LIFE LENGTH

RESULTS REPORT

SAMPLE CODE: SM01

Report issue date: 20-04-2012

Legal Notice

The present report and all data included herein are intended solely for the Recipient - who shall be identified in this report exclusively by reference to a numerical code - and for his/her personal use. This report may not be used for pharmaceutical or clinical research purposes, unless a prior agreement is reached with Life Length to this end. Neither the report nor its contents may be interpreted as a recommendation for medical treatment or medication, nor do these constitute a medical treatment as such, nor may any such statement be derived from the report.

This report is not to be used for treatment purposes, and is only intended for the Recipient to review and discuss with his/her own physician. The information contained in the report does not constitute medical advice or a medical consultation. It is not intended for the diagnosis of health problems and is not a substitute for professional medical care. By no means is the present report intended to suggest the start of any kind of medical treatment, nor should it be considered a substitute for the independent opinion of a physician with regard to any health-related issue.

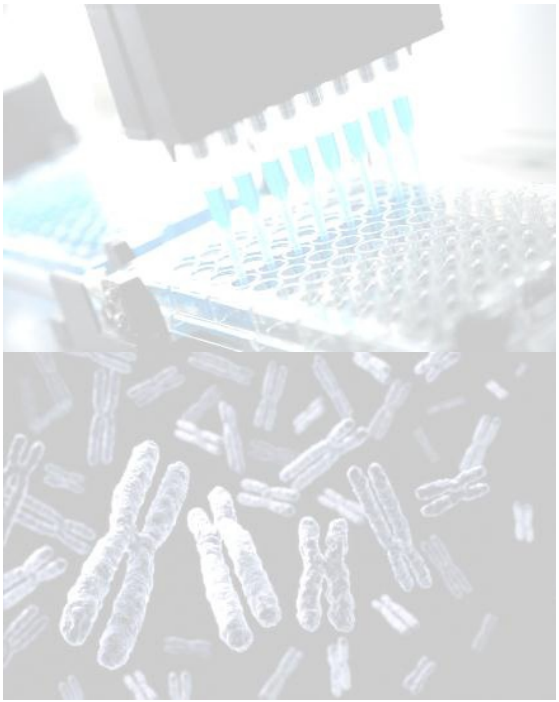
If the Recipient suffers from a persistent health problem or has any questions in that respect, we suggest he/she discuss the matter with his/her physician. Under no circumstances should the Recipient disregard the advice of his/her professional physician or delay recommended treatment due to the issuance of the present report.

The measurement of telomere length provided in this report was carried out in accordance with strict quality controls and the best technology available on the market at the time the report was issued. However, the mean variability of replicated samples has a coefficient of variation of approximately 5%.

The estimation of biological age is carried out based on telomeric measurements which Life Length performs on a sample of the general population using its advanced technology and which it stores in its database. At this time this information allows Life Length to estimate biological ages between 20 and 70, but Life Length does not yet possess enough information to estimate biological ages outside these ranges with sufficient statistical rigor. As Life Length expands its database with samples from individuals of ages greater and less than the aforementioned limits, its biological age estimation range will broaden. Life Length shall announce, through its website or its associated distributors, changes in said statistical capacity so that Recipients who have received measurements over the course of 2011 and 2012 may request, preserving their anonymity, the reissuance of their reports, with an updated estimation of their biological age, based on the measurement already conducted, at no additional cost.

Life Length assumes no responsibility for deviations in the results of analyses stemming from the non-viability or poor quality of blood sample provided by the Recipient. In addition, test results, which shall depend upon the quality of the blood sample analyzed, may reflect temporary changes in the Recipient's state of health, due to a temporary sickness, or if he/she is undergoing medical treatment, among other factors. As a result, we recommend repeating the measuremente at least on a yearly basis.

Life Length accepts no responsibility whatsoever for the use or utilization the applicant might make of the report and its results.



SUMMARY OF RESULTS:

Chronological age (years): 44

Estimated biological age (years): 34

Percentage of short telomeres (<3Kb): 16.32

Percentile of percentage of short telomeres: 38.38

Median telomere length (Kb): 7.2

Percentile of median telomere length: 66.72

IMPORTANT

In order to carry out any longitudinal analysis of your telomere length and estimated biological age, please record the code of this report for future measurements.

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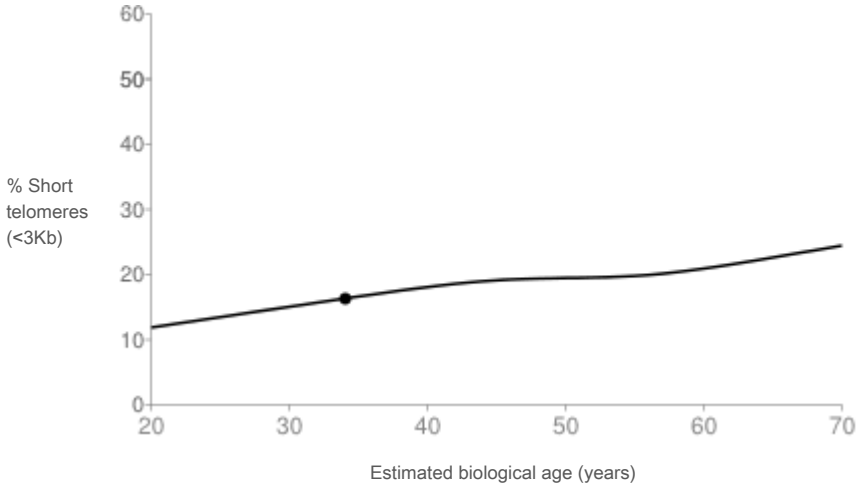
Percentage of short telomeres - General analysis

Percentage of short telomeres (<3Kb) 16.32

Estimated biological age (years) 34



Life Length's TAT (Telomere Analysis Technology) is the most valuable, versatile and scalable technology in the world, and the only one available which allows for the calculation of the percentage of short telomeres, the relevant indicator of the extent of cellular aging.

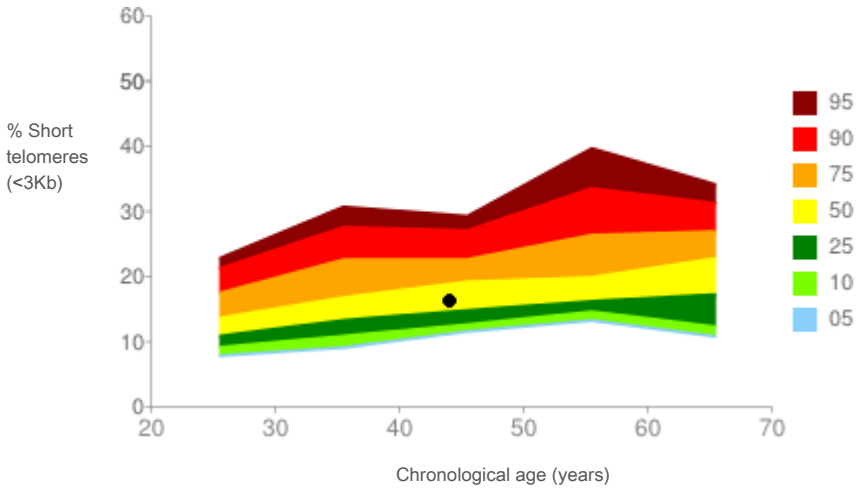
The adjacent graph shows the correlation between age and the percentage of short telomeres.

A telomere is considered short when its length is less than 3Kb.

The black spot represents your sample.

The point of intersection of your sample with the regression line reflects your biological age.

Percentage of short telomeres – Comparative analysis by age range and percentiles



The adjacent graph shows a comparative analysis of the percentage of short telomeres in your sample compared with the control sample base.

Each band represents a percentile of the control sample base.

Falling in the 75 percentile, for instance, means that 25% of the people of your age present a higher degree of cellular aging than you.

It is therefore best if your sample falls into one of the lower bands.

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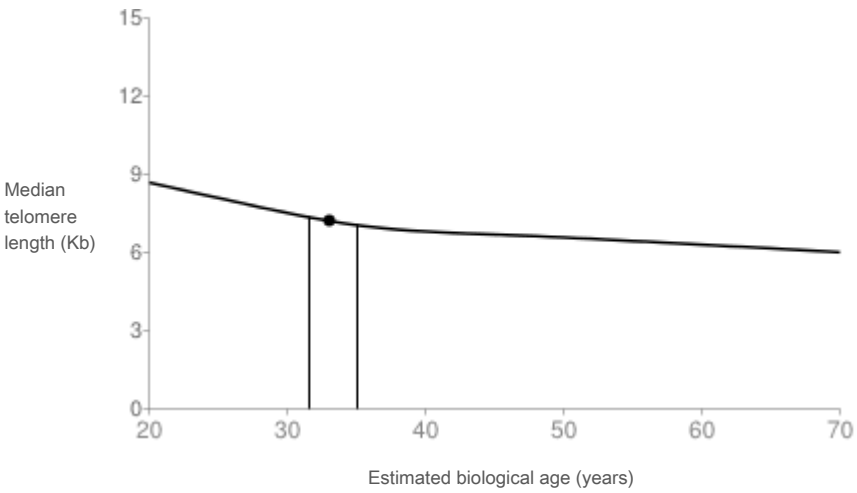
Median telomere length (Kb) – General analysis

Median telomere length (Kb) 7.2

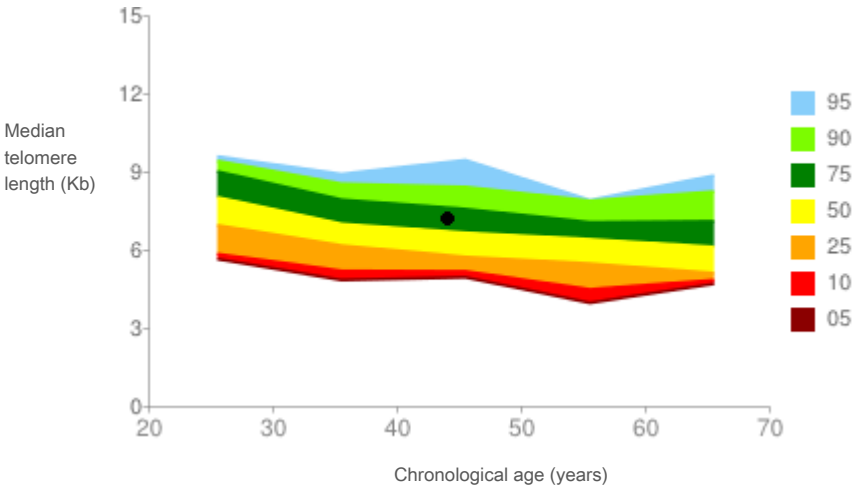


The adjacent graph shows the correlation between age and median telomere length.

The black spot represents your sample.

The point of intersection of your sample with the regression line reflects the telomere length expected according to your chronological age.

Median telomere length – Comparison by age band and percentiles



The adjacent graph shows a comparative analysis of the median telomere length in your sample compared with the control sample base.

Each line represents a specific percentage of our database.

For example, falling in the 75 percentile means that 25% of people of your age have a longer median telomere length than you.

It is therefore best if your sample falls into one of the higher bands.

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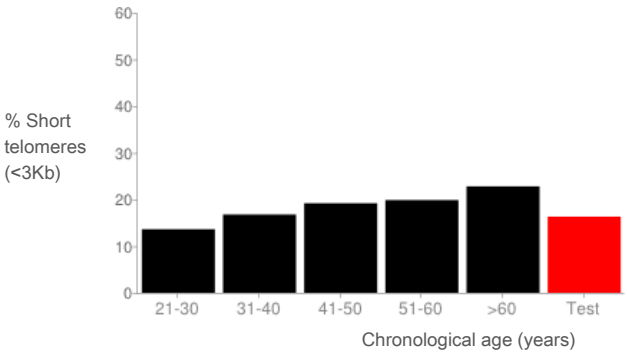
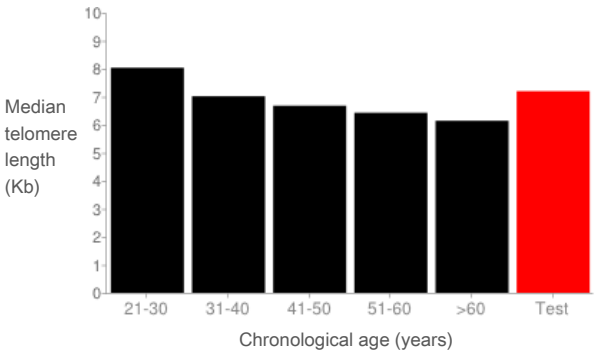
Comparative analysis by age bracket

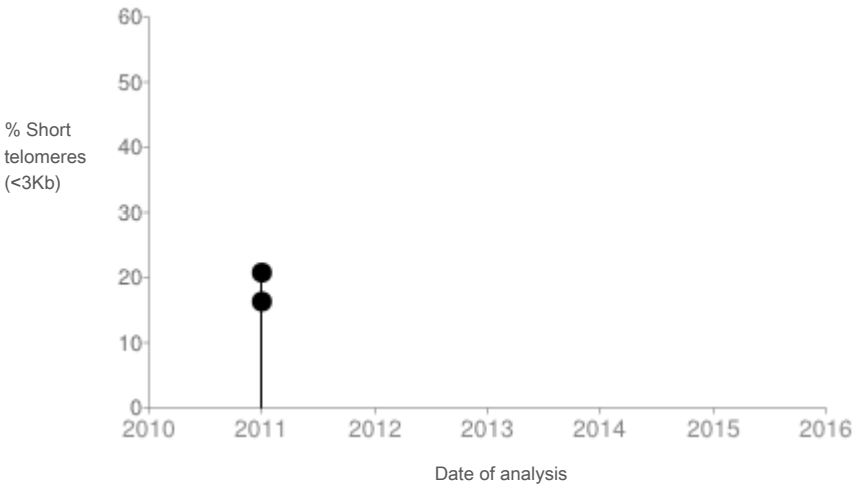


This graph shows a comparison between your percentage of short telomeres with that of different age groups. The shorter the bar, the lesser the degree of cellular aging compared to relevant age group.



This graph shows a comparison between your median telomere length and that of different age groups.

Longitudinal analysis - % of short telomeres



The adjacent graph shows the historic evolution of your results. Each spot represents an analysis that you took in the past.

The steeper the slope of the line, the faster the speed of telomere shortening and cellular aging.

We need you to take two or more tests in order for this information to become meaningful.

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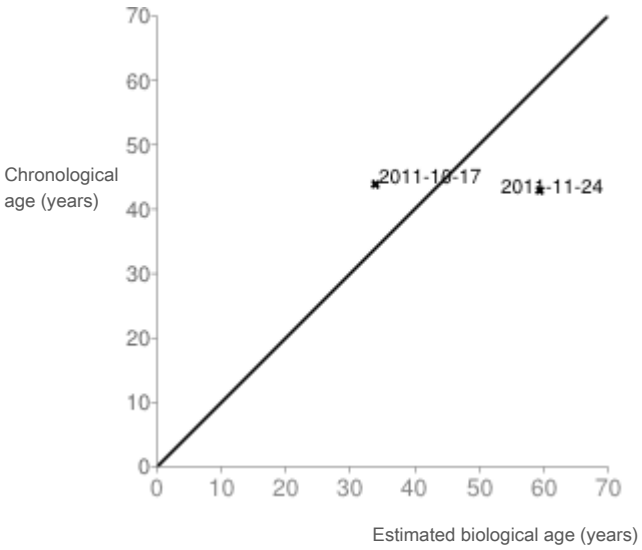
Longitudinal analysis - Chronological age vs. biological age



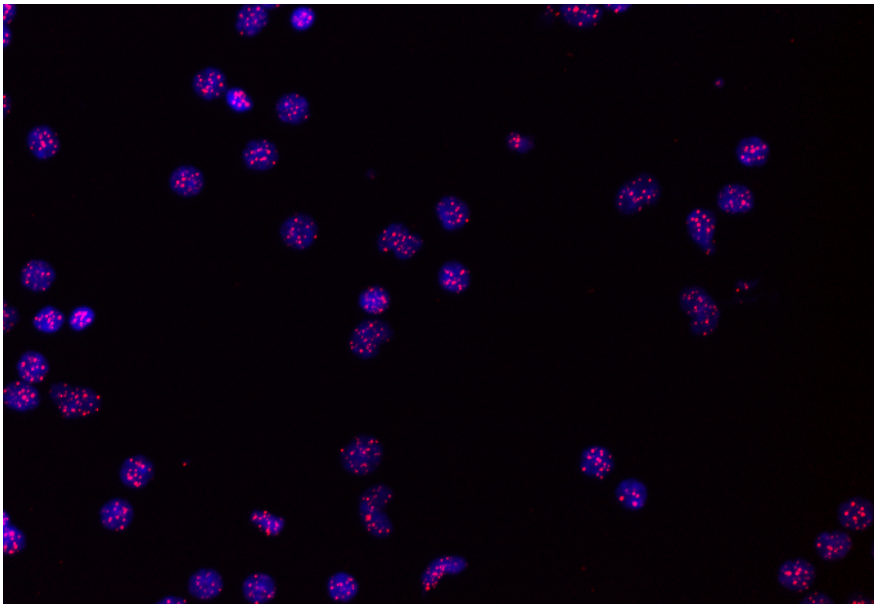
The adjacent graph shows the longitudinal evolution of your biological age vs. your chronological age. Each spot represents an analysis you took in the past.

Spots above the line correspond to having a biological age lower than your chronological age.

Spots below the line correspond having a biological age higher than your chronological age.

We need you to take two or more tests in order for this information to become meaningful.

Image capture taken from the HT Q-FISH analysis



This is an image of your own telomeres, unique to you. These come from your blood sample, which was analyzed and measured using Life Length's state-of-the-art equipment, which allows us to take and process images on a sub-cellular level.

Life Length's technology is highly accurate and reliable; the mean variability of replicated samples has a coefficient of variation of approximately 5%.

The image shows the nuclei of some of your cells from your blood samples (blue dots) and your telomeres (red dots). A higher intensity of colour in the red dots indicates greater telomere length and a lower percentage of critically-short telomeres.

LIFE LENGTH

ABOUT TELOMERES IN GENERAL

WHAT ARE CHROMOSOMES?

Chromosomes are highly condensed rods of Deoxyribonucleic Acid (DNA), the genetic material which contains the building blocks of life. DNA carries a specific code that gives instructions to our body on how to grow, develop and function. The instructions are organized into units called genes. Chromosomes serve as the storage for this important material, periodically dividing along with cells and replicating to make copies of the DNA they contain. Chromosomes are also very important in sexual reproduction, as they allow an organism to pass genetic material on to descendants.

In organisms with cell nuclei, known as eukaryotes, chromosomes are found inside the nucleus. Most of these organisms have a set of chromosomes which come in pairs. In structural cells, each cell retains a complete set of chromosomes, in what is known as diploid form, referring to the fact that the chromosome set is complete. In cells for sexual reproduction like eggs or sperm, each cell only has half of the parent organism's genetic material, stored in haploid form, ensuring that the parent passes down half of its genes.

WHAT ARE TELOMERES?

Telomeres are the ends of chromosomes, which have an essential role in protecting their integrity. One common analogy is that they are like the plastic caps at the end of shoe laces which keep the laces from unraveling.

Telomeres are formed by tandem repeats of a DNA sequence, which is conserved throughout evolution (TTAGGG in vertebrates) and associated proteins (the so-called telomere-binding proteins or “shelterins”). The function of telomeres is to protect chromosome ends from DNA repair and degradation activities, therefore, ensuring the proper functionality and viability of cells.

WHAT IS TELOMERASE?

Telomerase is an enzyme which is able to maintain telomeres and repair short telomeres by re-elongating them. To this end, telomerase add telomeric repeats de novo to the chromosome ends. In non-pathological conditions telomerase is expressed associated to pluripotency (early stages of embryo development), as well as in certain adult stem cell compartments. Telomerase is also highly expressed in pathological conditions, such as cancer, where it sustains the immortal growth of cancer cells. Healthy cells usually produce little or no telomerase and, as a consequence of this, they progressively shorten their telomeres associated to successive cycles of cell division, until they reach a critically short length which triggers cell death or an irreversible cell arrest known as replicative senescence (also known as the Hayflick limit).

WHY ARE TELOMERES IMPORTANT?

The length of telomeres at a given age is one of the best molecular markers of the degree of aging of an organism and therefore can be used to estimate its biological age.

Telomeres are progressively eroded with increasing organismal age as the consequence of cumulative cycles of cell division to regenerate tissues. This occurs both in differentiated cells as well as in the stem cell compartments, and has been demonstrated to impair the ability of stem cells to regenerate tissues when needed. There is strong evidence from genetically modified mouse models that demonstrates that accumulation of critically short telomeres is sufficient to cause organismal aging and that interventions that decrease the rate of telomere shortening with age, such as forced expression of the telomere-synthetizing enzyme telomerase, is also sufficient to delay aging and increase longevity. Thus, therapeutic strategies based on telomerase activation are envisioned as potentially important for dealing with age-related problems.

Telomeres and telomerase are also relevant for cancer biology. More than 95% of all types of tumors activate telomerase during their formation in order to achieve immortality. Telomerase is, therefore, considered necessary to sustain cancer growth. Therapies aimed to inhibit telomerase activity are currently tested in clinical trials of various types of human tumors.

WHAT IS THE DIFFERENCE BETWEEN AVERAGE TELOMERE LENGTH AND SHORT TELOMERES AND WHY IS THIS IMPORTANT?

Telomere length is heterogeneous within a single cell nucleus, so that each chromosome end has a different length of telomeric repeats (there are 2 telomeres per chromosome and 23 pairs of chromosomes per cell). Average telomere length is the mean length of all telomeres considered together, usually within a population of cells (not even per individual cell). However, scientific evidence shows that it is the short telomeres that are responsible for causing aging and the collateral effects of aging. This is because critically short telomeres inflict permanent and deleterious damage to the cell, unless they are repaired by telomerase. Therefore, to be able to evaluate whether telomeres are prematurely short for a given chronological age is necessary to use techniques that allow quantification of the abundance of short telomeres. Just measuring average telomere length of a population of cells is not sufficient to “identify” premature telomere shortening. The technology commercialized by Life Length is based on its ability to measure the percentage of critically short telomeres.

WHAT IS THE RELATIONSHIP BETWEEN BIOLOGICAL AGE AND CHRONOLOGICAL AGE THAT WE CAN LEARN FROM OUR TELOMERES?

Not all individuals age at the same speed even though they may have the same chronological age. Therefore, it is important to have molecular markers (other than chronological age) that can estimate the degree of aging of an organism. This information may be useful for health professionals and individuals alike to anticipate premature development of age-related issues and to try to consider a change life style (obesity, smoking have been shown to lead to accelerated telomere loss), to follow more closely our telomere dynamics over the years, or to benefit from potential telomere activators. Mounting evidence suggests that the length of telomeres is a good indicator of the degree of aging of an organism.

DO WE KNOW WHAT THE STANDARD TELOMERE LENGTH IS BY AGE? WHAT IS NORMAL?

Life Length has established a robust data-base for men and women, which allows us to determine the different percentiles of telomere length for a given age. This will allow any client to know in which percentile is their average telomere length as well as their percentage of short telomeres for a given chronological age.

WHAT ARE THE FACTORS THAT AFFECT THE LENGTH OF MY TELOMERES?

Genetics and lifestyle are fundamental factors that affect telomere length and the rate at which they shorten. Certain life-styles have been associated to having longer or shorter telomeres in a significant manner. For example, life style habits such as smoking, obesity or psychological stress increase oxidative stress and inflammation which contribute to higher rates of telomere attrition throughout life. Other factors such as diet, exercise, sleep are also believed to impact biological aging. Current therapies are being developed based on telomerase activation to re-juvenate telomeres. Measuring telomere length will be necessary to determine whether these therapies are effectively improving telomere length.

DOES A GREATER BIOLOGICAL AGE THAN CHRONOLOGICAL AGE INDICATE THAT THE INDIVIDUAL HAS THE RISKS AND RISK FACTORS ASSOCIATED WITH THEIR BIOLOGICAL AGE?

There is mounting scientific evidence that shorter telomeres may be associated with a higher risk of developing cardiovascular, central nervous system and other age-related diseases.

WHY DO I NEED TO KNOW MY BIOLOGICAL AGE?

First, it is an excellent indicator of an individual overall general health status. Second, by knowing our biological age, it permits us to obtain a better understanding of the life-style habits that impact aging and affords us the opportunity to make appropriate changes and by periodic re-testing, measure the results. Third, as physicians and the medical community become more comfortable with Life Length's telomere measuring, it will allow for more personalized medicine as doctors treat patients increasingly taking into consideration their biological age.

HOW OFTEN SHOULD I GET MY TELOMERES MEASURED?

We recommend that individuals interested in monitoring their telomere length should repeat the measurement at least once per year, although periods of three months may be adequate to detect changes in telomere length.

ABOUT LIFE LENGTH'S TAT

HOW DO YOU MEASURE TELOMERES?

We measure telomere length by telomeric quantitative FISH (Q-FISH) on interphase nuclei both on tissue sections (Telomapping) and on blood cells or any other cell type that can be attached to a plate (HT Q-FISH) which stands for High Throughput Quantitative Fluorescence In Situ Hybridization where telomeres are hybridized with a telomeric probe labeled with fluorescence. Each telomeric probe recognizes a fixed number of telomeric repeats (base pairs). For this reason, the intensity of the fluorescent signal from telomeric probes that hybridize to a given telomere is directly proportional to telomere length. Finally, fluorescence values are transformed into telomere length values for each individual telomere spot within a cell, being able to measure the mean telomere length as well as the percentage of short telomeres in a cell population.

WHAT IS THE TAT? WHAT IS HT Q-FISH?

Life Length's Telomere Analysis Technology (TAT) comprises two established protocols that allow the determination of telomere length at the individual level, both from cellular (HT Q-FISH) and tissue samples (Telomapping). HT Q-FISH technique is mainly used for telomere length quantification on peripheral blood mononuclear cells (PBMC) or white blood cells (WBC) but it can be used in any cell type that attached to a plate (i.e., fibroblasts, keratinocytes, etc.).

WHAT OTHER LARGE SCALE TECHNIQUES EXIST AND WHY IS LIFE LENGTH'S TECHNOLOGY THE MOST ACCURATE AMONG THEM?

Life Length's technology is the only large scale telomere analysis technology that allows the quantification of the abundance of critically short telomeres. The other high throughput telomere length measurement techniques, such as PCR (polymerase chain reaction) or flow cytometry based methods, can only determine the mean telomere length of a cell or a sample, but are unable to measure the real cause of aging and its effects caused by the percentage of short telomeres. Slight changes in the percentage of short telomeres with aging, lifestyle or life quality are not reflected in mean telomere length.

Life Length is the only company globally which can provide individuals a scientifically-rigorous estimate of one's biological age based on the percentage of critically-short telomeres measured in blood as a surrogate for the overall organism.

HOW PRECISE IS YOUR MEASUREMENT?

The mean variability of samples replicates has a coefficient of variation (C.V.) of approximately 5%. A human chromosome can contain 150 million pairs of nucleic acids or "base pairs" while the initial length of a telomere can be between 10,000 to 15,000 base pairs or less than 1/10,000 the length of the average chromosome. Critically-short telomeres are those telomeres that have shortened to fewer than 3,000 base pair. Life Length's TAT (Telomere Analysis Technology) is so sensitive that it can measure down to 120 base pair. That is the equivalent of measuring a highway 150,000 kilometers long and being precise to within 120 meters.

CAN YOU MEASURE THE TELOMERES IN ALL 23 PAIRS OF CHROMOSOMES IN ONE CELL? 92 MEASUREMENTS?

Yes, you can measure every single chromosome end by using quantitative telomeric FISH on metaphases. Typically for the high-thoughput QFISH (HT-QFISH) we measure telomere spots in interphasic nuclei obtaining around of 12 telomeric spots per nuclei and each spot represents the association of a few telomeres.

HOW MUCH BLOOD IS NEEDED TO MEASURE THE TELOMERES?

Telomere length can be measures with as little as 300 µl of total blood, however, we typically use 6 ml of blood for replicability and control purposes.

WHAT ELSE CAN YOU MEASURE (I.E. TISSUE)?

We can measure telomere length of any lymphoid cell type or any in vitro cultured cell line (normal or tumoral) by HT Q-FISH. Additionally the telomapping method allows the quantification of telomere length in skin section or biopsies (and any other available tissue), allowing the establishment of real telomere length maps. These maps can be used to localize stem cell niches or studying the biological age of a given tissue. This is important in pharmaceutical and cosmetic research where Life Length is providing technological services for drug development and clinical trials.

ABOUT THE MEASUREMENT

HOW DO I GET MY TELOMERES MEASURED? WHERE IS THE TECHNOLOGY OFFERED?

Life Length will be offering this technology globally through local laboratory partners which will handle the logistics of collecting the blood sample which is required.

IS ANY SPECIAL PREPARATION REQUIRED? MUST I FAST BEFORE THE MEASUREMENT?

No special preparation is required nor is it necessary to fast.

HOW LONG DOES IT TAKE TO GET THE RESULTS?

It takes approximately 4 to 6 weeks to deliver results from the time that the sample is received.

WHAT INFORMATION DO YOU REQUIRE IN THE HEALTH QUESTIONNAIRE? WHY IS IT SO EXTENSIVE?

In order to be able to provide individuals with increasingly robust information around life-style habits and other factors that influence the aging process, we require the completion of our detailed, anonymous questionnaire that we estimate will take under an hour to complete. It is important to have this information in order to be able to make statistical correlations with the questions asked and the results which will allow us to provide each individual with more specific feedback and increasingly robust statistical analysis about those aspects over which we can exercise at least some control and which impact on our rate of telomere loss and biological aging.

HOW MY INFORMATION KEPT ANONYMOUS AND CONFIDENTIAL?

Questionnaires are submitted with a numeric code or bar code from your physician and Life Length never receives your name. Reports are delivered back through our partners to your doctor, again using this identifying code.

WHAT IF I GET A "BAD" RESULT? WHAT CAN I DO?

Our report provides detailed information about your percentage of short telomeres and estimated biological age based on the blood sample submitted which research supports as a good surrogate for the overall organism. Knowing that you have a higher than average percentage of short telomeres is like knowing that you have high cholesterol or other conditions which are influenced by certain life-style choices; it affords you, always following professional medical advice, the opportunity to make those changes that may allow you to reduce your rate of telomere loss and potentially to even lengthen telomeres and thereby slow down biological aging. The enzyme telomerase is known to be able to actually lengthen telomeres and rejuvenate cells. There are various products sold as nutritional supplements claiming to activate telomerase, but most have not yet been fully scientifically validated and tested for safety and performance. If you decide to take a telomerase activator, be sure to buy from a reputable company whose product has been rigorously tested and shown to be effective in peer-reviewed published scientific papers. It appears that higher levels of vitamin D and Omega 3 may also aid in telomere maintenance.

For individuals with unusually short telomeres, your result may have been influenced by a recent traumatic event, sickness or other stressful occurrence that can have temporarily affected the length of your telomeres. For this reason, we recommend that these individuals especially consider repeating the measurement in 3 to 6-months instead of annually.

WANT TO CONTINUE TO BE INFORMED ABOUT TELOMERE BIOLOGY AND LIFE LENGTH?

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LIFE LENGTH