# **TELOSTEP Telomerase Activation Formula**

The Market Opportunity for a Low Cost Telomere Extender THE WORLDS FIRST ECONOMICAL DELIVERY SYSTEM for CYCLOASTRAGENOL The MOST CUTTING EDGE LIFE EXTENSION SCIENCE on THE PLANET



## TELOSTEP A CUTTING EDGE LONGEVITY SUPPLEMENT

TELOMERES RECHARGE REACTIVATE REVERSE AGING

## **BAD THINGS HAPPEN WHEN TELOMERES GET SHORT**

Telostep Turning Back the Cellular Clock





#### Introduction

Evidence of a relationship between telomere length and aging has fueled many people's quest for a "fountain of youth."

**Telomerase** is the enzyme that is able to elongate the end of telomeres. *Carol Greider and Elizabeth Blackburn discovered Telomerase in 1984, and together with Jack Szostak, they won the Nobel Prize in Physiology or Medicine in 2009 for their discovery.* There are several mammalian cell lines that have been made "immortal" simply by turning on telomerase. We also now know that stem cell proliferation and maintenance is highly linked to telomere length, specifically the short telomeres. The results have been very positive, both in mice and in humans. Telomeres are generally credited with maintaining the integrity of DNA by securing the ends of chromosomes.

**Cycloastragenol** is the active ingredient in *:Telostep:* and is the only compound with solid human data showing its effects on telomere length (it activates telomerase enzymes) and which cause health benefits in human beings that correlate with "anti-aging" effects. Cycloastragenol is a saponin derived from the Astragaloside IV molecule extracted from the astragulus root, a plant that has been used in traditional Chinese medicine for over 2,000 years for its apparent ability to slow the aging process. It is similar in structure to the Astragaloside IV molecule but smaller and more bioavailable. This gives cycloastragenol 20 to 30 times greater telomerase activation than Astragaloside IV. These ingredients are derived from edible plants and thus can be classified as a supplement, which allowed them to be taken to the market much faster then if they were synthetic drug ingredients.

#### The Telostep Patent "Turning Back the Cellular Clock"

The Patent, provisionally filed in August 2012 and non-provisionally filed in August 2013, claims various configurations of pills or capsules containing any active ingredient used to activate the production of the telomerase enzyme, each of these configurations protected by an enteric coating to protect the active ingredients from degradation due to the gastric acid in the stomach. This is of importance since the ingredients that have been proven to be good telomerase activators are very expensive. With protection from the digestive system this amount could be cut to a third or less of what it is now. Production designs for fully automated production have been developed. Telostep is not a drug and is not intended to cure any disease. According to the FDA, aging is not a disease. This is unique product, that is easy to manufacture and aides the natural healing abilities with no side effects

We age because our cells divide and our telomeres get shorter with each cell division. We believe it is possible to extend life with reduced risk of disease by maintaining telomeric homeostasis and now there is great research to back this up. The science of telomeres offers the most exciting and viable possibility for extreme life extension— the kind of anti-aging strategy that can actually allow you to regenerate and in effect "grow younger." Currently there are thousands of people taking these ingredients even at this high price. But clearly such a high price is preventing the market from expanding beyond this wealthy few. Take the price down by a factor of 3 or perhaps even in the direction of 10 and the market will become much greater. Telostep is a product, which delivers the effective anti-aging ingredients onto the market and will bring their price down from the current \$10k per year to one third or less than that amount, once in mass production.

## CUTTING EDGE LONGEVITY SCIENCE TELOMERES RE\_CHARGE\_REACTIVATE\_REVERSE AGING

## BAD THINGS HAPPEN WHEN TELOMERES GET SHORT

## **Telostep Company– Turning Back the Cellular Clock**

#### **Mission Statement**

Telostep is a project to take the most effective anti-aging ingredients on the market and bring their price down from the current \$10k per year to one third or less than that amount, once in mass production. A patent is currently pending on this approach.



### Telomeres, Telomerase and Aging

In 1961 Leonard Hayflick discovered that nearly every cell in the body can only divide 30 to 90 times before cell division stops, called the "Hayflick limit". Cells in the body are constantly lost due to injury, sickness and just unavoidable wear and tear and need to be replaced via cell division. Once this limit is hit cells of a specific type in a specific region of the body can be lacking, leading to muscles being weaker, organs not functioning as well, tissues being less flexible and generally the body being more aged. This is one of the main causes of aging.

Later other researchers found that the mechanism behind this limit was that every time a cell divides the system the cell uses to copy the DNA has a flaw such that a portion of the end of the DNA strand is left off of the new copy. In order to avoid this process deleting some vital instruction on the DNA, the ends of the DNA have a long chain of repeated, non-programming code of the genetic letters TTAGGG, called a telomere. This sacrificial end of the DNA repeats thousands of times, but a large number of them are lost with each cell division. Once the telomere ends are below a certain critical length, the cell will refuse to divide further to avoid damaging the DNA. This creates a clock that ticks with each cell division down to the point where cell division stops.

In the 1970's Elizabeth Blackburn discovered that cells have the ability to produce an enzyme called telomerase that is capable of adding telomeres back on to the end of the DNA, turning back the clock. This is how the cell resets itself between generations, so that a new body can undergo the great number of cell divisions required to build a new baby and to grow that baby into a new and youthful adult body. Even in an adult, the production of telomerase is turned on within a certain few cells in the body, such as those involved in reproduction and some other cells which are tasked to divide many more times than the average cell, such as adult stem cells. For this discovery Blackburn and a couple of her colleagues won the Nobel Prize in 2009.

In 2010 a group of researchers at Harvard and at two cancer research centers modified a group of mice be the age equivalent of an 80-year old human. These aged mice were then further modified to produce the enzyme telomerase. Over a 30-day period (human equivalent to 2.5 years) the mice dramatically reversed the aging process. Their organs, such as spleens, liver, testes, intestines, grew back to original size and function. Their muscles regained mass and strength. They became the physiological equivalent of youthful mice. Their brains grew back from 75% of youthful size to 100%. Their nervous system and mental function returned to a youthful state. They even became fertile again.

The main criticism of this study was that the aging process for these mice was genetically hastened prior to the test. To fix this problem a group of researchers at the Spanish National Cancer Research Institute, led by Maria Blasco, conducted this same test using a different manner to turn on the production of telomerase and using naturally aged mice in 2012. The result was the same sort of muscle, nerve and organ regeneration and a return to a more youthful state. **Furthermore, the Blasco study found that the mice increased in median life span by 12% to 24%**.

Previous to these two tests there had been a theoretical fear that telomere extension would increase the rate of malignant cancers by allowing benign cancer cells to reproduce more. But both the Harvard and Blasco studies (and every other telomere extension study) have shown either lower, or the same, levels of cancer proliferation.

#### **Telomere Extension in Humans**

In 2005 human testing began of an ingredient class that can activate telomerase production in humans. These ingredients can be derived from edible plants and thus can be classified as a supplement which allowed them to be taken to the market much faster then if they were synthetic drug ingredients. The first product to hit the market with this class of ingredient was the product TA-65 in 2007. There have been several other products to hit the market with this type of ingredient since, but TA-65 was the first and so has been the most studied.

The results have been very positive, both in mice and in humans.

Blasco, the same researcher who led the Blasco study, tested TA-65 in mice and found that telomerase was activated, telomeres were lengthened and lifespan increased with no increase in cancer. Senescent cells, worn out cells that do not divide due to having run out of telomeres, reduced in number by 1.5% in 3 months, 4.4% in 6 months and 8.6% in 9 months. Since senescent cells do not function properly and bring down the function of neighboring cells and can even cause cancer, reducing senescent cells in this manner is worthwhile for reversing aging. And, of course, lengthening telomeres prevents the formation of senescent cells in the first place. It also increases the number of immune cells available which can remove senescent cells.

A team from Whittier College and UCLA tested TA-65 in human cells in the lab and found that telomerase was activated (produced) and the number of cell divisions that a given set of cells could do was significantly increased, beyond the normal Hayflick limit.

Proprietary human testing done by the makers of TA-65 by multiple third party labs showed that although the average number of telomeres did not increase a large amount, the lengths of the shorter telomeres increased significantly. Later it was found by other researchers that in adult cells the cell limits the use of telomerase. If a cell is in a healthy state and if the cell has short telomeres, or if the cell undergoes cell division, the cell allows any telomerase present to lengthen the telomeres until they are at a moderate length, and then stops the telomerase from going further. This control mechanism may be the reason why earlier fears that telomere extension might promote cancer have turned out not to be valid.

Also, the cancer researchers who did the Harvard and Blasco studies speculate that improvements in the immune system by telomere extension may be highly effective in keeping cancer in check as well as preventing cells going senescent and ultimately cancerous from there. Cancer occurs, after all, 10 times more in those over 65 as in those under 65. By extending the shorter telomeres the ability of a cell to divide is allowed to continue and cell populations can begin to return to more youthful populations...and senescence can be avoided.

Testing in humans also showed an increase in immune system function, improved vision, improved sexual function, and more youthful skin. Anecdotal reports from many different sources have shown a pattern of improvement including better vision, better hearing, improved cardiovascular fitness, better sleep, more flexible skin, reduction in age spots, better concentration, more energy, fewer pains, better hair health and many other benefits. Typically people experience a few things from this list, but not all. And some people report no significant result. The variability of the results could be due to what portion of a particular person's aging process in a particular body part are due to hitting the telomere limit vs. other mechanisms of aging such as the build-up of free radicals or DNA damage. As a result not everyone who tries these telomere extending ingredients are happy with the results, but a very large percentage of them do show a significant result. They recapture some abilities they had in their youth that they thought were long gone.

Many human diseases such as cancer, heart disease, multiple sclerosis, etc., have been shown to not only be associated with shorter telomeres but to be, in part, caused by shorter telomeres. Given this and the improved organ function seen with telomere extension, using a telomerase activator can make a big impact in both health and lifespan.

#### An Opportunity to Reduce Cost and Enable Growth in the Telomere Extension Market

The "Telostep" project was launched around the realization that the molecules that activate telomerase production have an Achille's heal when it comes to these molecules making their way intact through the digestive system. A low cost method of protecting these highly expensive ingredients from the digestive system was patented and a proof of concept testing program was launched.

There is a certain segment of the DNA that programs for the production of the telomerase enzyme. That segment is turned on for telomerase production whenever there is a molecule that bonds to a region next to that segment. In order to bond to that site, a telomerase activating molecule must have a certain shape and configuration. This means that the molecule must have certain chemical bonds and a certain structure. The closer these characteristics are to the site on the DNA the better the molecule will fit there and stay there for telomerase production, like a key in a lock. This implies certain characteristics inherent to the molecule, such as the molecules inability to withstand acidic conditions.

One molecule that has been shown to have very weak telomerase activating ability is Omega 3. Omega 3 is much less active than the best ingredients used for telomerase production, but it does loosely fit into that lock and enable some telomere lengthening. Omega 3 has a very similar molecular configuration and chemical bonds as those more active ingredients. Omega 3 is significantly broken down by stomach acid. When Omega 3 is protected from stomach acid by a special coating, which dissolves in the intestines, 3 or more times the amount of Omega 3 can be measured in the bloodstream compared to taking the same amount of Omega 3 without the protection. This same sort of test has been applied to a number of molecules of a similar structure and the results are that 3 to 10 times more of the substance makes it into the bloodstream with protection than without.

The active ingredients that are most effective for telomerase activation are found in very small concentrations in the root of the astragalus plant. It takes over 1000 pounds of astragalus root to make enough of these ingredients for one person for one year. It is a very expensive extraction and purification process that results in a retail price of \$10,000 per person per year for the current products on the market.

With protection from the digestive system this amount could be cut to a third or less of what it is now. Currently there are thousands of people taking these ingredients even at this high price. But clearly such a high price is preventing the market from expanding beyond this wealthy few. Take the price down by a factor of 3 or perhaps even in the direction of 10 and the market will become much greater.

Lab experiments were conducted under the Telostep program looking at different design configurations for these ingredients. These experiments led to novel ways to configure the delivery system for maximum protection in the stomach and maximum dispersion in the intestines. Different approaches, including a preferred maximum performance approach, were all included in the Telostep patent. A thorough patent search showed no prior art for a protective coating approach for a telomerase activator. Also included in the Telostep patent was the use of any ingredient for telomerase activation with any of these types of protective coatings and/or with any of these rapid release systems. Because any molecule that activates telomerase production should benefit from this protection. This may give the Telostep patent a long life, beyond that of the currently used active ingredients.

In production Telostep can be made in existing production lines with some minor modifications. For early proof of concept testing a handmade version was developed. Testing began in the summer of 2012. So far the people trying Telostep have reported the same benefits that TA-65 consumers report, such as improved vision, improved hearing, improved flexibility, improved concentration, better cardiovascular fitness, fewer pains, more youthful skin, better hair health, better sleep, etc.

And these results have been achieved using far less than the amount of ingredients used by TA-65 consumers. It is thus being shown in this proof of concept test that the same sort of results can be obtained with significantly less ingredient cost by using the Telostep protection and delivery system.

The next step in the Telostep project is to continue the proof of concept testing to obtain more numbers of people and to test for a longer period. Once the proof of concept testing is complete the goal is to license the patent to an existing supplement manufacturer, an existing supplement distributor, or to a fully funded start up company.

Prior to the 1700's the average lifespan was around 30 years old. No one today complains that people are living beyond 30. Why should we currently accept a lifespan in the 80's or 90's?

#### Supplements

More than a decade ago supplements, other than routine vitamins, had a very poor reputation. For the most part this may have even been deserved. Few supplement manufacturers put much science into their products. But then the FDA drug testing program became so time consuming and so expensive, frequently taking over a decade and over \$500 million, that smaller research companies started to look at the rules for supplements as an alternative path to create useful products. And in any industry it is the smaller players who have the more innovative solutions.

Since then many supplements have proven their effectiveness in double blind testing, the gold standard of medical research. This has led most doctors to radically change their opinion of supplements. Today most doctors frequently advise their patients to take various supplements. For instance, Omega 3 is commonly advised for patients who are concerned with cardiovascular health. Vitamin D is almost universally advised for patients with low bone density. BioCoQ-10 is advised for many cardiovascular issues. Glucosamine is advised for people with strained tendons and joint issues. Bio-active cultures are advised to those with digestion problems. And the list goes on.

The manner in which supplements is regulated is completely different than drugs. For a drug the chemical in question must go through a defined testing and evaluation program lasting at least several years and an enormous amount of funding. Any chemical modification to the drug requires further testing.

Supplements, on the other hand, are regulated by being composed of components that are already approved safe by the FDA as edible. The theory is that as long as each component is safe for human consumption and as long as each component is not chemically altered in any way, the resulting product is safe. Essentially this policy is that if flour, eggs, water and baking powder are safe to eat than the bread is safe to eat. The raising of the bread is allowed as an acceptable reaction as this particular reaction is itself already approved as safe. But if any of these ingredients were to be chemically altered in a way that is not already approved as safe then the result would not be acceptable.

We have taken care in the design of Telostep to only use components that qualify for use in a supplement. We have furthermore taken care that these components are not chemically changed from this qualifying state due to the manufacturing processes.

There are several mammalian cell lines that have been made "immortal" simply by turning on telomerase and expressing it at a higher level than normal. Most surprising is the absence of increased cancer in many of these experiments. We also now know that stem cell proliferation and maintenance is highly linked to telomere length, specifically the short telomeres.

There have been a couple of recent developments that greatly improve the business outlook of the Telostep project to reduce the cost of telomere extension.

One is that the makers of the leading telomere extension product, TA-65, recently revealed that they currently have 20,000 customers. This may not seem like a very large number of customers, but a full treatment of TA-65 costs around \$10k per year per person and so it is actually quite a substantial level of sales for such a new product.

The main barrier to people taking a telomere extender so far has been this high price tag. The people taking TA-65 generally love the results, but not many can afford the price. The whole point of the Telostep patent is to reduce the cost of a telomere extender by perhaps a factor of 3. This would open up the market to a much wider audience.

The second piece of good news is that Elizabeth Blackburn, the Nobel Prize winner who discovered the role of the telomerase enzyme to lengthen telomeres, has started a company that has just made available an inexpensive telomere length test. For \$300 not only can a person measure the length of their telomeres but also the percentage of telomeres that are short. It is critical when evaluating telomere lengthening to know the percentage of telomeres that are short rather than the average length. In the recent past tests that provided this information where prohibitively expensive. But now Blackburn has taken the price down to a small fraction of what it was in the past.

The Telostep project is currently doing proof of concept tests. We expect to launch the product in October 2016

#### Telomerase to the rescue

The Telomere Theory of Aging, first posed by the Russian scientist Alexey Olovnikov, postulates that the key mechanism that drives cellular aging is the loss of telomeric DNA, which eventually causes chromosomal instability, and cell senescence and cell apoptosis (death).

Telomerase is the an enzyme that is able to elongate the end of telomeres. However, telomerase is not present, or is present in only very small amounts, in most somatic cells. It is only present (at low levels) in stem cells, and in immune cells during clonal expansion, which contributes to the higher proliferation capacity of these types of cells. Because there is little or no telomerase in most somatic cells, telomeres shorten with age in almost all cells of the body. The end result is generalized aging and ultimately death due to the complications of aging. And thus we have the Telomere Theory of Cell Senescence and Aging.

Telomerase was discovered by Carol Greider and Elizabeth Blackburn in 1984, and together with Jack Szostak, they won the Nobel Prize in Physiology or Medicine in 2009 for their discovery.

The primary consequence of telomere dysfunction is cellular senescence, a permanent growth arrest state, but this telomere shortening can be stopped by telomerase. Telomerase activity is required to maintain telomeres. And there are key regulators of telomerase and telomere function that can directly lead to or prevent cellular senescence.

A recent study found that longevity is associated with longer telomeric length in individuals aged 70 years of age or older. These researchers speculate that individuals with longer telomeres have an increased likelihood of resisting cancer and neurodegenerative diseases.

Another study also observed a correlation between telomere length in people of different neurological status. Significant telomere shortening in peripheral blood cells from Alzheimer's disease patients versus healthy people was observed, and it turned out that healthy people have longer telomere length than those with neurological dysfunction.

People with healthy arteries were found to have longer telomeres in endothelial cells of the surface of coronary arteries in comparison to those with coronary artery disease.

Immune memory, an essential immune capacity, appears to become limited as a result of telomere erosion and telomerase downregulation. Thus, improved telomere function may have a positive impact on immune memory.

# TESTIMONIALS So FAR (using Telostep)

"I have stopped using glasses for long distance vision assistance, with rare exceptions, eg night driving in bad weather."

"Much improved cardiovascular fitness at rest and while exercising. Breathing comes easier and is less strained."

"I feel more hungry most of the time, and certain items have definitely improved. My overall eyesight has improved dramatically. My skin texture appears to have improved. My energy level is very high and I sleep less. My clarity of thought has improved. My inner self feels calm."

"I have noted that I can put my hands behind my back. This helps when I slide my belt into the grooves of my trousers behind my back. I also notice when I'm sitting in the passenger side of the car. I can reach for my seat belt with no pain or effort. I'm pleased with the results so far."

"My vision has improved and people say I am looking younger."

"I noticed that while I usually go for the mail in the adjacent apartment building walking rapidly both ways, I did not have to slow down on my return, which I usually had to do. I do not have to slow down anymore."

"I get a better night's sleep."

"On an overall basis I feel good about what appears to be transpiring."

"Overall much improved hearing. Even greater hearing improvement for high pitched sounds. Wonderful ability to hear more subtle resonance in voices and instruments."

"Vision improvement, hearing improvement, much more elasticity and some muscle improvement, very little exercise but a slow pulse rate, 60, low blood pressure 120+ over 70+, an overall feeling of well being, and optimistic."

"After three months on Telostep, I have improved my hearing acuity. Previously, with hearing aids, I used to turn the TV volume up from zero to 10 or higher. Now I can listen to the voice at the levels of 2,3 and 4."

"I have noticed less ringing in the ears. It is a relief."

"I now have better distance vision overall and better focus across the whole field of view for distance vision. No longer squinting. Everything is just in focus."

"A lower back pain I had for years suddenly disappeared."

"I was starting to get a slight shaking of my right hand when holding a cup of coffee, which seems to have ceased after Telostep."

"Generally I have been in good spirits and in well being with the capsules. Some friends thought I was six years younger than I am."

"I only have to hold books half as far away to read them without reading glasses. So my reading vision is improved, but not yet all the way."

"Since taking Telostep, my appetite has been ferocious. On the other hand I do not appear to be gaining weight."

"High blood pressure induced red dots on my ankles disappeared (they were there for 20+ years)."

"I continue to have feelings of well being attributable to Telostep."

"I sat down at my computer and took off my distance glasses, and before I switched to my reading glasses, I suddenly realized I could read the small print on the posters I have on the facing wall."

"Less inflammation and fewer headaches. Less stiff shoulders. More relaxed and less stiff back. Less fat and more muscle. Improved skin elasticity. Even though less fat overall, more fat in earlobes and face, less gaunt, as in youth."

"It appears that the liver spots on the back of my hands are fading significantly. My left hand more than my right."

"Improved fingernails that grow faster. Having to trim them more often may not be a benefit, but having them be healthier is."

"This has improved my clarity of thought. My thoughts get more muddled whenever I stop taking Telostep for longer periods of time."

"Have you been able to discover a memory improvement of Telostep? I joined a World Language Cafe where we find a table to speak a foreign language. I joined a German table and discovered that I could remember about 10 German poems or expressions that I haven't used since 1945."

"One upper tooth and one lower molar was bothering me. The dentist admitted that he partially botched the root canal job on the upper tooth and that I had some decay on the molar under the cap. I tend to stall regarding going to the dentist. I started the Telostep, and the pains were 90+% relieved. When I temporarily stopped the Telostep, the pain came back. Since restarting Telostep, the pain is 98% gone."

"I am reading heavy works for longer periods which I also attribute to Telostep."

"Better vision in low light. Brighter, clearer colors."

"I think that I am less prone to illness since taking Telostep."

"Better overall feeling of good health."



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# **ROGER GREEN**

## A LEADER IN TECHNOLOGY DEVELOPMENT

Mr. Roger Green, a New Zealander, is an international businessman based in New York

Roger Green has been active for over 25 years in environmental, eco-design, and alternative healthcare education including emerging green energy technologies initiatives around the world. He is the founder and director of the Breakthru-Technologies Company, which has sponsored several international conferences and is financing many innovative inventions.

Mr. Green has been a seed capital investor in the emerging field of cold fusion, aka LENR, Low Energy Nuclear Reactions, and has been active in the promotion of the E cat Technology based on the invention from the Italian, Andrea Rossi.

Currently, Green has been working with a team of scientist to re-create the Priore tesla rejuvenation technology, which in the period of the 1960's demonstrated amazing healing and natural pain relief to hundreds of well-document patients. The new device all the Theraphi was released to the market in late 2015

www.Theraphi.tech

Roger Green is recognized as one of the world's most innovative, dynamic and expert teachers on modern day natural healthcare incorporating both eastern and western themes, having given presentations to over 70 countries. In addition, Mr. Green is passionate about creating a more humane system of health care through his work of nearly 30 years as Director of The Academy of Healing Nutrition,

After founding and directing several private natural health clinics, he is excited about the opportunity to bring the TELOSTEP Telomere activation system to the world.



## Web Links

Harvard Mouse Study

#### Articles

http://abcnews.go.com/Health/Alzheimers/aging-reversed-mice/story?id=12269125#.UaZ3O6LvjTo http://www.guardian.co.uk/science/2010/nov/28/scientists-reverse-ageing-mice-humans http://online.wsj.com/article/SB10001424052748703785704575642964209242180.html

Paper

http://www.nature.com/nature/journal/v469/n7328/full/nature09603.html

Blasco Mouse Study

Articles

http://singularityhub.com/2012/05/24/telomerase-gene-therapy-extends-lives-of-mice-by-up-to-24-percent/

Paper

http://onlinelibrary.wiley.com/doi/10.1002/emmm.201200245/abstract

TA-65

Articles http://rechargebiomedical.com/ http://emediahealth.com/2009/05/15/is-ta-65-the-means-to-immortality/

Personal Experience http://www.rechargebiomedical.com/testimonials.php http://www.ta65doctor.com/contact-us/testimonials/

Studies and Data http://www.ncbi.nlm.nih.gov/pubmed/20822369 http://www.rechargebiomedical.com/testimonials.php?page=47 http://www.jimmunol.org/cgi/content/meeting\_abstract/182/1\_MeetingAbstracts/90.30 http://www.drdavesbest.com/TA65/TA-65\_Telomeres\_FAQ.pdf http://www.revgenetics.com/ta-65/ta-65-and-cancer http://www.rechargebiomedical.com/blog/for-death-begins-with-lifes-first-breath/#.UaabY6LvjTo http://www.rechargebiomedical.com/ta-65.php http://www.mdpi.com/2073-4409/2/1/57?utm\_source=RevGenetics+News&utm\_campaign=dba88b38f7-April+Week+4&utm\_medium=email

Short telomeres cause heart disease, cancer, multiple sclerosis, celiac disease, not just correlation <a href="http://www.sciencedaily.com/releases/2013/03/130327133339.htm">http://www.sciencedaily.com/releases/2013/03/130327133339.htm</a>

Short telomere length leads to disease, cancer and short lifespan http://www.the-scientist.com/?articles.view/articleNo/32010/title/Telomeres-in-Disease/

Mental state and telomere lengthening

http://www.medicalnewstoday.com/releases/252958.php

Getting short telomeres longer more important than the average length <u>http://www.spectral-</u> imaging.com/attachments/250\_The%20shortest%20telomere,%20not%20average%20telomere%20length,%20is %20critical%20for%20cell%20viability%20and%20chromosome%20stability.pdf

Short telomeres can cause adverse genes to be expressed <a href="http://www.the-scientist.com/?articles.view/articleNo/35448/title/Telomeres-Affect-Gene-Expression/">http://www.the-scientist.com/?articles.view/articleNo/35448/title/Telomeres-Affect-Gene-Expression/</a>

Presentation on telomeres and health and lifespan http://www.drbartnof.com/video/telomere/player.HTM#



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