Association of genetic and oxidative stress biomarkers with physical and cognitive frailty in older adults

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The concept of frailty - as opposite of full health or 'robustness' - has been proposed as a more accurate measure of biological age, due to the high inter-individual variability in ageing manifestations. Frailty is a multidimensional syndrome characterised by the loss of functions and reserves (energy, physical capacity, cognition and health) and related to an increased risk of negative health outcomes, including illness, falls, disability, institutionalisation and death. Due to the reversible characteristics of frailty, its early identification is critical and therefore knowledge on the factors involved in its physiopathology is crucial. Oxidative stress acts as a key factor in the ageing process, being involved in age-dependent diseases. Besides, genomic instability is considered a primary hallmark of ageing. Therefore, the aim of this study was to determine the possible association of genetic and oxidative stress biomarkers with frailty status (physical and cognitive) in older adults. Thus, a cross-sectional study was conducted in a population of 154 Spanish older adults (aged 65 and over) classified according to their physical (phenotype criteria) and cognitive frailty status. Primary and oxidative DNA damage were evaluated in whole blood by the standard and fpg-modified comet assay, respectively. Total antioxidant capacity, 8-hydroxy-2'-deoxyguanosine (8OHdG) and cell-free DNA were also analysed in serum samples. Results showed significantly higher total antioxidant capacity and lower cell-free DNA in both physical frail and cognitive frail groups as compared with the healthy one, but no differences were observed for 8OH-dG and for primary and oxidative DNA damage. Further research with additional biomarkers is needed to ascertain the role of genomic instability and oxidative stress in frailty development.

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