

CAN WE DELAY THE AGING OF OUR CELLS?

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AIM

To determine how our diet affects **cellular aging**, which foods can delay it, or which habits can lead to premature cellular aging.

INTRODUCTION

One of the main causes of cell **aging** at a molecular level is **telomere shortening**. Each time a cell divides, the ends of its chromosomes lose nucleotides. An increase in telomerase activity can reverse the telomere shortening. It is now believed that telomere length can serve as a **biological marker** for determining the life expectancy of a cell or organism (Cottliar and Slavutsky 2000; Hernández 1999).

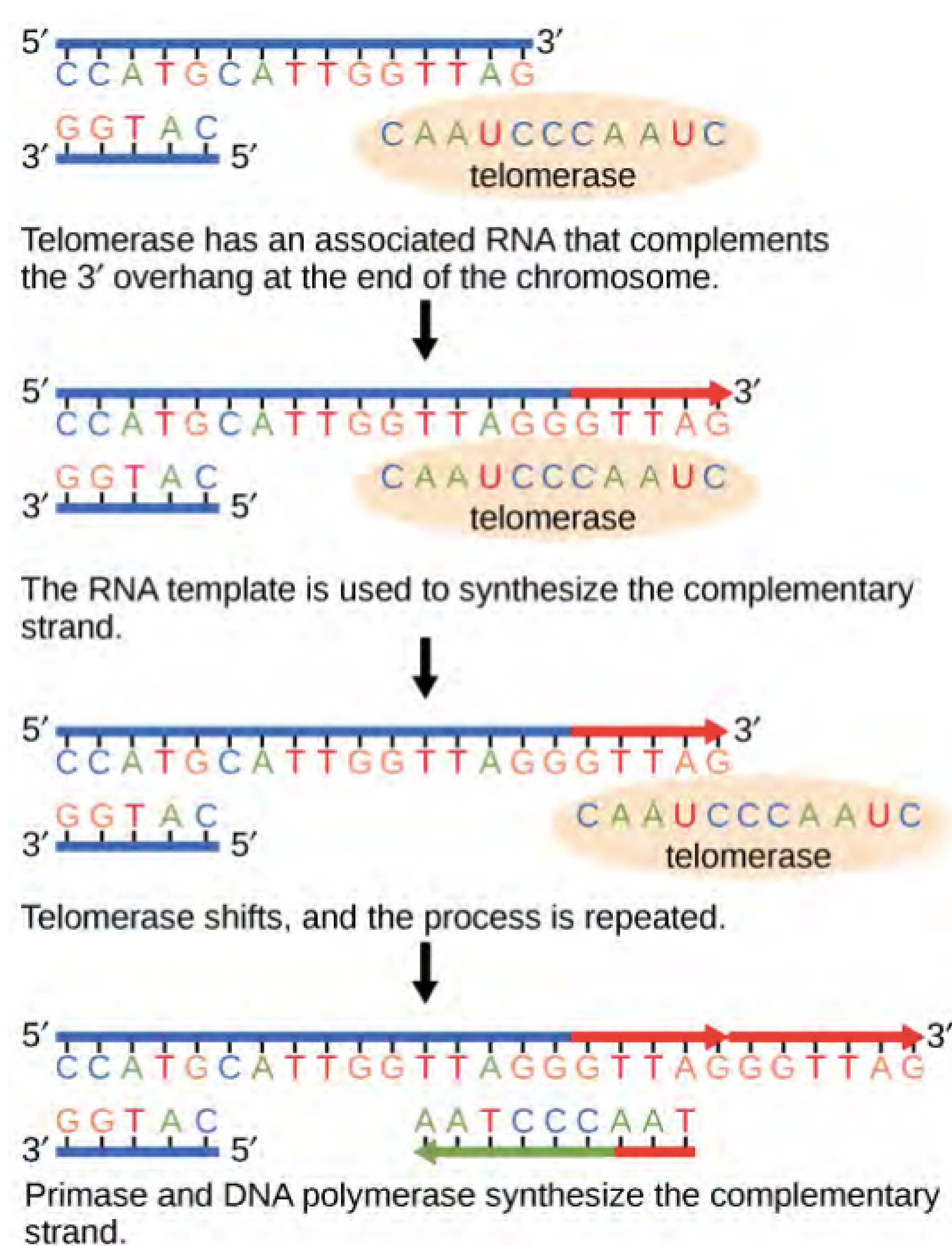


Figure 1. The ends of linear chromosomes are maintained by the action of the telomerase enzyme (Flowler et al. 2013).

FACTORS IMPACTING TELOMERE SHORTENING

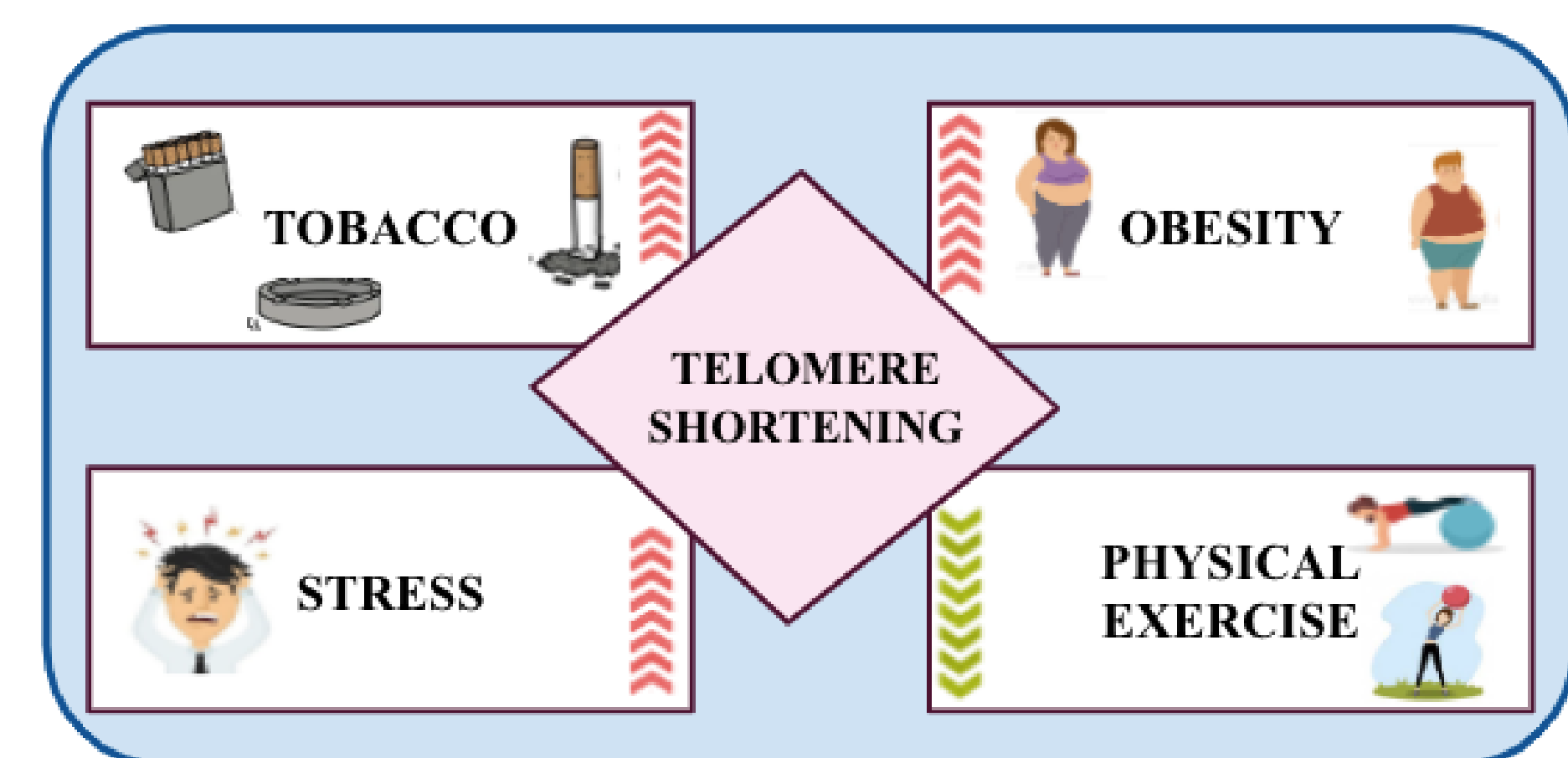


Figure 2. Factors that have an impact on telomere shortening.

In a study about the **Mediterranean diet**, subjects with higher adherence, $MDS \geq 6$ (Mediterranean diet score), showed **longer LTL** (leukocyte telomere length) and **higher telomerase activity** (Fig 3.).

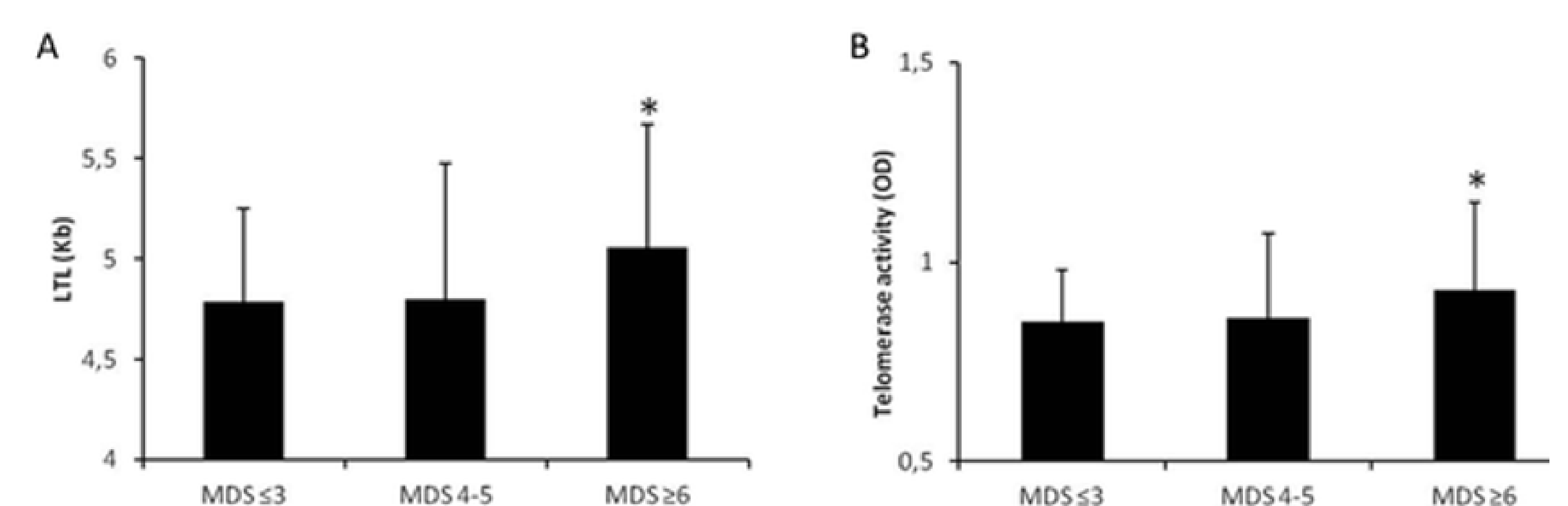


Figure 3. Relationship between LTL and telomerase activity, according to adherence to the MD (Boccardi et al. 2013).

Table 1. Food consumption and effects on the telomere length of subjects (Meshkani et al. 2021; Nettleton et al. 2008).

Food groups	β coefficient (95% CI)	P value
Dietary products	-0.180 (-0.276, -0.085)	<0.001
Fish	0.208 (0.144, 0.272)	0.001
Coloured fruits	0.115 (0.047, 0.183)	0.001
Green leafy vegetables	0.098 (0.037, 0.159)	0.002
Yellow and orange vegetables	0.093 (0.020, 0.166)	0.012
Orange juice	0.022 (0.003, 0.041)	<0.05
Nuts and seeds	0.105 (0.041, 0.168)	0.01
Sugary drinks	-0.010 (-0.021, 0.001)	<0.05

Table 2. Effects of processed meat intake on the telomere length (Nettleton et al. 2008).

Processed meat intake	Intake range (servings/d)	Telomere length (T/S ratio)
Model 3 ^b		
Quartile 1 (n=261)	0.0 – 0.0	0.845±0.01
Quartile 2 (n=159)	>0.0 – 0.04	0.854±0.01
Quartile 3 (n=211)	>0.04 – 0.15	0.852±0.01
Quartile 4 (n=209)	>0.15 – 2.8	0.828±0.01
P ^a		0.005

CONCLUSIONS

- The **aging** process is affected by **oxidative stress** and **inflammation**.
- Lifestyle factors such as smoking, obesity, poor quality diet, and stress, negatively affect telomere length.

- A higher intake of **plant-based** foods and **fish**, have **lower** markers of inflammation and oxidative stress, as well as longer telomeres. Consumption of **red meat**, **processed meat** and **sugary beverages** are associated with **shorter** telomere length.
- **Dietary factors** are an essential tool to **reduce cell damage** and oxidative stress, thus improving telomere attrition.

REFERENCES

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