, and emotionally costly ways.

**"You can narcotize your body, you can distract your brain, but one day your body will present its bill."**

[Dr. Alice Miller]



# Human Aging

The Brain branches out to the entire body by way of nerves exiting the spinal cord, coordinating the production of hormones, and regulating the immune system. The brain thus controls and/or can impact....."Everything". This is the foundation of all one needs to know about how the activity that goes on in the brain, influences the aging process. As the brain and immune system go.....so goes aging. Anything that causes long term detriment to brain and immune system function, will accelerate aging. Chronic overtraining by athletes causes long term damaging effects to brain and immune system function.

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"People do not grow old. When they cease to grow, they become old.".....[Emerson]

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"Until now, the assumption that the maximum human life span is fixed, has been justified....."  
"Our understanding of the cellular processes that underlie aging however, have shown this assumption is invalid....."  
"We may be able to extend the maximum human life span and postpone or prevent the onset of diseases associated with aging."

D.A.Banks, M.Fossel.....October 1997  
Journal Of The American Medical Association.....Volume 278 #16.....October 22, 1997.....page 134

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"Loss of neurons is thought to be irreversible in the adult human brain, because dying neurons cannot be replaced."  
"Our results further indicate that human hippocampus retains its ability to generate neurons throughout life."

P.S.Erikson.....November 1998  
Nature Medicine.....Volume 4 #11.....November 1998.....page 1313

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## What Is Aging -----

"Aging".....the gradual wearing down and/or destruction of brain cell DNA, is the primary factor that limits human life.

The ends of DNA strands are called telomeres. Shortening of the ends of DNA strands (telomere shortening) over the life span is a process of "normal" aging. Accelerated aging is caused by brain cell atrophy/death. Accelerated aging takes place due to DNA damage induced by oxidants (leading to brain cell destruction). Where intake of antioxidants (Vitamin C, Vitamin E, Beta Carotene, Selenium) is insufficient, and exercise induced production of antioxidants (Glutathione, Superoxide Dismutase) is lacking, long term oxidant induced brain cell death occurs. Long term stress causes long term cortisol (stress hormone) production, which also causes brain cell death. Brain substances called Neurotrophins protect brain cells from cortisol and oxidant induced destruction. Neurotrophin levels are decreased over time by chronic stress, chronic alcohol and caffeine intake, low exercise levels, as well as gradual reduction of brain activity during the traditional "retirement years".

## The Cause Of Accelerated Aging & Preventable Disease In Humans -----

--- Chronically high psychological stress.....produces chronically elevated cortisol [stress hormone] and/or high levels of glutamate [a brain chemical], and/or high adrenalin levels.

--- Sedentary life style allows low production of the anti-oxidants called glutathione and super-oxide dismutase that are produced by brain and body cells in as a result of exercise training.

--- Long term intake of "pro-oxidants" & immune cell suppressors, in particular....caffeine, alcohol, and cigarette smoke, that destroy brain cells.

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"You can narcotize your body, you can distract your brain, but one day your body will present it's bill".....[Alice Miller]

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## **200 Year Life Spans: More Reality Than Sci-Fi -----**

In the absence of accelerated aging inducers,.....gradual telomere shortening in brain cell DNA is what limits human life. This may take a minimum of 150 – 200 years. The average life span in the United States is approximately 70 years. Accelerated aging.....not telomere shortening.....is what is seen in nearly all Americans. "Old" people in our society live literally less than half a life time. How we choose to live, determines how we die.

Most Americans die in relatively painful, medically expensive, and emotionally costly ways.

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"Many theories have been proposed to explain the aging process. However, damage to deoxyribonucleic acid (DNA) is the centerpiece of most of these. Recently telomere shortening has been described to be associated with DNA damage."

"The loss of telomeres can lead to DNA damage. The association between cellular senescence and telomere shortening in vitro is well established."

"Evidence is also accumulating that telomere shortening is associated with cellular senescence in vivo."

A.Ahmed, T.Tollefsbol.....August 2001

Telomeres And Telomerase: Basic Science Implications For Aging.

Journal of the American Geriatrics Society.....Volume 49 #8.....August 2001.....page 1105 -1109

## **"The" Ways To Improve Human Aging.....1 -- Self-Mastery -----**

Live a principle oriented life style [see Stephen Covey's book...7 Habits Of Highly Effective People] focused on developing self-mastery. Develop the major life skills of being solution, logic, and mastery oriented. Establish rational thought and proactivity as major values in life. These skills remove and prevent destructive aspects of stress rather than simply managing it. They produce high levels of self-competence and self-efficacy, which lead to self-mastery. This reduces chronic exposure of brain cells and body tissues to elevated levels of glutamate, cortisol, and adrenaline, which induce brain cell destruction, immune system suppression, and tumor growth.

-- Deal with all major "inner-child" wounds (see John Bradshaw's book "Homecoming") and issues thus creating changes in brain cell function and basal stress levels which directly affect immune cell function.

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".....this study supports the hypothesis that cumulative exposure to cortisol over the life span may contribute to age-related loss of neurons in the hippocampus, and that prolonged stress or exposure to cortisol accelerates this process."

The Journal Of Neuroscience.....Volume 5 #5.....May 1995.....page 1222

## **"The" Ways To Improve Human Aging.....2 -- Brain & Nervous System -----**

Increase & maintain Neurotrophin & Anti-oxidant levels. Neurotrophins are brain and nervous system substances that have positive effects on cell antioxidant levels (Glutathione and Superoxide Dismutase) that directly affect human aging. They cause improved brain cell maintenance and survival by protecting them from oxidant induced damage. A productively active Nervous System produces neurotrophins in abundance. This is the mechanism by which intellectual pursuits, high intensity exercise and strength training, giving and receiving love, being touched/massaged in a gentle manner, etc collectively maintain health and slow aging. Play games of logic and skill throughout your life (ie. Chess, battleship, etc.). Play games of hand/eye coordination throughout your life (ie. Throwing stones at targets, video games, etc).

-- Establish down time during the day for engaging in autogenic relaxation, meditation, napping, massage, prayer, or hot bath/Jacuzzi.

-- Periodically, a few days each week, take in Anti-oxidants [Vitamin C = 500mg, Vitamin E = 400IU, Beta Carotene = 25,000IU, Selenium = 250mcg].

"Formation and survival of new neurons.....can be substantially increased by the provision of an enriched environment or by increased locomotor activity (exercise)."

"Direct stimulation of patient's own neural stem cells through.....behavioral manipulation might offer scope for greater repair....."

R.J.E.Armstrong, R.A.Baker.....October 2001

The Lancet.....Volume 358.....October 6, 2001.....page 1174 - 1176

### **"The" Ways To Improve Human Aging.....3 -- Immune System -----**

Do things that improve/maintain high level immune function.....such as.....

-- Watch standup comedy live or on TV, often.

-- Engage in high intensity, low volume, aerobic exercise.

-- Establish down time during the day for engaging in autogenic relaxation, meditation, napping, massage, prayer, or hot bath/Jacuzzi.

-- Take in Anti-oxidants [Vitamin C = 500mg, Vitamin E = 400IU, Beta Carotene = 25,000IU, Selenium = 250mcg]

-- "Enriched" physical and social environments improve immune function.

Colorful furniture - mobiles - plants - walls - posters, as well as music, lamps w/dimmer switches, extracts from aroma therapy shops, post affirmations/goals on a wall.

-- Establish a strong support group of....."functional".....friends to spend time with in all major areas of your life.

-- Get a well mannered, lovable, huggable pet [get Dog Training Video by the best dog trainer...see store section of [www.unclematty.com](http://www.unclematty.com)].

"In this country, cancer has been reduced to a pink ribbon and a mammogram."

Fran Visco

National Breast Cancer Coalition

"Oxidative stress in brain is emerging as a potential causal factor in aging and age-related neurodegenerative disorders."

"To the extent that the animal models faithfully mirror their respective disorders, and based on the totality of the studies, it is apparent that oxidative stress, the excess of free radicals over the means of scavenging these harmful agents, may play critical roles in the molecular basis of accelerated aging, Alzheimer's disease, and Huntington's disease."

D.A.Butterfield, B.J.Howard, M.A. LaFontaine.....June 2001

Brain Oxidative Stress In Animal Models Of Accelerated Aging And The Age-Related Neurodegenerative Disorders, Alzheimer's Disease And Huntington's Disease

Current Medicinal Chemistry.....Volume 8 #7.....June 2001.....page 815 - 828

"There is substantial and long-standing literature linking the level of general nutrition to longevity."

"Oxidative damage has been shown to be a major feature of the aging process. Telomere shortening is now well established as a key process regulating cell senescence in vitro. There is some evidence that the same process may be important for aging in vivo. Very recently it has been found that oxidative damage accelerates telomere shortening."

B.J.Jennings, S.E.Ozanne, C.N.Hales.....September 2000

Nutrition, Oxidative Damage, Telomere Shortening, And Cellular Senescence: Individual Or Connected Agents Of Aging?.

Molecular Genetics & Metabolism.....Volume 71 #1 - 2.....Sept-October 2000.....page 32 - 42

Blaming stuff on age and aging is [pardon the pun] getting old.

Why can't it just be ok to make certain life style choices and enjoy the upside of that. And when the downside starts to show up in your life just accept it without blaming it on something else.

Why must the downside of everything either be "its genetic" or "I'm getting old".

If you're 30 to 70 years old, those aches and pains aren't "its genetic" and you ain't old.

Can we please just dispense with the scapegoating.

If your life choices are ok to you then let them be ok.  
Enjoy the upside and stop trying to blame the downside on something else.

There are identical twins women and men in their 60's and 70's, genes exactly the same where one twin has arthritis the other does not. One is obese, the other is not. One has run a marathon, the other can't get out of bed in the morning without aches and pains.

If you're 40 something you're not old.  
If you're 50 something you're not old.  
If you're 60 something, you ain't old either.

**You don't know what old is and you're decades away from finding out.**

Dispense with the bullshit that you're constantly telling yourself and others.  
Its a self fulfilling prophecy.

Whatever you're experiencing, you signed up for it and that's ok.  
Let it be ok, stop putting it on genes, age or aging.

# A big picture of age and aging.

50 is the new 30.  
60 is the new 40  
Etc, etc, etc.

A life span to age 60.....In our culture a person who is one-third of the way through their life span is considered to be a "young" person. Thus a 20 year old would be expected to have the fully functioning mental and physical abilities of brain, muscle, cardiovascular, and immune system capacity of a "young" person.

Logically this psychological concept should apply as the life span increases.

A life span to age 75.....In our culture a person who is one-third of the way through their life span is considered to be a "young" person. Thus a 25 year old would be expected to have the fully functioning mental and physical abilities of brain, muscle, cardiovascular, and immune system capacity of a "young" person.

Logically this psychological concept should apply as the life span increases.

A life span to age 90.....In our culture a person who is one-third of the way through their life span is considered to be a "young" person. Thus a 30 year old would be expected to have the fully functioning mental and physical abilities of brain, muscle, cardiovascular, and immune system capacity of a "young" person.

Logically this psychological concept should apply as the life span increases.

A life span to age 105.....In our culture a person who is one-third of the way through their life span is considered to be a "young" person. Thus a 35 year old would be expected to have the fully functioning mental and physical abilities of brain, muscle, cardiovascular, and immune system capacity of a "young" person.

Logically this psychological concept should apply as the life span increases.

A life span to age 120.....In our culture a person who is one-third of the way through their life span is considered to be a "young" person. Thus a 40 year old would be expected to have the fully functioning mental and physical abilities of brain, muscle, cardiovascular, and immune system capacity of a "young" person.

Logically this psychological concept should apply as the life span increases.

A life span to age 135.....In our culture a person who is one-third of the way through their life span is considered to be a "young" person. Thus a 45 year old would be expected to have the fully functioning mental and physical abilities of brain, muscle, cardiovascular, and immune system capacity of a "young" person.

Logically this psychological concept should apply as the life span increases.

A life span to age 150.....In our culture a person who is one-third of the way through their life span is considered to be a "young" person. Thus a 50 year old would be expected to have the fully functioning mental and physical abilities of brain, muscle, cardiovascular, and immune system capacity of a "young" person.

Logically this psychological concept should apply as the life span increases.

A life span to age 165.....In our culture a person who is one-third of the way through their life span is considered to be a "young" person. Thus a 55 year old would be expected to have the fully functioning mental and physical abilities of brain, muscle, cardiovascular, and immune system capacity of a "young" person.

Logically this psychological concept should apply as the life span increases.

A life span to age 180.....In our culture a person who is one-third of the way through their life span is considered to be a "young" person. Thus a 60 year old would be expected to have the fully functioning mental and physical abilities of brain, muscle, cardiovascular, and immune system capacity of a "young" person.

Logically this psychological concept should apply as the life span increases.

A life span to age 195.....In our culture a person who is one-third of the way through their life span is considered to be a "young" person. Thus a 65 year old would be expected to have the fully functioning mental and physical abilities of brain, muscle, cardiovascular, and immune system capacity of a "young" person.

Logically this psychological concept should apply as the life span increases

# Our changing health care system

Here are --your-- new doctors.  
There are many.

Several are specialists.  
Meet with them regularly.

They will help you add decades of youthful living to your life.  
Here are their names.....

Dr. Walking

Dr. Sleep

Dr. Sunset-watching

Dr. Down-Time

Dr. Nutrition

Dr. Laughter-StandupComedy

Dr. Strength training

Dr. Relaxation

Dr. Sunlight-Exposure

Dr. Yoga

Dr. Meditation

Dr. Jogging

Dr. Nutrient-Based-Medicine

Dr. Mind-Body Medicine

"Better health care will depend, not on some new therapeutic standard, but on the level of willingness and competence to engage in self care."

[Dr. I. Illich....1978]

### **Alzheimer's, Heart Disease, Cancer.....**

Medically the 3 big ticket items in America. Fewer than 10% of people that get these are in an "its genetic" situation. Medically the 3 big ticket items in America all have the immune system in common.....

--- In Alzheimer's....macrophages are a specific type of immune system cell that are supposed to remove beta-amyloid plaques from brain blood vessel walls, preventing beta-amyloid's continued accumulation and toxicity to brain cells, especially those in the memory areas of the brain called the hippocampus.

--- In Heart Disease....macrophages are a specific type of immune system cell that are supposed to remove cholesterol plaques from blood vessel walls, preventing their continued accumulation and significant blocking of blood flow through blood vessels.

--- In cancer..."Natural killer cells" are a specific type of immune system cells that are supposed to kill cancer cells, preventing their continued growth and spread. At autopsy, many Americans that died of Alzheimer's were developing heart disease and cancer. At autopsy, many Americans that died of Heart Disease were developing Alzheimer's and cancer. At autopsy, many Americans that died of cancer were developing Alzheimer's and cancer.

--- In the brain, when rate of beta-amyloid deposits exceeds the rate of removal, and does so for years or decades, this is what Alzheimer's looks like.

--- In the blood vessels around the heart, legs, neck, etc, when rate of cholesterol deposits exceeds the rate of removal, and does so for years or decades, this is what Heart Disease looks like.

--- In the body in general, when rate of cancer cell production, growth, and/or spread exceeds the rate of cancer cell death, and does so for years or decades, this is what Cancer looks like.

To be a good doctor one must -first- be a good physiologist. Physiology is -not- pharmacology. You can't drug your way to a fully functioning immune system. You can't drug your way to restore an immune system to full functioning.

Rather than focus on the removal of beta-amyloid plaques in the brain by macrophages, the Traditional Medicine approach is to drug their way to artificially upping neurotransmitters related to memory and thinking ability to help people "live with" beta amyloid continuing to kill off their brain cells.

Rather than focus on the removal of cholesterol plaques by macrophages, the Traditional Medicine approach is to drug [via statin drugs....Lipitor, Crestor, Pravastatin, etc] their way to slowing the rate that cholesterol plaques continue to accumulate on blood vessels walls, continuing to close off the blood vessel and kill patient.

Rather than focus on the killing of cancer cells by Natural Killer cells, the Traditional Medicine approach is to drug and radiate their way to temporarily killing some cancer cells while also killing off the body's main killers of cancer cells, sending the patient on their way with a low functioning immune system and the likelihood of recurrence in spite of the "cancer survivor" mantra.

--- Relatively modest levels of immune system suppression maintained over years or decades can have major effects. It can be enough to create a situation where.....beta amyloid's binding of a small amount of a substance called "macrophage-inhibitory factor" can be all that's necessary for Alzheimer's progression across years and decades.

--- Relatively modest levels of immune system suppression maintained over years or decades can have major effects. It can be enough to create a situation where.....a small amount of cholesterol causing engorgement of macrophages rendering them useless can be all that's necessary for Heart Disease progression across years and decades.

--- Relatively modest levels of immune system suppression maintained over years or decades can have major effects. It can be enough to create a situation where.....cancer cell production of a small amount a substance called "Inter-Leukin-10", preventing Natural Killer cells from killing them off can be all that's necessary for Cancer progression across years and decades. To be a good doctor one must -first- be a good physiologist. Physiology is -not- pharmacology. Mind-Body Medicine is all but exclusively about using the brain to increase immune cell number, immune cell activity, and restore immune system functioning. Through published research, Nutrition Medicine has identified several individual nutrients that can be consumed in supplement form to increase immune cell number, immune cell activity, and restore immune system functioning. The immune system.....Chronically elevated levels of stress, levels maintained for years or decades chronically reduces immune cell number, immune cell activity, immune system functioning. Stress leads to increased production of beta-amyloid, increased deposits of cholesterol on blood vessel walls, increased production of cancerous cells.

Through published research, Nutrition Medicine has identified several individual nutrients that can be consumed in supplement form that interfere with beta amyloid production or its continued existence. Such as resveratrol. Such as curcumin. Such as N-acetyl-L-cysteine. Such as L-Carnitine. Through published research, Nutrition Medicine has identified several individual nutrients that can be consumed in supplement form that interfere with cholesterol getting deposited on artery walls or aid in its removal. Such as Vitamin K2. Such as Allicin [Kyolic]. Such as Resveratrol. Through published research, Nutrition Medicine has identified several individual nutrients that can be consumed in supplement form that can increase Natural Killer Cell activity and function in killing cancer cells. Such as liquid colostrum. Such as very long chain plant sugars [organic Aloe Juice]. Such as nucleotides.

Meditation or relaxation exercises.

The memory, thinking, and reasoning areas of the brain are no different than muscle. Decades of stress and overwork will present its bill at some point.

Exercise the brain.

The memory, thinking, and reasoning areas of the brain are no different than muscle. Atrophy due to disuse will eventually create a breeding ground for oxidants and pro-oxidants that will attack tissues and DNA, leading to several disease processes, from clogged blood vessels [stroke] to altered cell production [cancer]. This is more than "use it or lose it". You'll not only lose it if you don't use it, but you'll contribute to disease if you don't use it.

Exercise the brain.

The brain controls muscle. Walking, running, lifting weights, ect, don't just exercise muscles and heart, they exercise the brain cells as well. Atrophy due to disuse [ie. lack of exercise] will eventually create a breeding ground for oxidants and pro-oxidants that will attack tissues and DNA, leading to several disease processes, from clogged blood vessels [stroke] to altered cell production [cancer]. This is more than "use it or lose it". You'll not only lose it if you don't use it, but you'll contribute to disease if you don't use it.

To be a good doctor one must -first- be a good physiologist.

Physiology is -not- pharmacology.

**“.....telomere lengths in blood accord with those in other tissues.”**

**“Those with shorter telomeres in blood DNA had poorer survival.....”**

**“These results lend support to the hypothesis that telomere shortening in human beings contributes to mortality in many age-related diseases.”**

R.M.Cawthon, K.R.Smith, E.O'Brien, A.Sivatchenko, R.A.Kerber  
Association Between Telomere Length In Blood And Mortality In People Aged 60 Years Of Older  
The Lancet.....February 1, 2003.....Volume 361.....page 393



telomeres and meditation.....

"The enzyme telomerase, through its influence on telomere length, is associated with health and mortality. Four pioneering randomized control trials, including a total of 190 participants, provided information on the effect of mindfulness meditation on telomerase."

".....mindfulness meditation leads to increased telomerase activity in peripheral blood mononuclear cells. These results suggest the need for further large-scale trials investigating optimal implementation of mindfulness meditation to facilitate telomerase functioning."

N.S.Schutte, J.M. Malouf

A meta-analytic review of the effects of mindfulness meditation on telomerase activity  
Psychoneuroendocrinology.....Volume 42.....April 2014.....page 45 - 48

## reversing clogged arteries.....

"In a prospective, randomised, controlled trial **to determine whether comprehensive lifestyle changes affect coronary atherosclerosis** after 1 year, 28 patients were assigned to an experimental group (low-fat vegetarian diet, stopping smoking, stress management training, and moderate exercise) and 20 to a usual-care control group."

"195 coronary artery lesions were analysed by quantitative coronary angiography."

".....82% of experimental-group patients **had an average change towards regression**."

".....**regression of even severe coronary atherosclerosis after only 1 year**, without use of lipid-lowering drugs."

D. Ornish, et al

Can lifestyle changes reverse coronary heart disease? The Lifestyle Heart Trial  
The Lancet....Volume 336, #8708....July 21, 1990....page 129

# Its not age or aging Its disuse atrophy...stupid

"A contributing factor to the loss of muscle mass and strength during aging is the reduction in the number of functioning motor units."

".....the purpose of this study was to estimate the number of functioning motor units in the tibialis anterior of masters runners (~65 years old) and to compare the values with recreationally active young (~25 years old) and healthy age-matched controls (~65 years old).

"These results demonstrate that lifelong high-intensity physical activity could potentially mitigate the loss of motor units associated with aging well into the seventh decade of life."

G.A. Power, et al

Motor unit number estimates in masters runners: use it or lose it?

Medicine & Science in Sports & Exercise.....Volume 42 #9.....September 2010....page 1644 -1650

# Human Healing: Mechanism Of....

## Skin Aging & Wrinkles

Skin is the largest organ of the human body. Damaging it leads to major health problems. Avoiding the sun however, can be as destructive to health as purposely baking oneself in it. Vitamin D is a carrier of calcium. It's production is a result of exposure to ultraviolet rays from the sun. Going to extremes to limit sun exposure, can result in reduced production of Vitamin D. This will result in the absorption of less calcium from the diet, which will impede functions of many tissues and lead to osteoporosis (loss of bone mass).

### Optimal Melanin Production

Ultraviolet rays from the sun penetrate the skin and turn on the gene for melanin (protective skin pigment), which causes production of the melanin protein. This means that our skin has a mechanism by which it can adapt to sun exposure in a protective manner. This situation is just like training or overtraining any other tissue (ie muscle, tendon, bone) of the body. When the rate of sun exposure, exceeds the rate of melanin production and skin repair, problems will result. It is unwise to "lay out" in the sun non-stop for 1 to 4 hours. Brief exposures in interval form, spaced out over several days should achieve the same "look" without the short term skin damage and long term wrinkling.

### Skin Cancer & Anti-oxidants

Excessive sun exposure leads to high levels of oxidant damage to the melanocyte cells that produce melanin. With insufficient intake of anti-oxidants in the diet, oxidants can attack the DNA of these cells, causing mutations of the melanocytes to occur.....known as melanoma, skin cancer.

**Vitamin E, beta carotene, and selenium, can prevent damage from UV light.**

### Development Of Wrinkles

Ultraviolet rays from the sun, penetrate the skin and cause an elevation of the enzyme called matrix metalloproteinase. This enzyme causes the breakdown of collagen, the protein that comprises skin tissue. Collagen fibers give skin its strength and resiliency. **Damage to these fibers has been demonstrated to be the major mechanism of skin aging and wrinkles.** Generally, in sun damaged skin, you will find less collagen than in healthy skin. Wrinkles appear in places where damage has been done to the layers of skin underneath the outer layer, but has not repaired fully. There are inhibitors of matrix metalloproteinase. One is produced inside the body, another called Retinoic acid (derived from vitamin A or beta carotene), can be placed on the skin. Sun exposers turn on the genes of both the enzyme and the inhibitors of the enzyme, thus allowing collagen breakdown to occur, but in a regulated manner. Placing retinoic acid on the skin prior to sun exposure can inhibit the production of

the enzyme during sun exposure. Even when "laying out" every other day, excessive sun exposure can create a 300% elevation of the matrix metalloproteinase enzyme that remains elevated everyday, for many days.

### Chronic Stress & Wrinkles

The Brain is "hooked up" to the skin by way of the nervous system. Thus, stress induced production of cortisol (stress hormone) can lead to skin wrinkling. Cortisol can decrease the function of the fibroblast cells that produce collagen (new skin tissue) following damage. Cortisol may also increase the production of the metalloproteinase enzyme. Cortisol induced immune suppression may decrease the growth promoting functions that immune cells engage in within the skin. The decrease of neurotrophin production caused by stress may result in a decrease in the functioning of fibroblast cells, or decrease the production of the inhibitor of the metalloproteinase enzyme. **These things collectively explain why people "look older" as a result of living stress as a life style.** Reducing stress and limiting the rate of sun exposure such that it never exceeds the rate of repair, are the most effective ways to prevent long term skin damage and wrinkling.

**In Australia, approximately 40% of all Australians get some form of skin cancer in their life time. Sun screens were not available 3000 years ago. Our species has survived in spite of this, which suggests that sun screen is not what dermatologists claim it to be. Sun screen has no effect on self-hatred (baking oneself), or outright stupidity.**

### Say No To Sun Screens

People probably did not "lay out" 3000 years ago to get a tan. They likely took steps to prevent skin damage, which included a higher intake of anti-oxidants in their diets. Oxybenzone is used to make sunscreens, especially the high "sun protection factors" (SPF). About 1 - 2% of the oxybenzone in the sunscreen is absorbed through the skin, gets into the blood stream, and is excreted in urine about 48 hours later. There have been no studies looking at long term toxicity. This substance has no business being inside a person's body. It may be only a matter of time before health problems that already exist get traced back to this. The kidney and liver are the first organs to examine since they must process and excrete the stuff.

# Mechanisms Of Gray Hair [and graying hair]

The basics.....

Paying attention to terms oxidants and anti-oxidants may help in picking up on a consistent pattern of things going on in the human body related to aging, not age. The issue of hair graying, basically what studies suggest is that gray hair is caused by a reduction in enzymes related to anti-oxidant activity in the hair follicle.

As with most other areas of the body, when you lack anti-oxidants, damage will occur to cells and/or cell DNA.

In most humans, oxidative damage to brain cells is the primary mechanism of aging.

In most humans, oxidative damage to hair follicles, may be the primary mechanism of graying hair.

We may all have at least heard of the term "hydrogen peroxide" in the context of bleaching hair. Hydrogen peroxide is an oxidant that our cells can break down via the use of anti-oxidant enzymes.

Apparently the gradual reduction and/or loss of production of these enzymes results in the accumulation of hydrogen peroxide in the hair follicle, which shuts down the cells [melanocytes] that produce pigment [your hair color], thus resulting in gray hair.

This would in part, explain why soaking one's head in high potency Aloe juice tends to reverse graying hair. The juice contains anti-oxidants and other substances that likely reverse the mechanisms of graying hair.

**Why Hair Goes Gray**

**By Miranda Hitti**

WebMD Health News

Reviewed by Louise Chang, MD

Feb. 25, 2009 -- Scientists may have figured out why hair turns gray, and their finding may open the door to new anti-graying strategies.

New research shows that hair turns gray as a result of a chemical chain reaction that causes hair to bleach itself from the inside out.

The process starts when there is a dip in levels of an enzyme called catalase. That catalase shortfall means that the hydrogen peroxide that naturally occurs in hair can't be broken down. So hydrogen peroxide builds up in the hair, and because other enzymes that would repair hydrogen peroxide's damage are also in short supply, the hair goes gray.

Putting the brakes on that chemical chain reaction "could have great implications in the hair graying scenario in humans," write the researchers, who included Karin Schallreuter, a professor clinical and experimental dermatology at England's University of Bradford.

The study appears online in The FASEB Journal; the FASEB is the Federation of American Societies for Experimental Biology.

terms:

- hair follicle = place where hair extends out from skin
- apoptosis = destruction of cells
- melanocyte = cell that produces pigment [color] of skin and/or hair
- hair follicle melanocyte apoptosis = destruction of hair color producing cells
- melano-genesis = production of pigment [hair color]
- reactive oxygen species = oxidants, the reason we need anti-oxidants [ie. vitamin C, vitamin E, etc, etc, etc]

".....graying of human hair has been the subject of intense research since ancient times."

"Reactive oxygen species have been implicated in hair follicle melanocyte apoptosis and DNA damage. Here we show for the first time.....that human gray/white scalp hair shafts accumulate hydrogen peroxide in millimolar concentrations."

".....we demonstrate almost absent catalase and methionine sulfoxide reductase A and B protein expression.....with a functional loss of methionine sulfoxide repair in the entire gray hair follicle."

Accordingly, methionine sulfoxide formation of Met residues, including Met 374 in the active site of tyrosinase, the key enzyme in melanogenesis, limits enzyme functionality.....which leads to gradual loss of hair color."

"Notably, under in vitro conditions, Met oxidation can be prevented by L-methionine".

"In summary, our data feed the long-voiced, but insufficiently proven, concept of hydrogen peroxide induced oxidative damage in the entire human hair follicle, inclusive of the hair shaft, as a key element in senile hair graying, which does not exclusively affect follicle melanocytes."

"This new insight could open new strategies for intervention and reversal of the hair graying process."

**J.M. Wood, et al**

**Senile hair graying: H<sub>2</sub>O<sub>2</sub>-mediated oxidative stress affects human hair color by blunting methionine sulfoxide repair.**

**Published online before print February 23, 2009 Federation of American Societies for Experimental Biology.**

**Potential for mac nut oil to re-start melanin production in hair follicles.....also known as reversing grey hair. This study demonstrated success on skin melanin production. Need human studies on hair follicle melanin production. Already have studies on mac nut oil induced increase in hair production.**

"Fatty acids have shown to regulate melanogenesis....."

"We investigated the in vitro melanogenic activity of subfractions enriched in fatty acids obtained from the oil of *Macadamia integrifolia*."

".....a randomized, placebo-controlled trial was carried out to evaluate whether a pharmaceutical formulation containing the macadamia oil was capable of re-establishing pigmentation in patients with vitiligo."

"The formulation caused an improvement in the patients' depigmented patches."

"In conclusion, these findings indicate that macadamia oil could be used as an active compound of the pharmaceutical formulation for vitiligo treatment."

C.H.Okuma, et al

In Vitro Melanogenic Activity of *Macadamia integrifolia* Oil and Clinical Pilot Study of a Pharmaceutical Formulation in Patients with Vitiligo

Latin American Journal Of Pharmacy -- Volume 30 #7 -- September 2011 -- page 1336

".....exercise intensity was associated with reduced...heart disease.."

"...intensity of walking is more important than time spent."

"...greater risk reduction can be obtained with more intense exercise."

"...there is increasing evidence for the beneficial effects of strength training on coronary heart disease..."

"...increasing intensity of aerobic exercise...and adding weight training to the exercise program are among the most effective strategies to reduce the risk of coronary heart disease..."

**M. Tanasescu, et al**

**Exercise Type And Intensity In Relation To Coronary Heart Disease In Men**

**Journal Of The American Medical Association....October 23/30, 2002....Volume 288 #16....page 2000**

"Exercise training-induced improvements in intrinsic cardiac contractile function in normal hearts have been well established. When instituted after myocardial infarction [heart attack], exercise training has also been shown to exert beneficial effects on cardiovascular function in both humans and animals."

"....a program of high intensity sprint training instituted shortly after myocardial infarction [heart attack] was effective...."

**L.Zhang. et al**

**Sprint Training Restores Normal Contractility In PostInfarction Rat Myocytes**

**Journal Of Applied Physiology....Volume 89....2000....page 1099**

"Dynamic and high-magnitude loading, which elicits a high strain rate in bones, is known to be effective for anabolic loading."

"...high-impact exercise is considered to be very beneficial for bones."

**Y. Umemura, N.Sogo, A.Honda**

**Effects Of Intervals Between Jumps Or Bouts On Osteogenic Response To Loading**

**Journal Of Applied Physiology....Volume 93....2002....page 134**

".....a study of U.S. male physicians suggest that habitual vigorous exercise diminishes the risk of sudden death during vigorous exertion."

**C.M.Albert, et al**

**Triggering Of Sudden Death From Cardiac Causes By Vigorours Exertion**

**New England Journal Of Medicine....Volume 343 #19....2000....page 1355**



## the importance of strength training as you age.....

"In the knee extensors which are important for ambulation and weight-bearing function, a 30% decrease in whole muscle size occurs between the ages of 50 and 80 yr. This whole muscle atrophy results from atrophy of type II myofibers and apparent loss of both type I and type II motor units as evidence from cadaveric studies of vastus lateralis indicate the number of myofibers, regardless of fiber type, declines substantially between the sixth and eighth decades."

".....muscle mass declines.....(termed sarcopenia)."

"In the United States, \$18.5 billion of total direct health care costs in 2000 were attributable to sarcopenia....."

".....this will undoubtedly increase because the percentage of American adults 65 yr and older is expected to increase from one in nine to 20% of the adult population by 2030 (National Institute on Aging statistics)."

"Resistance training has shown the most promise among interventions aimed to decrease the effects of sarcopenia, as it enhances strength, power, and mobility function and induces varying degrees of skeletal muscle hypertrophy."

**D.J. Kosek, et al**

**Efficacy of 3 days/wk resistance training on myofiber hypertrophy and myogenic mechanisms in young vs. older adults**

**Journal Of Applied Physiology.....Volume 101 #2, August 2006.....page 531 - 544**

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"Since not only maximal strength but the ability of the leg extensor muscles to develop force rapidly are both important performance characteristics contributing to several tasks of daily life such as climbing stairs, walking, or even prevention of falls and/or trips, this should be taken into consideration when constructing strength training programs for both middle-aged and older men and women."

"In order to induce increases in explosive strength and power capacities, heavy resistance training also in older people should be combined with power type of strength training performed with lower-load exercises but emphasizing higher movement velocities of the exercises performed."

**K.Hakkinen, et al**

**Effects Of Heavy Resistance/Power Training On Maximal Strength, Muscle Morphology, And Hormonal Response Patterns In 60 -75 Year Old Men & Women**

**Canadian Journal Of Applied Physiology...Volume 27 #3...June 2002...page 213**

"Evidence now exists that one of the major factors leading to the structural and functional changes in human muscle with aging is the progressive degeneration of the nervous system....."

"It is evident from the literature that increasing age has a pronounced effect on the motor unit, in particular the lower motor neuron. As a consequence, the muscle fibers innervated by these neurons will also be affected."

".....normal aging can be referred to as a slowly progressive neurogenic process, and the degeneration of the nervous system is considered as a major factor underlying the reductions in muscle mass and strength that occur with advancing age."

**J. Lexell**

**Evidence for Nervous System Degeneration with Advancing Age**

**The Journal of Nutrition.....Volume 127 #5....May 1997.....page 1011S-1013S**

".....much of the decline in functional capacity with advancing age in physically inactive people is due to progressive disuse atrophy rather than the aging process per se."

Sport Science Exchange Round Table  
Gatorade Sport Science Institute.....Winter 1992

"Frailty is what causes premature death. We don't walk, we don't carry our own suitcases. When we don't exercise we get frail."

[Dr. Mehmet Oz...Professor of Surgery, Columbia University]

"The way you think, the way you behave, the way you eat, can influence your life by 30 to 50 years."

[Dr. Deepak Chopra]

# Mind-body Medicine.....

The human brain is an electrical generator with wires [spinal cord, and nerves] that extend out to the rest of the body, giving it either control and/or influence over quite literally, everything.

The first law of implementing mind-body medicine. Your immediate environment, both indoors and outdoors.

"Enriched" physical and social environments improve immune function, reduce stress, and slow aging processes. In the immediate indoor environment.....colorful furniture - mobiles - plants - walls - posters, as well as music, lamps w/dimmer switches, extracts from aroma therapy shops, post affirmations/goals on a wall. In the external environment.....green space, parks, lakes, streams.

## the impact of "green space" in your city on your rate of aging.....

Telomeres = things on the ends of your DNA strands. They get shorter as you age. Your DNA degrades when they get too short

"Telomere length.....can be regarded as a marker of biological ageing."

".....study of the health status of 976 men aged 65 years and over from various regions in Hong Kong, we measured telomere length and examined its variation....."

"...compare four densely populated regions in the old part of Kowloon with a region built from reclaimed land in the New Territories (Shatin), where many buildings were built on either side of a river and next to the Tolo Harbour, with **many parks** and markets and a transport terminus situated in the housing complexes."

"Telomeres in participants living in older regions in Kowloon were shorter than in those living in Shatin. The results show that the presence of green spaces could have health benefits in terms of biological ageing, which is mediated by a mechanism other than age, lifestyle, or socioeconomic status. We therefore agree that the psychological benefit arising from a restorative environment could be a real one."

**J.Woo, et al**

**Green Space, Psychological Restoration, and Telomere Length**

**The Lancet....Volume 373 #9660.....January 24, 2009....page 299 – 300**

# Re-think what you think you know about “its genetic” .....

“Telomere length is a primary biomarker of cellular aging. Recently, both telomere length and telomerase activity have been shown to be influenced by various environmental factors such as oxidative stress, psychological stress, and socioeconomic status.....results indicate that moderate physical activity levels may provide a protective effect on...telomere length compared with both low and high exercise energy expenditure levels.

A.T.Ludlow, et al

Relationship between Physical Activity Level, Telomere Length, and Telomerase Activity

Medicine and Science in Sports and Exercise...Volume 40 #10.....October 2008.....page 1764 - 1771

# Re-think what you think you know about “its genetic” .....

parental behavior;  
creating an "enriched" environment for one's kids can create changes in  
their genes that they can pass on to their children.....

".....a large number of recent studies have reported that phenotypes acquired from an animal's environment can be transmitted to the next generation. Moreover, epidemiology studies have hinted that a similar phenomenon occurs in humans. This type of inheritance does not involve gene mutations that change DNA sequence. Instead, it is thought that epigenetic changes in chromatin, such as DNA methylation and histone modification, occur. In this review, we will focus on one exciting new example of this phenomenon, transfer across generations of enhanced synaptic plasticity and memory formation induced by exposure to an “enriched” environment."



# TheETG Exercise Program

Begin this exercise program at where-ever your fitness level happens to be today, progress from there!

| Monday     | Tuesday | Wednesday  | Thursday | Friday     | Saturday | Sunday |
|------------|---------|------------|----------|------------|----------|--------|
| Workout #1 |         | Workout #2 |          | Workout #3 |          |        |

Tuesdays/Thursdays/Saturdays = walk 100 yards, jog 100 yards. Do 8 repetitions of this, walking faster and jogging faster as you go.

## Workout #1 = Fast walk or run up a large hill

The distance.....1/2 mile split into uphill repetitions of 100 yards to 200 yards in length.

Where.....a -very- large hill

The workout.....run or walk uphill at a pace that is fast for you. At the top of the hill, do a slow walk rest period to the bottom of the hill.

## Workout #2 = Strength Day & Stretch Day

**Strength Day**.....start conservatively in weight you lift in each exercise.

Progress over time to working with weights you can't lift more than 6 repetitions.

For all exercises do **4 repetitions**.

jump exercise.....stand on a stool, stair, bench, etc....jump down from that height to the floor, then immediately jump up in the air.

strength exercise.....do a squat [go no more than one-quarter of the way down]

strength exercise.....do a calf raise

strength exercise.....do a arm curl [hold a weight in your hand, curl it upward toward your shoulder]

strength exercise.....do one-leg jumping [lift one leg off the ground, then jump up.....or jump onto a small box, stair,etc]

strength exercise.....do a pull-up [go up as far as you can. Over time as you get stronger, go up further until you can get all the way up.

strength exercise.....do a wall handstand [push-up in a hand-stand position]

[put your back to a wall, put your hands on the floor and walk your feet up the wall, then do a push-ups. Over time as you get stronger, walk your feet further up the wall. When you can go close to vertical, turn around facing the wall, use the wall as a backstop and do a pushup in the full hand-stand position]

### Stretch Day

pictures of the stretches.....see the next page

Hold each stretch.....for 4 minutes

The stretches.....hip flexor muscles, hamstrings muscles, calf muscles

## Workout #3 = Fast walk or run on a track

The distance.....1 mile split into 4 repetitions of ¼ mile [400 meters], 1 lap of the track in length.

Where.....on a track [perhaps at a high school or middle school track in your area]

The workout.....walk or run at a pace that is fast for you. Take lots of rest in between each.

### Optional Supplement Exercises a couple days each week

#### **1 ----- Repetitive motion exercise for the neck**

-- start with your head in a level position

-- motion = tilt the head back to look straight up at the ceiling, then return to being level

-- do 20 repetitions of that tilting your head back to look at the ceiling

#### **2 ----- Retraction of shoulder girdle**

-- start with your arms straight and out in front of you, elbows locked

-- motion = pull your shoulders back, then return

-- do 20 repetitions of that pulling your shoulders back

#### **3 ----- Floor press-ups**

-- start with laying face down on the floor, hands under your shoulders like a "push-up" position

-- motion = push --only-- your chest off the floor, then return to the ground

-- do 20 repetitions of that pushing your chest off the floor

## So called "performance enhancing drugs" are prescription drugs.

### Some examples of the effectiveness of prescription drugs in sport.....

"The drug erythropoietin, often called EPO.....a new systemic review of existing research reveals that **there is no scientific evidence that it does enhance performance**, but there is evidence that using it in sport could place a user's health and life at risk."  
EPO [erythropoietin] doping in elite cycling: No evidence of benefit, but risk of harm  
Science Daily.....December 5, 2012.

"....**there is no scientific basis from which to conclude that rHuEPO has performance-enhancing properties** in elite cyclists." "The use of rHuEPO in cycling is rife but scientifically unsupported by evidence, and its use in sports is medical malpractice."  
J.A.Heuberger, et al  
Erythropoietin doping in cycling: lack of evidence for efficacy and a negative risk-benefit.  
British Journal Of Clinical Pharmacology.....Volume 75 #6.....June 2013...page 1406

"The **over-exaggeration of the effects of growth hormone** in muscle building is effectively promoting its abuse...."  
"....there is the question of disinformation on rhGH....Part of this problem may, paradoxically, derive from the anti-doping authorities themselves. By ignoring the evidence the **rhGH does not work** in normal healthy subjects, the athletic establishment could be accused of effectively promoting its use."  
**"We must tell athletes the truth: growth hormone does not 'work'** or at least not as they think it does and that its is associated with all kinds of immediate and long term hazards-----everything from decreased performance to cancer."  
"....none of us scientists, doctors, coaches, or sports bodies should continue to suggest that this dangerous doping practice works."  
M.J. Rennie  
British Journal Of Sports Medicine.....Volume 37 #2....April 2003....pages 100-103

"**Testosterone prohormones** such as androstenedione, androstenediol, and dehydroepiandrosterone (DHEA) have been heavily marketed as testosterone-enhancing and muscle-building nutritional supplements for the past decade."  
"Contrary to marketing claims, research to date indicates that the use of prohormone nutritional supplements (DHEA, androstenedione, androstenediol, and other steroid hormone supplements) **does not produce either anabolic or ergogenic** effects in men. Moreover, the use of prohormone nutritional supplements may raise the risk for negative health consequences."  
G.A.Brown, et al  
Testosterone Prohormone Supplements.  
Medicine & Science in Sports & Exercise.....Volume 38 #8....August 2006.....pg 1367-1537

## So called "performance enhancing drugs" are prescription drugs.

### Some examples of the effectiveness of prescription drugs in American medicine & health care.....

"Most drugs are only effective **for a small percentage** of people who take them."  
Michael Leavitt [U.S. Secretary of Health & Human Services 2005 - 2009]

".....the benefits that US health care currently deliver **may not outweigh the aggregate health harm** it imparts."  
Journal Of The American Medical Association...Volume 302 #1..July 1, 2009...page 89 - 91

"It is estimated that more than 700,000 individuals are seen in hospital emergency departments for adverse drug events each year in the United States."  
[Centers For Disease Control.....2015]

"106,000 deaths/year **from non-error**, adverse effects of medications"  
B. Starfield  
Is US Health Really the Best in the World  
Journal of The American Medical Association.....Volume 284 #4....July 26, 2000....page 483 - 485

".....1.5 million U.S. residents are harmed or killed each year because of medication errors, according to an Institute of Medicine report."  
Nature Medicine....Volume 12 #9.....September 2006.....pg 984 - 985.....News In Brief

**Pursue becoming a**

**Master Of  
Sport**