TELOYEARS™
Know how *well* you're aging.

TeloYears™ Glossary of Terms

Assay: An analytic laboratory process performed in order to detect and quantify some target substance, such as drugs, types of cells or components of cells, e.g. telomeres.

Average Telomere Length (ATL): The mean length of all telomeres in a given sample.

Biomarker: A measurable chemical surrogate endpoint for a target biological process. "A characteristic that is objectively measured and evaluated as an indicator of normal biological processes, pathogenic processes, or pharmacologic responses to a therapeutic intervention." (National Institutes of Health Biomarkers Definitions Working Group)

Cell: The smallest, basic structural and functional unit of an organism, typically microscopic, consisting of cytoplasm and, in eukaryotes, a nucleus and other organelles enclosed in a membrane.

Cellular Aging: See Cellular Senescence.

Cellular Senescence: Throughout our lives, every time our cells divide for tissue growth or replenishment, the telomeres shorten. At every cell division, telomeres lose a bit of their DNA until, over time, the cell cannot replicate and becomes senescent, which is the cellular equivalent of aging. This shortening process acts as an aging clock for the lifetime of the cell.

Chromosomes: A threadlike structure of nucleic acids and protein found in the nucleus of most living cells, carrying genetic information in the form of genes.

Coefficient of Variation (CV): A standardized measure of dispersion of a probability or frequency distribution. It is typically expressed as a percentage and is defined as the ratio of the standard deviation to the mean. Assays with low CVs (e.g. <5%) are more reproducible than those with larger CVs.

Clinical Laboratory Improvement Amendments (CLIA) of 1988 are United States federal regulatory standards that apply to all clinical laboratory testing performed on humans in the United States, except clinical trials and basic research (which the FDA regulates). The TeloYears test is performed at the CLIA-certified Telomere Diagnostics laboratory in Silicon Valley, California.

DNA: Deoxyribonucleic acid is one of two macromolecules that carry and encode genetic information. It consists of two polynucleotide strands twisted around each other in the famous double helix shape. DNA has two remarkable features: it can reproduce identical

(subject to various errors) copies of itself, and the four nucleotide bases (adenine, cytosine, guanine and thymine) that make up the strands serve as a four-letter alphabet (A, C, G, T) that can encode genetic information.

Enzyme: Biochemical macromolecules (proteins or catalytic RNA) that specifically accelerate

(catalyze) chemical reactions upon which cells depend to survive and reproduce. Enzymes are not consumed during the reactions they accelerate, but survive intact for multiple uses. Telomerase is an enzyme.

Eukaryote: One of the three major domains into which biologists organize life. Unlike the

Prokaryotes (Bacteria and Archaea), Eukaryote cells contain nuclei (which, in turn, enclose the cell's chromosomes) and membrane-bound organelles. All multicellular organisms (and some single-celled microbes) grouped in plants, fungi and animals (including humans), are Eukaryotes.

Genes: Coding sequences (loci, regions) of DNA that serve life as the molecular units of heredity, carrying information from organism to offspring, as well as guiding cell growth, metabolism and reproduction through directing protein synthesis.

Hayflick Limit: With each reproductive cycle, telomeres lose a few sequences and become shorter. Eventually, the telomeres are too short and the cell becomes senescent. This telomere-determined lifespan of the cell is the Hayflick limit, named after anatomist Leonard Hayflick, who showed that human fetal cells are not immortal, but have a finite number of cell divisions before senescence.

Leukocyte: White blood cells (WBCs) start as stem cells in bone marrow, and differentiate into specialized immune system cells. Average telomere length (ATL) usually derives the average using a sample of WBCs. See ATL.

Nucleus: All eukaryotic cells contain a nucleus, a membrane-enclosed organelle that contains most of the cell's genetic material organized as complexes of DNA molecules with other proteins that form chromosomes.

Quantified Self: A movement of people using technology to collect, store and analyze data about themselves, mostly focused on health and wellness data, such as: weight and caloric intake, physical activity and exercise, vital signs (blood pressure, pulse, temperature), physical symptoms (allergic reactions, GI upsets, pain, etc.) and various biomarkers, such as average telomere length. Other names for this movement include life-loggers, self-trackers, body hackers, personal informatics.

qPCR with Cawthon: The quantitative (or real-time) polymerase chain reaction (qPCR) is the leading laboratory method for amplifying DNA in order to robustly detect and quantify products of gene expression (such as a telomere sequence). The Cawthon protocols were developed at the University of Utah by Dr. Richard Cawthon to enable PCR amplification and simple, rapid and reliable measurement of telomeres. Telomere Diagnostics holds the worldwide rights to use the qPCR with Cawthon method.

RNA: Ribonucleic acid is a second polymeric molecule that carries genetic information. It differs from DNA in being a single-stranded molecule that uses ribose instead of deoxyribose in its nucleotide and substitutes uracil for thymine as the complementary base to adenine.

Sequence: A nucleic acid sequence is a string of letters that represent the order of nucleotides in DNA (ACGT) or RNA (ACGU), where the nucleotides in DNA are adenine, cytosine, guanine, and thymine (in RNA uracil replaces thymine). Such sequences can be coding, i.e., a codon that specifies a single amino acid during cellular protein synthesis, or non-coding: sequences that do not encode for protein synthesis, but rather have transcription and translation regulatory functions. Telomeres are examples of non-coding DNA, that instead of directing protein syntheses, serve to protect the ends of chromosomes.

Telomere: From the Greek telos + mere = end + part. Like the plastic ends of shoelaces, telomeres protect the long strands of DNA within a chromosome during cell reproduction. With each reproductive cycle, the telomeres lose a few sequences and become shorter. Genetics, lifestyle and the environment influence the rate at which telomeres shorten. Eventually, the telomeres become too short and the cell becomes senescent. See Hayflick limit.

Telomerase: (aka terminal transferase) is a ribonucleoprotein reverse transcriptase (enzyme) that adds a species-dependent telomere repeat sequence to the ends of telomeres on chromosomes.

TeloYears™: A simple genetic test that reveals the cellular age that's encoded in your DNA so you can know how well you're aging. Now available from the company founded by the 2009 Nobel Prize winner in the field of Telomere Biology, TeloYears measures the length of your telomeres, which are the protective caps on the ends of your DNA strands that tend to shorten and fray with age. By comparing your result to a large representative population, your TeloYears test report provides your age in TeloYears, or the actual age of the typical man or woman whose telomere length is similar to yours.

For more information or to purchase TeloYears™, visit www.teloyears.com

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The TeloYears test is not intended for screening, diagnosing, treating or preventing diseases or medical conditions. The test is available for individuals between the ages of 20 to 80 within the United States, except for the state of New York.

The information provided by the TeloYears test should not be used to replace medically appropriate screening tests recommended based upon actual age or other risk factors, nor should the information be used to make decisions about diagnosis or treatment of diseases or medical conditions. The Telomere Diagnostics lab is regulated under the Clinical Laboratory Improvement Amendments of 1988 (CLIA) as qualified to perform high complexity clinical testing. The performance characteristics of this test were determined by Telomere Diagnostics. It has not been cleared or approved by the U.S. Food and Drug Administration.

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