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Telomere Science

There are trillions of cells in our body and at any given time a great number are dividing furiously to keep us alive and well. The process is directed by genes sitting on the 23 pairs of chromosomes found in the nucleus of each and every cell. The chromosomes are long sequences of DNA that contain all our genetic material. Each pair of chromosomes consists of one from your mother and one from your father and they are twisted around each other to form a structure called the double helix.

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Of particular interest to the scientists at T.A. Sciences are the ends of each chromosome known as telomeres. Telomeres have no genetic function; they are simply stretches of DNA (repeats of base pairs) that protect the rest of the chromosome. These little bits of DNA are critical to healthy cell function and have been likened to the plastic tips on shoelaces because they prevent the chromosome from "fraying."

However, telomeres become progressively shorter each time the cell divides. When they get too short, cells reach replicative senescence and can no longer divide. The result can be the various conditions associated with old age.



Scientists have only recently begun to understand the critical importance of shortened telomeres. Research has shown that people over 60 who have long telomeres experience greater heart and immune system health than their age-matched counterparts with shorter telomeres. Thus, it is becoming well-understood that maintaining telomere length is preventing age-related decline.

The phenomenon of cellular aging was first noted by Professor Lenhard Hayflick in 1961. He discovered that cells cannot divide beyond a specific number of times. This is called the Hayflick Limit. Cells reaching this limit become old. Although Professor Hayflick discovered this important scientific principle, he had no idea what caused it.

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It took almost 30 more years before the role telomeres play in cellular aging was finally understood. In 1990, Calvin Harley at McMaster University in Canada and Carol Greider at Cold Spring Harbor Laboratory in the USA discovered that telomere shortening goes hand-in-hand with the aging process and is the direct cause of cells reaching the Hayflick Limit.

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This product is not intended to diagnose, treat, cure, or prevent any disease.

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TA-65 Dosing Guideline

The statistics showing TA-65's efficacy in the ground breaking scientific paper published Sept. 8, 2010 in the peer-reviewed scientific journal *Rejuvenation Research* allows us to offer different dosing options. Below is the guideline for you to choose the appropriate dosage and price for your unique situation:

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- <u>250 units (1 capsule daily)</u> is efficacious for healthy adults in their 40's or 50's. Also 250 units can serve as a maintenance dose for older people who have been taking higher doses of TA-65 for several years and want to continue on a reduced cost program. Clients who took this dose were shown to have increased short telomere length and significantly improved immune system function. There are also anecdotal reports of increased endurance and other benefits. Cost: US \$600.00 for each 3 month segment.
- 2. <u>500 units (2 capsules daily)</u> has been proven to lengthen short telomeres, restore the immune system, and improve other important bio markers. Anecdotal reports included increased energy,

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endurance, vision improvements, sexual enhancement, and more. This medium strength dose is recommended for people who are generally in good health and want to be proactive in longevity and healthy aging. Many people in their 50's or 60's fall into this category. **Cost: US \$1,200.00 for each 3 month segment.**

- 3. <u>1000 units (4 capsules daily)</u> This is considered the HIGH DOSE and is recommended for clients who are:
 - 1. Over 70 years of age, or
 - 2. Are of any age and have measured their telomeres and found them to be short, or
 - 3. Have reason to believe that strengthening their immune system would have particular benefit.

It is expected that this dose will give an increased benefit over the lower doses (although not a proportional benefit). Study subjects experienced lengthened telomeres, restoration of weak immune systems, bone density improvements and other important bio marker improvements which usually decline with age. Anecdotal reports include energy increase, endurance, cognitive improvements, improved vision, sexual enhancement, and an overall feeling of well being. **Cost: US \$2,200.00 for each 3 month segment.**

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http://www.tasciences.com/ta-65/ta-65-dosing-guideline/



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FAQ

What are telomeres?

Telomeres (te-•lo•meres) are buffers, protective pieces of DNA material at the ends of each and every chromosome in every cell in the body. Imagine a shoelace with the little plastic endpiece that keeps the strings of the lace bound together. This is what a telomere looks like and how it functions. Just as a shoelace unravels if the protective tip is missing, so the genetic material of the chromosomes degrades if not properly protected by telomeres of a certain length.

What is Telomerase Activation?

Telomerase (te•lo-m•er•ase) is a naturally-occurring enzyme in the body and a vital factor in cell health. It helps maintain the protective telomeres located at the ends of all

chromosomes. Scientific studies have shown that controlled activation of telomerase in normal cells can increase telomere length, improve functional capacity, and promote the proliferative lifespan of cells. The Telomerase-Activating potency of the molecule TA-65 has been independently proven in rigorous tests by 3rd party laboratories.

Have these products been tested?

T.A. SciencesTM follows stringent scientific procedures to back up the safety and efficacy of our products. For more than a decade, we have conducted a series of studies including, most importantly, a 2005 Anti-Aging Trial designed to directly measure the effect of TA-65 when taken internally. In this trial we saw a reduction in the signs of aging from the introduction of TA-65 into the bloodstream. A 125-person safety study showed no negative effects from daily use of TA-65. More exciting news on testing will be available as soon as on-going studies are completed.

Is there real science behind these products?

The presence of telomerase and the effects of telomere shortening are so basic to human aging and the maladies of old age that an entirely new branch of biology (Telomere Biology) has sprung up in the last two decades. The science of telomeres and telomerase activation is a new frontier, attracting some of the brightest scientific minds in both the academic and pharmaceutical worlds. To maintain its leadership role in Telomerase Activation, T.A. SciencesTM maintains unique relationships with leading edge biotech firms and opinion leaders in the field of Telomere Biology. Dr. Calvin Harley, who first discovered the link between Telomeres and aging, works closely with T.A. Sciences to integrate the latest scientific discoveries into T.A. Sciences' products. T.A. Sciences has also established working relationships with several other of the world's leading Telomere Biologists.

For more information on the science behind TA Activation click here.

How does T.A. Sciences assure the quality of its products?

Quality and purity are assured through a series of analytical tests. Here is the process from the beginning to the end of the supply chain:

- T.A. Sciences harvests high-potency, naturally grown Astragalus. The raw plant material is refined into a base powder at our exclusive plant-extraction facility.
- This refined base material is then further extracted and purified through a proprietary process perfected over more than a decade of research and development to yield the single molecule TA -65 at over 98% purity. Using HPLC/ELSD/CAD, mass spectrometry, and gas chromatography, TA-65 is tested for purity, solvent residue, microbial, heavy metals, and pesticides.
- The Purified TA-65 is then sent to an FDA-certified facility for further processing utilizing advanced delivery technology to improve the bioavailability of the TA-65 molecule.
- The bioenhanced TA-65 is blended with USP (United States Pharmacopeia) grade GRAS (Generally Recognized As Safe) excipients and encapsulated and packaged at our subcontractor's state of the art GMP (Good Manufacturing Practices) certified facility. The final product must pass another series of tests including microbial and heavy metals before it can be released.
- Through these and other rigorous quality programs, T.A. Sciences can assure our clients that what we say on our label is 100% accurate.

What is the plant from which TA-65 is derived?

TA-65 is a naturally occurring molecule found in an ancient Chinese medicinal herb. Well known to most of China's 1.3 billion people for over 1000 years, this medicinal root can be found in every traditional Chinese herbal shop. Major health benefits from this plant have long been recognized by practitioners in China, but never before has the TA-65 active ingredient been isolated and purified.

If TA-65 is a molecule coming from an ancient medicinal plant and extracts are available in any vitamin shop, why not just buy those inexpensive commercial products?

To answer this question, we purchased four commonly available extract products and had them tested to verify how much, if any, TA-65 is present. In all four cases, the testing lab could not detect any TA-65. Their assay is accurate to one part per million.

This is not surprising because not only is the TA-65 molecule rare, but extraction processes used by Chinese processing companies normally destroy it. T.A. Sciences uses a proprietary production process that took years of research and over several million dollars to develop. Several patents have been issued to T.A. Sciences over the years related to this technology.

Are there any allergens in the product I should be aware of?

TA-65 does not contain dairy, eggs, gluten, corn, soy, wheat, sugar, starch, salt, preservatives, artificial color, flavor, or fragrances.

Is TA-65 Scientifically Supported?

T.A. Sciences is the first and only company in the world to offer Telomerase-Activating products to combat the effects of cellular aging through leading-edge science. After more than 10 years of rigorous Research and Development, T.A. Sciences is proud to market the unique and potent TA-65 molecule available in TA-65MD®.

Is TA-65 a drug?

TA-65 is a nutritional supplement, not a drug. It activates telomerase and this helps keep cells functioning in a normal and healthy way as we age. TA-65 is not a drug and we make no claims that it prevents or treats any disease.

Is there a risk of unwanted cell proliferation?

TA-65 is a single molecule found in the Astragalus plant. Astragalus extracts have been safely consumed by humans for over a thousand years and are available in any vitamin shop. TA-65's method of action is to activate the enzyme telomerase which in turn affects the telomeres, which are located at the tips of every chromosome in every cell of the body. Telomeres are the cellular clock of aging, every time a cell divides, telomeres get shorter. When telomeres get too short, cells can no longer divide and proliferate; they become old cells. Maintaining telomere health and length allows cells to continue to divide and proliferate for a longer time; they simply live and function longer. However if cells live longer, there is a theoretical concern that they might over proliferate. Therefore, theoretically, TA-65 could stimulate unwanted growth and cell overpopulation. Of course what TA-65 aims to do is to keep healthy cells alive and functioning for as long as possible. But what about the possibility of allowing unhealthy cells to live longer?

There is evidence that suggests that TA-65 boosts and strengthens the immune system, which we believe should address or suppress any cell overpopulation. Thus, we believe the overall effect of TA-65 regarding cell proliferation to be positive.

Furthermore, we believe that a number of physical changes associated with old age are due to the presence of short telomeres. TA-65 is specifically designed to promote overall cell health and longevity by increasing telomere length or slowing the rate of telomere shortening. When telomerase is activated, cell distress due to shortened telomeres is reduced.

In summary, considering the lack of evidence of TA-65 causing unwanted human cell proliferation, we believe the potential beneficial effects of activating telomerase and maintaining healthy tissue function outweigh any theoretical risk. And we practice what we preach; many T.A. Sciences employees are currently taking TA-65.

A doctor or professional health care provider who is familiar with Telomere Biology is in the best position to assess if TA-65 is right for you. Products that activate telomerase are on the frontiers of science and before you take TA-65, you should consult your physician or health care provider.

TA-65 sounds too good to be true. How do I know this is not just snake oil like other so-called anti-aging products?

TA-65 has been proven by outside, 3rd party laboratories to activate telomerase. Telomerase lengthens telomeres and longer telomeres allow cells to continue to divide and replicate longer.

In 2005 we did an Anti-Aging Trial that statistically shows in black and white what real people experienced from TA-65. This was a double-blind, placebo controlled study with data interpreted by Stanford University Ph.D., Dr. Jochen Kumm.

T.A. Sciences is solidly grounded in patented telomerase technology and validated by additional controlled studies.

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