

### PATIENT

PFirst PLast  
DOB: 01/01/54

### ORDERING PROVIDER

Example Organization

### LABORATORY INFORMATION

Lab ID: N8C9841  
Collection Date: 01/11/10  
Test Date: 01/21/10  
Report Date: 01/22/10



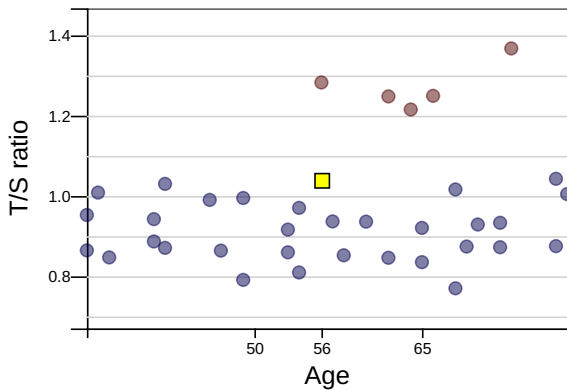
### CONTROL GROUP

This chromosome represents the projected telomere length of your sex (M) and age (56) matched control group, based on cheek (buccal) swabs.



### YOUR TELOMERES

This chromosome represents a relative comparison of your cheek cell telomere length as compared to your sex and age matched control group. As of 01/11/2010, your average relative telomere length is **1.04** (T/S ratio). This is similar to your matched control group's average relative telomere length of 0.98. This suggests your telomere's lengths are within 7% of your matched control group.



● Control values ● Values outside median ■ Your T/S ratio 01/11/2010

Values outside of the median may be caused by many factors including: medications; viral infections; pregnancy status; extreme exercises like marathon running; extreme nutritional status like vitamin B deficiency or excess iron; cancer; obesity. If your telomeric age falls outside the median values, we recommend you consult with your healthcare professional.

### Your Estimated Telomeric Age

- Your telomeric age is 54 years old according to your 01/11/2010 results.
- Based on this estimation, your average telomere length and telomeric age are approximately the same as your sex-matched control group. **Looking good!**
- Your telomeric age is measured by comparing your telomere length to your control group.
- Retesting your telomere length will track your telomeric age over time, ideally showing improvements after implementing your customized lifestyle changes.
- While we report comparisons against the control group, it is most important to focus on your own telomeric age changes over time.
- **You are on the right track!** If you have future health concerns and want to see how your body is responding, then we recommend retesting.

### YOUR ESTIMATED TELOMERIC AGE

#### What is a telomere?

Telomeres are the caps at the ends of chromosomes that protect DNA from damage. Each time a cell replicates, telomeres become shorter over time. Telomere shortening is a natural aging process that can be positively or negatively affected by lifestyle choices. The method used for measuring telomere length actually uses a ratio, called the T/S ratio. When we compare your ratio to a control group, this determines your telomeric age. Tracking your telomeric age over time, especially after you have made lifestyle improvements, is the most effective way to monitor changes. When you re-test, not only will you be compared to the control group again, you will be comparing your initial test with your new test(s).

#### How might telomere length be improved and slow the aging process?

Research suggests maintaining a healthy diet, getting the right exercise and sleep, along with reductions in stress, smoking and alcohol use, can minimize the rate of telomere shortening as we age. To help you identify specific lifestyle choices to improve your health, we recommend working with your doctor. In the meantime, making some of the simple changes below may maintain or improve your telomere length and slow the aging process.

- Incorporate stress reduction techniques such as daily breathing exercises, daily meditation, and weekly physical exercise including yoga.<sup>1-3</sup>
- Employ these five strategies for a healthy lifestyle<sup>3-6</sup>:
  - Avoid smoke exposure (tobacco and environmental)
  - Maintain a healthy body weight
  - Engage in moderate to vigorous exercise (50 minutes three times a week or 30 minutes five times a week)
  - Drink alcohol ONLY in moderation
  - Eat a healthy diet (the Mediterranean diet has been shown to positively impact telomeres)<sup>2</sup>
- Acupuncture, and to a lesser extent shiatsu, have been shown to improve telomere length in small studies.<sup>7</sup>
- Include the anti-inflammatory omega-3 oils, EPA and DHA, in your daily diet or use supplementation.<sup>8</sup>
- Start a professional grade multivitamin with high levels of vitamin C and E and adequate vitamin D.<sup>9,10</sup>
- Three cups of green tea daily may benefit telomere length and reduce aging according to a study in Chinese men.<sup>11</sup>

*Telomere measurements are from cheek (buccal) swabs and cannot be directly compared to other telomere measurements taken from blood samples. Using buccal cells as sources to measure telomere length bears some limitations. These include the high rate of cell division and turnover rate in epithelial cell tissue as well as the oxidative stress effect inherent in oxygenated buccal swabs. These factors are known to shorten telomere length. The content of this report is provided for informational purposes only, not as a diagnostic tool. The report does not supersede the judgment of a qualified medical provider. This test is not a substitute for a comprehensive consideration of all factors that influence the maintenance of a healthy body. This test is not FDA approved. The test's performance characteristics have been established and maintained by Kashi Clinical Laboratories under CLIA and CAP compliance.*

#### Reported and Reviewed By:



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HCLD  
CEO and Laboratory Director**

### BACKGROUND REFERENCES

1. Humphreys KL, et al. Accelerated telomere shortening: Tracking the lasting impact of early institutional care at the cellular level. *Psychiatry Res.* 2016 Dec 30;246:95-100.
2. Boccardi V, Paolisso G, Mecocci P. Nutrition and lifestyle in healthy aging: the telomerase challenge. *Aging (Albany NY).* 2016;8(1):12-15.
3. Shammass MA. Telomeres, lifestyle, cancer, and aging. *Curr Opin Clin Nutr Metab Care.* 2011;14(1):28-34.
4. Balan E, et al. Physical Activity and Nutrition: Two Promising Strategies for Telomere Maintenance? *Nutrients.* 2018;10(12):1942.
5. Sun Q, et al. Healthy Lifestyle and Leukocyte Telomere Length in U.S. Women. *PLoS One.* 2012; 7(5): e38374.
6. Yamaki, N, et al. Telomere shortening in alcohol dependence: Roles of Alcohol and Acetaldehyde. *J Psychiatr Res.* 2019 Feb;109:27-32.
7. Omura Y et al. Estimation of the amount of telomere molecules in different human age groups and the telomere increasing effect of acupuncture and shiatsu on St.36, using synthesized basic units of the human telomere molecules as reference control substances for the bi-digital O-ring test resonance phenomenon. *Acupunct Electrother Res.* 1998;23(3-4):185-206.
8. Farzaneh-Far R, et al. Association of marine omega-3 fatty acid levels with telomeric aging in patients with coronary heart disease. *JAMA.* 2010;303:250-257.
9. Xu Q, Parks CG, Deroo LA, Cawthon RM, Sandler DP, Chen H. Multivitamin use and telomere length in women. *Am J Clin Nutr.* 2009;89(6):1857-63.
10. Richards JB, et al. Higher serum vitamin D concentrations are associated with longer leukocyte telomeres in women. *Am J Clin Nutr.* 2007;86(5):1420-1425.
11. Chan R, et al. Chinese tea consumption is associated with longer telomere length in elderly Chinese men. *Br J Nutr.* 2010;103(1):107-113.