47 No sports?

The WHO estimates that, by the year 2020, our lifestyle will be a co-factor responsible for around 70 % of all diseases. One major problem is the lack of exercise stemming from the changes in our world, i.e. sitting too long every day at the workplace and during our leisure time (▶ Chapter 85). Indeed, the skeletal muscles are not only involved in exercise. they are also an important metabolic organ. During physical activities, a variety of immunological and hormonal messenger substances are produced in the working muscles which then affect the central circuitry of our bodies. These substances, called myokines, have a very positive influence on the duration and quality of our lives (Kvaavik et al. 2010, Pedersen et Febbraio 2012, Bente 2013).

> Exercise is extremely important for all bodily functions.

The effects conferred by physical activity on improving health and extending survival can be observed well into old age (Hamer et al. 2014). According to the results of an older prospective long-term study with approx. 17,000 person-years, most of the 70-, 78- and 85 year-old test subjects who engaged in at least 4 hours of physical activity per week lived markedly longer than their lazier peers (Stessman et al. 2009).

Physical activity might even slow down the aging process of the genes. This evidence was provided by a study that investigated **telomere length** in 2,401 twins aged 18–81 (Cherkas et al. 2008). Telomeres consist of tandemly repeated DNA sequences at the end of the chromosomes that do not give any building instructions to the body. However, they protect the gene strands from committing errors during duplication. Telomere length, especially in the white blood corpuscles, and the magnitude of their natural shortening with every cell division are indicators for biological aging in humans. In the test subjects of the same calendar age who engaged in a good 3 hours of physical activity per week, the telomeres averaged 200 nucleotides longer than in their unathletic twins. Because the telomere length in leukocytes declines by an average of 21 nucleotides per year, these 200 nucleotides prove that the physically active individuals were biologically approximately 10 years younger than their inactive peers. Apparently, telomere length is a general measure of health. One result of the Nurses' Health Study showed that women with a healthy lifestyle had longer leukocyte telomeres than women with an unhealthy lifestyle (Sun et al. 2012). The health benefits of longer telomeres that have actually been measurable to date include findings that the risk of both cancer incidence and mortality is statistically significantly lowered (Willeit et al. 2010).

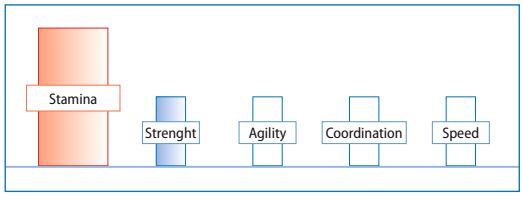

Fig. 47.1 Training objectives in sports

D. Mathias, *Staying healthy from 1 to 100*, DOI 10.1007/978-3-662-49195-9_47,