Ageing is accompanied by a progressive decline in skeletal muscle mass and strength which may lead to impaired ability to perform activities of daily living in older adults. Although the exact cause of the gradual decline in muscle mass is unknown, identifying efficient strategies aiming to prevent age-related loss of muscle mass and strength is important in order to promote healthy ageing.

The thesis aimed to explore the effects of resistance training alone or combined with a healthy diet on skeletal muscle mass and function of healthy recreationally active older women and to determine mechanisms by which elevated systemic inflammation may contribute to the age-related decline of muscle mass in older adults. The combination of resistance training and a healthy diet induced gains in leg lean mass as well as greater gains in dynamic explosive force than resistance training alone in healthy recreationally active older women. The observed gains in leg lean mass were accompanied by increases in the size of type IIA muscle fibres together with down-regulation in gene expression of a pro-inflammatory factor (IL-1β) and up-regulation in gene expression of a regulator of cellular growth (mTOR) in skeletal muscle of older women. Additionally, reduced muscle protein synthesis and size of muscle cells may mediate the detrimental effects of elevated circulating markers of inflammation on muscle mass in older adults.