

## **Anatomy of the physiological and pathological microvasculature of the human Achilles tendon**

Achilles tendon (AT) connects the muscles of the posterior compartment of the lower leg and calcaneus, enabling effective mobility. The diseases of this largest human tendon in the human body affect millions of people around the world every year. Among the factors that play the most important role in the pathophysiology of AT, the key role is attributed to the local disturbances of blood circulation, which lead to impairment of the nutrient supply and loss of mechanical strength. Existing research has not assessed the microcirculation of the AT in a sufficiently accurate way. For this reason, the author of this study decided to carry out a project, which is aimed to describe the microvascular network of the AT using a variety of research methods. The combined analysis will allow for the creation of a complete model of the microvascular network of the AT. In addition, the author decided to investigate how the vasculature of the AT changes in patients suffering from advanced diabetes that developed diabetic foot syndrome and had to undergo subsequent amputation.

Development of a complete description of AT microcirculation will be a milestone in unraveling the complex pathomorphology and pathophysiology of diseases of this anatomical structure. It will definitely provide an answer to the question whether the controversial vascular theory postulated for many years has foundations in the detailed microanatomy of circulation within the tendon. Data on the organization of the blood vessel network will also allow for more effective planning of surgical procedures aimed at the treatment of injuries related to physical activity, inflammatory tendonitis, and procedures of extending the AT in children with cerebral palsy. With dependable and accurate data on the microcirculation in this area, surgeons will be able to reliably plan the location of incision lines so that they do not significantly affect the physiological blood supply to the tendon, and that nearby vessels can promote healing of the wound.

In addition, knowledge about vascular changes in the AT associated with the development of diabetes will contribute to a better understanding of the impact this disease has on the development of diabetic foot syndrome and other associated disorders of the AT. It will also allow a better understanding of the pathophysiology of this very important clinical problem and will indicate new directions for the development of modern therapies and prevention methods.