**Master athletes** can be seen as examples for ‘successful ageing’ – ‘successful’ meaning that these people challenge the limits of human performance in relation to age. By considering the underlying psychological features our research focuses on the body functions that enable the outstanding sportive achievements of Master athletes. It is evident, though, that their running speed, jumping height and distance, throwing distance etc. decreases with age despite the continued effort to improve them (training). Our studies try to unravel these mechanisms: Does muscle mass decrease with age, or is it rather the intrinsic speed and strength within the muscle that makes older people weaker and slower? Does the blood supply play a role and could some of the ageing-effects be combatted by a specific diet or by alternative kinds of exercise? Obviously, answering these questions will not only be helpful for older athletes, but also for the population in general.

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Dr. Rittweger has started his work on the physiology of Master Athletics in 2002 and has collected data and published scientific articles on this topic ever since. He also studies the physiological effects of immobilization. Combining those two approaches will help to understand which of the effects usually ascribed to ageing are really caused by the biological program of ‘senescence’, and how much is due to the more sedentary lifestyle led by many older people.

Research in the **Institute of Aerospace Medicine** is focused on the central task of providing for the health and performance of the persons involved (pilot, crew, passenger, astronaut, motorist, resident etc.). Furthermore, from a medical point of view the development of countermeasures to protect humans from the effects of weightlessness, like the loss of bone and muscle mass, is one of our main tasks to enable long-term stays of humans in space. At the same time, when conducting research under microgravity conditions, basic functions of the human body are examined by eliminating the interfering influence of gravity in a system-physiological approach.

The research of **space physiology** focusses on the influence of weightlessness, nutrition, physical inactivity, unloading, and ageing processes on human health. The investigations are performed in an integrative approach – from the cell to the whole organism – on ground and in space.