Introduction

Physical inactivity is the fourth leading risk factor for global mortality. Globally, the level of physical activity is declining, having profound implications for the general health of the population and the prevalence of type 2 diabetes, obesity, cardiovascular complications, cancer and age-related muscle wasting, sarcopenia (Haskell et al., 2007, 2010). This group of conditions accounts for almost half of the overall rate of disease and ~60 % of deaths, which clearly constitutes a huge socioeconomic burden (2010). Regular physical activity reduces the risk of this group of conditions including their associated risk factors such as high blood pressure and high blood sugar (2010, Haskell et al., 2007, Kesaniemi et al., 2001, Mora et al., 2007). By recognising the major health benefits of physical activity and exercise, we can consider exercise as “medicine”.

Skeletal muscle comprises ~40 % of the total body mass in healthy, lean men and ~30 % in women (Kim et al., 2002b, Lee et al., 2000), making it crucial to locomotion and exercise performance, as well as the regulation of whole-body metabolism (Izumiya et al., 2008, Egan and Zierath, 2013, Goodman et al., 2011). Therefore, dysregulation of skeletal muscle function can deteriorate whole-body health and contribute to decreased quality of life (Neel et al., 2013, Bujak et al., 2015, Seguin and Nelson, 2003). In recent years, research has established that maintenance of skeletal muscle mass by exercise or exercise-mimicking stimuli elicit beneficial effects on the abovementioned chronic conditions associated with physical inactivity (Carey and Kingwell, 2009, Hawley and Holloszy, 2009, Matsakas and Narkar, 2010, Mercken et al., 2012).