

Sarcopenia is a very common condition among the elderly and represents a major cause of morbidity and mortality being a main cause of frailty. Sarcopenia, although probably not known by the general population as a medical term, is instead a well-known situation that is popularly perceived as something associated with aging since it is characterised by a progressive and generalised loss of muscle mass and strength. This is inevitably associated with a poor quality of life and also death. Indeed, several adverse outcomes have been connected to sarcopenia as, for example, impaired mobility/disability, falls, fractures, metabolic syndrome, insulin resistance, diabetes. Sarcopenia is defined as a syndrome since it displays different characteristics in different subjects and it depends on several causes, such as age, gender, family history, the presence of previous fracture, physical activity, and nutrition. Also inflammation is a condition often present in the elderly and it is also associated with all those pathologies listed above. Recently it has emerged that inflammation is also a cause of muscle deterioration and, hence, it could be associated with sarcopenia. However, there are certain type of inflammations, e.g. those related to specific cell machineries called inflammasomes, whose role in aging and in sarcopenia has been hypothesized only very recently.

Physical activity and healthy lifestyle are the only effective strategies to limit the onset of the age-associated diseases but they also represent effective strategies in contrasting (preventing and treating) sarcopenia. At least a part of the positive effects of physical activity resides in its anti-inflammatory action. Indeed, physical activity is effective in counteracting all the inflammations.

The objective of this proposal is to define the role of the different types of inflammations in age-associated sarcopenia and to verify how and to which extent different kinds of physical activity modify the sarcopenia-associated inflammatory status.

In order to obtain this result, we will recruit post-menopausal women either affected or not by sarcopenia and we will submit them to different regimens of physical activity: one group will perform a walking using special poles (Nordic walking) while the other group will perform a very fast series of body weight-based resistance exercises (high-intensity circuit training, HICT). The training programs will be performed 3 times per week and will last for 12 weeks.

The blood will be used to measure all the molecule, both circulating and stored in the blood cells, that can be associated with the sarcopenic status and with the response to the training. Moreover, a radiological analysis, muscle performances assessment, and cognitive functions assessment will be also performed, at the beginning and at the end of the training programs, in order to investigate all the possible positive effects of physical activity.

Last, but not least, through this proposal we want to sensitize the people about the problem sarcopenia, which is becoming epidemical in western countries (and not only) and to further push people towards the importance of the healthy living for a healthy aging. Obtained data will allow us to better understand the mechanisms underlying this pathology and to plan more effective physical activity program interventions by considering, as we described in our previous scientific papers, the whole set of variables that have been observed to limit the adaptive changes.