Abstract: Soft tissue injuries that affect muscles, tendons, ligaments and cartilage are extremely common at all levels of activity. In youth sport, ~50% of all injuries are sprains, strains, and pulls. In professional sports, the incidence of soft tissue injury reaches 60% for the English Premier League and nearly 70% in the National Football League. In professional basketball, a conservative estimate is that 75% of players suffer from patellar tendinopathy. Even though musculoskeletal injuries are extremely common and have huge personal, competitive and financial costs, very few advances have been made in preventing and treating these injuries.

Over the past 10 years, several important advances have been made towards understanding the molecular basis of tendon and muscle matrix biology and function. These advances have led to a new molecular understanding of the response to exercise and new ways to load in order to prevent and treat injuries. Central to these advances is a better understanding of how strength training and nutrition can alter strength adaptations by affecting connective tissue synthesis and reverse even advanced tendinopathy. This seminar will discuss both the molecular mechanisms underlying muscle and tendon function and how these can be applied to produce clinical strategies to optimize load, decrease injury, and improve performance.