

## Telomere length

Principal Investigators: [Florian Kronenberg](#)

### Background and previous findings

Telomeres play a key role in the maintenance of chromosome integrity. Short telomeres are linked to age-associated diseases and cancer. We developed a high-throughput real-time PCR assay to determine the decrease rate of relative telomere length (RTL) over 10 years.

We found that the telomeres shortened, on average, by 455 bp over 10 years. Short telomere length at baseline was associated with incident cancer independently of standard cancer risk factors. Furthermore, short telomere length was associated with cancer mortality and individual cancer subtypes with a high fatality rate.

In addition, we found that the RTL was inversely correlated to family history of CVD. Participants with CVD events during follow-up had significantly shorter telomeres. Remarkably, RTL was strongly associated with advanced, but not early, atherogenesis.

We performed several studies in patients with chronic kidney disease and found associations with progression of chronic kidney disease as well as cardiovascular outcomes.

### Team members:

Margot Haun, Julia Raschenberger, Stefan Coassin, Anita Kloss-Brandstätter

### Main collaborators:

Stefan Kiechl, Peter Willeit, Johann Willeit, Kai-Uwe Eckardt (for the GCKD Study)

### Selected Publications:

1. [Ehrlenbach S](#), Willeit P, Kiechl S, Willeit J, Reindl M, Schanda K, [Kronenberg F](#), [Brandstätter A](#): Influences on the reduction of relative telomere length over ten years in the population-based Bruneck Study: introduction of a well-controlled high-throughput assay. *International Journal of Epidemiology* 38:1725-1734, 2009. [\[Pub-Med\]](#)
2. Willeit P, Willeit J, [Brandstätter A](#), [Ehrlenbach S](#), Mayr A, Gasperi A, Weger S, Oberhollenzer F, Reindl M, [Kronenberg F](#), Kiechl S: Cellular aging reflected by leukocyte telomere length predicts advanced atherosclerosis and cardiovascular disease risk. *Arteriosclerosis Thrombosis and Vascular Biology* 30:1649-1656, 2010. [\[Pub-Med\]](#)
3. Willeit P, Willeit J, Mayr A, Weger S, Oberhollenzer F, [Brandstätter A](#), [Kronenberg F](#), Kiechl S: Telomere length and risk of incident cancer and cancer mortality. *JAMA* 304:69-75, 2010. [\[Pub-Med\]](#)
4. [Ehrlenbach S](#), Willeit P, Kiechl S, Willeit J, Reindl M, Schanda K, [Kronenberg F](#), [Brandstätter A](#): Raising the bar on telomere epidemiology. *International Journal of Epidemiology* 39:308-309, 2010. [\[Pub-Med\]](#)

5. Willeit P, Willeit J, Kloss-Brandstätter A, Kronenberg F, Kiechl S: Fifteen-year follow-up of association between telomere length and incident cancer and cancer mortality. *JAMA* 306:42-44, 2011. [\[Pub-Med\]](#)
6. Kloss-Brandstätter A, Willeit P, Lamina C, Kiechl S, Kronenberg F: Correlation between baseline telomere length and shortening over time—spurious or true? *International Journal of Epidemiology* 40:840-841, 2011. [\[Pub-Med\]](#)
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8. Raschenberger J, Kollerits B, Titze S, Köttgen A, Bärthlein B, Ekici AB, Forer L, Schönherr S, Weissensteiner H, Haun M, Wanner C, Eckardt KU, Kronenberg F: Do telomeres have a higher plasticity than thought? Results from the German chronic kidney disease (GCKD) study as a high-risk population. *Exp. Gerontol.* 72:172-176, 2015. [\[Pub-Med\]](#)
9. Broer L\*, Raschenberger J\*, Deelen J\*, Mangino M, Codd V, Pietilainen KH, Albrecht E, Amin N, Beekman M, de Craen AJ, Gieger C, Haun M, Henneman P, Herder C, Hovatta I, Laser A, Kedenko L, Koenig W, Kollerits B, Moilanen E, Oostra BA, Paulweber B, Quaye L, Rissanen A, Roden M, Surakka I, Valdes AM, Vuolteenaho K, Thorand B, Van Dijk KW, Kaprio J, Spector TD, Slagboom PE, Samani NJ\*, Kronenberg F\*, Van Duijn CM\*, Ladwig KH\*: Association of adiponectin and leptin with relative telomere length in seven independent cohorts including 11,448 participants. *Eur. J. Epidemiol.* 29:629-638, 2014. [\[Pub-Med\]](#)
10. Willeit P\*, Raschenberger J\*, Heydon EE, Tsimikas S, Haun M, Mayr A, Weger S, Witztum JL, Butterworth AS, Willeit J, Kronenberg F, Kiechl S: Leucocyte Telomere Length and Risk of Type 2 Diabetes Mellitus: New Prospective Cohort Study and Literature-Based Meta-Analysis. *PLoS. ONE.* 9:e112483, 2014. [\[Pub-Med\]](#)
11. Raschenberger J, Kollerits B, Hammerer-Lercher A, Rantner B, Stadler M, Haun M, Klein-Weigel P, Fraedrich G, Kronenberg F: The association of relative telomere length with symptomatic peripheral arterial disease: Results from the CAVASIC Study. *Atherosclerosis* 229:469-474, 2013. [\[Pub-Med\]](#)