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Life

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Ancient
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Made
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LONGEVITY

How to tap into your body's resources for your longest health span

Longevity

Ad me'ah ve'esrim shanah. (May you live until 120.)

-Hebrew blessing

The human interest in how long we can live has been with us for millennia. Consider this passage from *The Yellow Emperor's Classic of Medicine* published in the third millennium BCE.

"I've heard that in the days of old, everyone lived one hundred years without showing the usual signs of aging. In our time, however people age prematurely, living only fifty years. Is this due to a change in environment, or is it because people have lost the correct way of life?

"In the past, people practiced the Tao, the Way of Life...they formulated practices such as Dao-in, an exercise combining stretching, massaging, and breathing to promote energy flow, and meditation to help maintain and harmonize themselves with the universe. They ate a balanced diet at regular times, arose and retired at regular hours, avoided oversteering their bodies and minds, and refrained from overindulgence of all kinds. They maintained well-being of body and mind: thus it is not surprising that they lived over one hundred years."

Ancient Teachings: Modern Eyes

In Ancient Chinese Medicine, as discussed in *The Yellow Emperor*, living to 120 years was not regarded as unusual. As a specific measure, as in the Hebrew blessing, 120 years seems to resonate across cultures and the ages. Science now shows that the neurons in our brains, unlike other cells in our bodies, can live to 120 years. An instance of *modern eyes, ancient teachings*. This ebook will look at

the modern science that underscores the validity of some of these ancient teachings in securing a long, healthy life span.



Jing or Essence: Key to Longevity

In Chinese Medicine, longevity is linked to a concept called *Jing*, one's primal life force. People lucky enough to be born with an abundance of *Jing*, will most likely be healthy, strong, and resilient, and will achieve great longevity.

Jing is like being born with a fully charged battery. Though you can limit the leakage and recharge it with healthy, balanced living, nature dictates life will eventually run it down. We will look at strategies to safely harness the body's longevity genes or nourish *Jing*. But first let us consider what the Ancients called "anterior and posterior heaven"—concepts we know in modern medicine as genetics and epigenetics.

Anterior and Posterior Heaven: Genetics and Epigenetics

What you are born with, your potential, according to the Ancient Teachings, is your "**anterior heaven.**" You cannot control your anterior heaven. Even if you were born into royalty, for instance, and had hemophilia (like the last Russian Tsarevich, Alexei Nikolaevich) there would

be limited options for this unlucky anterior heaven. No amount of right living would change that. This is just the luck of the draw, your genetic inheritance.

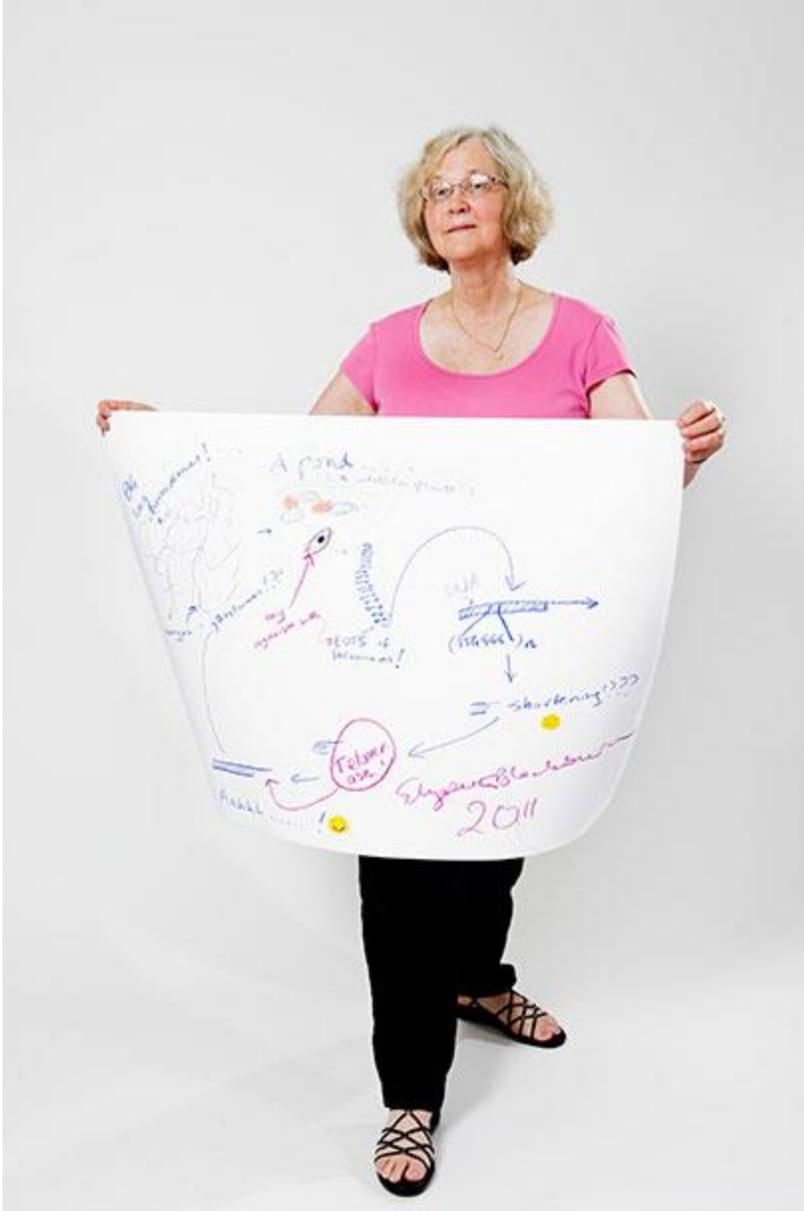
"Posterior heaven", on the other hand, represents your life circumstances and *habits* and can be affected by your health practices, the way you live. If you are born healthy, live wisely, and guard your Jing, you can theoretically live a very long time, even to 120 years. This requires some deep resilience. *How do we get it?*

Modern Science of Aging

Telomeres: A Measure of Your Battery's Charge or Jing

A famous foray into the science of aging is the Nobel Prize-winning work of biological researcher Dr. Elizabeth Blackburn. She has explored the science of telomeres, the segments of repeating DNA sequences at the end of our chromosomes or inherent DNA genetic material. It has been shown that they get shorter as we age.

In a groundbreaking study, Dr. Blackburn and her team found that telomeres also shorten under prolonged increase in stress. The researchers discovered that mothers of chronically ill children had shorter telomeres than mothers of healthy children. This had always been intuitively believed ("stress kills" after all), but there had been no measure for aging on the cellular level to substantiate this belief. Remember that acupuncture can enhance vagal activity, lowering stress levels, and improve autonomic balance.



The Cellular Science of Aging: Enter Sirtuins and MTOR and AMPK

The current understanding of aging at a cellular level is that there are two modes for cells to be in, the yin and yang of cell states, if you will. The yang mode is growth and reproduction, while the yin mode is defense and conservation.

Dr. David Sinclair author of *Lifespan: Why We Age—and Why We Don't Have To*, a foremost longevity researcher, calls this defensive yin mode "hunkering down." When resources are abundant and there are no threats, cells go into the growth and reproduction mode which is *counterproductive to longevity*. *The key to longevity is for the cells to go into the defensive or hunkering down state which is activated when there is threat or hardship, such as inadequate*

food, or other adverse conditions. For longevity, the optimal trigger is when the threat is mild and stimulates a defense mode, but not a mortal challenge. Remember that too much of a threat to the system (stress, malnutrition) damages your posterior heaven, and can shorten your life. ***So, how do we safely get our cells to switch into "hunker down" mode?***



Switch on Longevity Genes

Sirtuins

David Sinclair and other longevity researchers have discovered that specific mammalian genes code for cell switching from growth to defensiveness and are considered longevity genes.

Sinclair, in his book, writes, "Together, these genes form a surveillance network within our bodies, communicating with one another between cells and between organs by releasing proteins and chemicals into the bloodstream, monitoring, responding to what we eat, how much we exercise and what time of day it is. They tell us to hunker down when the going gets tough and they tell us to grow fast and reproduce fast when the going gets easier."

Sinclair's focus has been on ways to exploit these genes for longer life. The genes he focuses on make protein enzymes called Sirtuins that change the packaging of DNA, turning

genes on and off when needed.



David Sinclair, PhD Age 53

The role of NAD

As writer Graham Averill explains it, "If they get overwhelmed, cells start to misbehave, and we see the symptoms of aging, like organ failure or wrinkles. All the genetic info in our cells is still there as we get older, but our body loses the ability to interpret it. This is because our body starts to run low on NAD, a molecule that activates the sirtuins: we have half as much NAD in our body when we're 50 as we do at 20. Without it, the sirtuins can't do their job, and the cells in our body forget what they're supposed to be doing."

This is an example of "epigenesis," the equivalent of a powerful tweak to your posterior heaven. Epigenesis changes how genes are expressed (the process which gives instructions which DNA is converted into a protein) without changing the DNA itself. So sirtuins do this by controlling which DNA is exposed and expressed and can control our health, fitness, and survival.

TOR and Autophagy

There are other longevity genes. One of these is the *target of rapamycin* (TOR or mTOR as it is called in mammals), a complex of proteins that regulate growth and metabolism. Sensitive to nutrients, TOR signals cells in stress to hunker down when TOR is inhibited. The cells can improve survival by boosting such activities as DNA repair, reducing inflammation caused by

old and worn cells. Perhaps its most important function is that it digests old proteins which can lead to toxic aging. Self-eating, or autophagy, works to conserve and clean up. Think of it as a mechanic scavenging old auto parts to keep an old car running, but also cleaning up the junkyard as a side benefit. If times are tough, you do not buy a new car, you use whatever you can find to keep going. Similarly, when the going gets tough, shutting down TOR permits cellular survival or longevity and survival of the organism.

AMPK the Metabolic Master Switch

Here's another tongue-twister for you—5' adenosine monophosphate-activated protein kinase or, more simply, AMPK, another enzyme which evolved to respond to adverse conditions and has been called "a metabolic master switch" in terms of hunkering down.

It plays a role in cellular energy homeostasis, largely to activate stored glucose and fatty acid uptake when cellular energy is low. AMPK is considered an important therapeutic target for controlling human diseases including metabolic syndrome and cancer

Insulin-like Growth Factor 1 (IGF-1)

You've read about—and maybe you even know—centenarians who confound neighbors, family, and researchers and reach a ripe old age despite a life eating and drinking whatever they wanted. IGF-1 is reduced in fasting, and fasting-mimicking diets, but these centenarians often have a gene mutation for IGF-1 that is associated with lower rates of death and disease.

Hormesis: Turning on Longevity Genes

All these defense systems are activated in response to biological stress. Some stresses are too great to overcome, cause DNA breaks and mutations, and lead to illness and death.

But if we use hormetic strategies, we may be able to mimic these lucky centenarians.

Lifestyle Strategies for Longevity: Do Not Get Too Comfortable

The lifestyle strategies that help us switch into "hunker down" mode include time-restricted eating, exercise, sauna, and cold shock. Apply all of these tactics in a hormetic dosage, otherwise, they could be damaging. Let's look at these and others.

Calorie Restriction

Calorie restriction has been shown to prolong life in yeast, fruit flies, and mice and anecdotally in humans. As Sinclair wrote in *Lifespan*, "If this happened only in yeast, it would merely be interesting. But because we knew that rodents also lived longer when their food was restricted it was apparent that this genetic program is very old, perhaps nearly as old as life itself."

In animal studies, the key to engaging the longevity genes is through a razor's edge calorie restriction: just enough food to function and no more. This razor's edge is the limiting factor in studying humans since malnutrition can shorten life. Enter intermittent fasting.

Intermittent Fasting

A sustainable caloric restriction strategy is called intermittent fasting. Subjects who followed a restricted diet for five days a month, lost weight, reduced their body fat and affected their levels of IGF 1 and its gene, which, as I've mentioned, are linked to longevity. Some researchers use this gene to predict—with great accuracy—how long someone will live. Those centenarians with IGF-1 are simply winners in the genetic lottery and can eat fatty food, drink alcohol, and generally be careless with their habits. The rest of us have extra work to do.

Short of fasting for days each month, a popular strategy is spending sixteen hours a day without eating. By eliminating breakfast and having just a small lunch and an early dinner, you can experience some benefits of fasting. Almost any periodic fasting diet that does not lead to malnutrition will likely put your longevity genes to work in ways that will result in deep resilience and longer and healthier life.

Protein Restriction

Limiting your intake of meat and dairy reduces protein consumption and inhibits mTOR which forces cells to spend less energy dividing and more energy in the process of autophagy, which recycles damaged and misfolded proteins.

We cannot live without protein, but we can do a better job of restricting the amount we put into our bodies. Cutting back on our intake of the amino acid Methionine, which is found in beef, lamb, poultry, pork, and eggs, and substituting with plant protein, is part of a good longevity strategy.

Exercise

Scientists have found that those adults who exercise more have longer telomeres. Individuals who exercised the equivalent of at least half an hour of jogging five days a week had telomeres that appeared to be nearly a decade younger than those who lived a more sedentary life.

Exercise, by definition, is the application of stress to our bodies.



The longevity regulators AMPK, mTOR, and sirtuins are all modulated in the right direction by exercise, irrespective of caloric intake. They help build new blood vessels, improve heart and lung health, make people stronger, and extend telomeres. Even fifteen minutes of jogging a day reduced subjects' chance of death from heart attack by 40 percent and all-cause



mortality by 45 percent. And ten minutes a day of high intensity exercise, the kind that leaves you breathless and sweating, engages the greatest number of health promoting genes, and more of them in older exercisers.

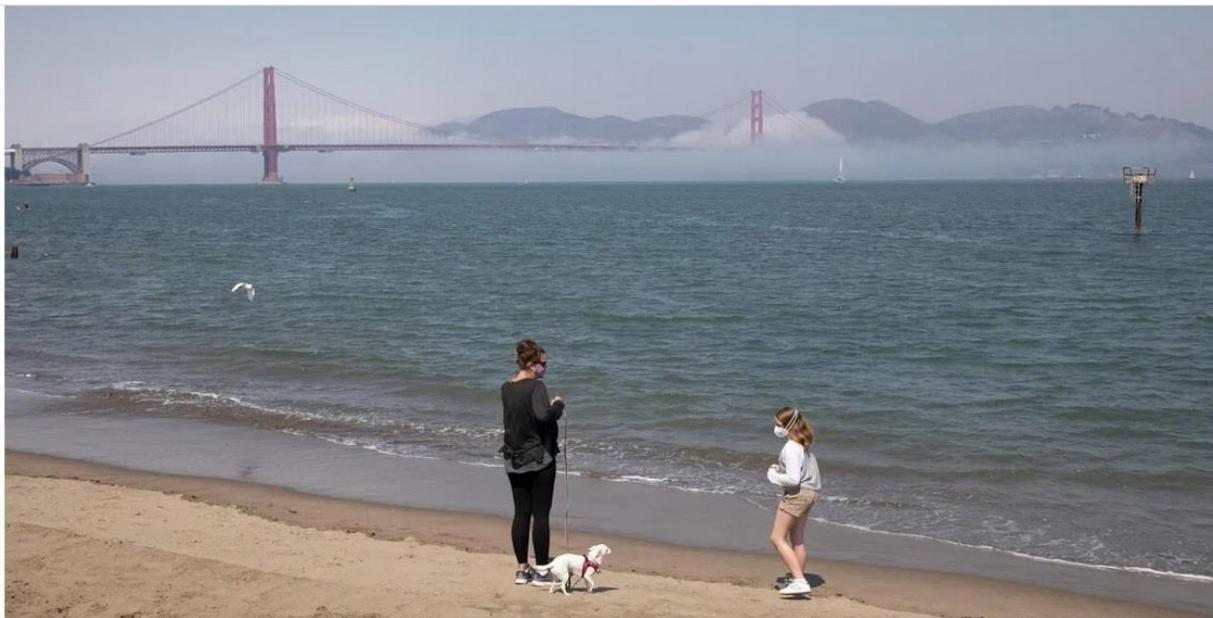
Cold and Heat

Exposing your body to extreme cold and heat is another effective way to turn on your longevity genes. Cold activates a gene called UCP2, which promotes brown fat in arms, back and shoulders, leading to more mitochondria (the power houses of metabolism), which can significantly reduce diabetes, obesity, and Alzheimer's disease rates. Exercising in the cold can turbocharge the creation of brown fat. Even sleeping in the cold can help.

The heat in a sauna has the same effect. In a group of about 2,300 middle-aged men from Eastern Finland studied for more than twenty years, those who used the sauna with great frequency, up to seven times a week, enjoyed a twofold drop in fatal heart attacks. The frequent sauna-goers also reduced all causes of death compared to those who had only one sauna per week. So, a little stress outside of the thermal neutral zone can go a long way to deepen strength.

Metformin and Rapamycin

Two medications which have received attention in the longevity industry, are Metformin, the time-honored oral medication for Type 2 diabetes and Rapamycin. The results of the TAME study should be able to offer more guidance as to the safety and efficacy of this medication in countering aging. Medications though can easily tip us into dangerous territory with unwanted side-effects. Easier to take a pill than jump into the cold bay!



San Francisco Bay, Cold Even in Summer!

Remember, the safest way is to harness the body's own systems with lifestyle changes and acupuncture.

All these strategies involve effort but are powerful if adopted as habits. But fortunately, we can get many of the same potent anti-aging effects from acupuncture which also has the advantage of being relaxing and does not require effort. Among many benefits, acupuncture calms the body and mind at a cellular level and is a type of hormesis since it has a demonstrated

effect on longevity genes. It is no wonder that acupuncture has been highly valued for centuries as a treatment for illness and well-being, and long life.

Acupuncture and Longevity

Reducing the Stress Response with Acupuncture

Research consistently shows that acupuncture improves autonomic balance with increased rest-and-digest (parasympathetic or vagal activity) and decreased fight-or-flight (sympathetic activity). But what has also been found is that patients who show improved autonomic balance with acupuncture are much more likely to show clinical improvement over time. This measured improvement is a harbinger of better resilience leading to better results.

Acupuncture and Jing

We have direct evidence that acupuncture can improve physiological measures that are markers of aging in animals. One study showed that acupuncture on the kidney meridian (closely related to Jing) improved renal function and increased sex hormone production compared to that of a younger animal. More research on this type of direct hormonal response is necessary, but the results are provocative. It is perhaps why acupuncture has been so effective in improving fertility and the success of IVF treatments.

Acupuncture Provides Cellular Hormesis

Besides harnessing the relaxation response, and increasing hormonal levels, aging science shows us another way acupuncture might help prolong life—as a highly effective hormetic challenge.

AMPK

Some animal studies show that electro acupuncture activates the AMPK system. While these studies ask more questions than they answer, they are nonetheless encouraging and help to provide insight into the prevention aspect of ancient acupuncture treatments.

Sirtuins

Additional studies showed that sirtuins are affected by acupuncture. In the first study, the authors hypothesize that acupuncture exerts its beneficial effects through a process of epigenesis (improving posterior heaven) through Sirt2, one of the seven sirtuins. The second study concerns Sirt1, a sirtuin long recognized for its role in longevity. In this study, they explored its

role in mitigating obesity. Again, these are studies are on animals, but may help to guide further acupuncture research.

mTOR

Perhaps the most promising studies concern mTOR signaling. mTOR was shown to be beneficial in Parkinson mice by clearing proteins through the mTOR pathway. Both rapamycin and acupuncture achieved this, but acupuncture did not have any side effects. Mice with premature ovarian failure was averted through the mTOR pathway. This may account for the effectiveness of electroacupuncture in patients undergoing in vitro fertilization, IVF. So, in summary, acupuncture likely acts as a hormetic longevity stimulus by activating the hunkering down switch of mTOR.

Herbal therapy

Of note is that astragalus, which I recommend to patients and a formula that I have taken daily for over a decade, has been shown to lengthen telomeres. Injected astragalus also increases autophagy (cleaning up senescent proteins and cells) and decreases IL-6, a pro-inflammatory protein.

Modern Medicine and Ancient Strategies

Longevity is starting to be recognized as a valid aim in modern medicine, late to the party, of course, compared to Chinese Medicine.

Looking at the science as we currently know it, promoting stress reduction and hormetic challenges through acupuncture and lifestyle changes, we can claim some of the deep resilience required to reach 100 years and beyond.



*(This ebook features highlights from the chapter on Longevity from my upcoming book “**The First Doctor**”*