**Dose-depended cfDNA and ms\_cfDNA kinetics to muscle-damaging exercise**

We aimed to analyse the kinetics of cell free DNA and classical markers such as creatine kinase, after the induction of delayed onset muscle soreness. Inflammation related, acute, and transient increases in cfDNA have been observed in a number of different exercises, and chronic increases have been observed after 12 weeks of high intensity resistance training. We found that after the plyometric training (50 drop-jumps) the cell free DNA shows an increase and returns to almost baseline values 45 min post exercise. The first peak is followed by delayed increases of cfDNA concentrations starting from 6h post, similar to creatine kinase.

Acute strenuous exercise leads to a dose dependent transient inflammation and can lead to muscle tissue trauma. Without sufficient recovery, a more severe form of chronic tissue trauma can develop which finally leads to reduced performance and overtraining syndrome. Elevation of cell free DNA appears earlier that feeling of tiredness, muscle pain and soreness. The analysis of cell free DNA might result in a highly specific and sensitive muscle tissue marker to prevent chronic overtraining, which could help to avoid injuries.