

## What's a Telomere?

***Did you know your estimated lifespan is a lot like the end of a shoelace?*** Some of us will live long, full lives because our "shoelaces" aren't frayed, yet others will die prematurely from "laces" with unraveled ends. I guess it makes us ask the question, "***how do I keep my shoelaces from fraying?***" Right?

An emerging secret to longevity & anti-aging is in sustaining the length of your telomeres, or "shoelace caps." In fact, the 2009 Nobel Prize in Physiology /Medicine was awarded for the discovery of how chromosomes & gene expression are protected by telomeres.

All of our genes are located on the twisted, double stranded molecules of DNA called chromosomes. Telomeres are the protective caps at the end of these chromosomes which preserve the replication of DNA.

Their length is a marker for biological aging because these "caps" literally guard our genetic information during mitosis, or cell replication. **A lot like a shoelace cap, the telomere prevents the fraying of the chromosome strand and thus, protects our chains of chemical codes, DNA.** As a cell ages, its telomeres naturally become shorter and shorter with each replication.

**Eventually, the telomere becomes too short to allow cell replication; the cell stops dividing and it dies.**

## THE HAYFLICK LIMIT

Cell death leads to aging & physical death. ***The Hayflick Limit is the point at which a cell can no longer divide, and it commences apoptosis. In a general sense, our physical death can be defined as reaching the systemic Hayflick Limit.*** Actually, this limit is a cellular defense mechanism to prevent the replication of an error and/or mutation in the DNA. When telomeres get shortened, there is an increased risk of mutation leading to cancers.

***Interestingly, the Hayflick Limit only applies to normal functioning cells. Cancer cells possess an enzyme called telomerase which is able to restore the telomere length by continually adding DNA sequences.*** This gives cancer its immortality and explains why cancer cells are not restricted to the Hayflick Limit.

***A cancer cell's telomere length is never depleted!*** This unique ability of telomerase to elongate telomeres is being researched for normal functioning cells. Many believe telomerase-based therapies could prevent disease and extend lifespan. However, in preliminary studies telomerase therapy has induced cancerous states.

**In normal functioning cells, the Hayflick Limit correlates directly with the length of the telomeres. The shorter the telomere, the sooner the cell will die. Telomere length predicts biological aging, not chronological aging; many people have a biological age much younger or older than their actual years. Telomere length is the best way to ascertain your accurate biological age.**

**SpectraCell Laboratories**, in Houston, Texas, offers the only available telomere analysis in the United States. Your score is based on the telomere length of white blood cells compared to a sample group within the same age range. The higher the score the "younger" the cells; this serial evaluation of telomere length is an indicator of how rapidly you are aging compared to a normal population.

***Premature death and all forms of degenerative, chronic diseases are directly related to shortened telomeres. Thus, the preservation of cell replication, through maintaining the length of telomeres, is now at the forefront of anti-aging.***

# Bristlecone Med-fitness

*"Damaging truth, I prefer it to advantageous error. Truth heals the pain which perhaps it evokes." -Goethe*

## TELOMERASE

Statistically, people with shorter telomeres die 5x sooner, they are 3x as likely to die of heart disease, and they have an 8x higher chance of death from infectious disease. Although the enzyme telomerase may seem promising, there are many safe, more natural ways to slow telomere loss.

An inflammatory diet, or one that increases oxidative stress, will shorten telomeres quickly. This includes refined carbs and/or high carb diets, fast foods, processed foods & trans fats. Maintaining an ideal body weight and body composition with low body fat (less than 22% for women and less than 16% for men) significantly slows telomere shortening. Decreasing visceral fat by lowering insulin levels is also extremely important.

Diabetes and insulin resistance have a positive correlation to shortened telomeres. Regular aerobic and resistance exercise, sleeping at least 8 hours per night, stress reduction (cortisol reduction), adding bio-identical hormone replacement therapy (progesterone, estrogen, testosterone & natural thyroid), and fasting for at least 12 hours at night/4x per week will also decrease telomere loss.

## FISH OIL...AGAIN!

Antioxidant supplements such as vitamin C, E, D, selenium, quercetin, and green tea are powerful to decrease oxidative stress, and stop telomere shortening. ***"Increasing antioxidant capacity at the cellular level is critical to maintaining telomere length."*** "On January 20<sup>th</sup>, 2010, Dr. Ramin Farzaneh-Far, of the University of California, San Francisco, reported the biggest medical breakthrough in slowing the rate of telomere loss.

***"Patients who have the highest omega-3 fatty acid blood levels (EPA & DHA) also have telomeres that shorten at a significantly slower rate than patients with lower levels."*** He further reported, ***"Patients with the lowest levels of omega-3 fatty acids have the fastest rate of telomere shortening over a 5 year period. These patients are aging faster than those with higher fish oil levels."***

The January '10 report was based on a study of 608 men and women with stable coronary artery disease. Telomere length and blood levels of the omega-3's, EPA & DHA were assessed before and after the 5 year study. Patients whose levels of EPA & DHA were among the top 25% had the slowest rate of telomere shortening over the 5 year period. ***"Each 1-standard deviation increase in DHA & EPA levels was associated with a 32% reduction in the odds of telomere shortening."***

Dr. Farzaneh-Far reported that the omega-3's protect against oxidative stress and increase the body's natural activity of the telomerase enzyme ***in normal cells while suppressing telomerase in cancer cells!*** *Arresting telomerase within the immortal cancer cell has been cited as the possible 'cure' for cancer (fish oil to the rescue!)*

In our continuing commitment to your excellence in health, we are excited to announce our partnership with Spectracell Labs. Spectracell is a progressive, educationally oriented lab with a mission to improve health and wellness from the inside-out. Currently, they are the only lab in the United States to provide telomere length assessment; ***now you can have direct access to their services!*** Please contact Julie for more information.

*And please, don't forget your fish oil!*

*~~~~~Kelly & Julie~~~~~*