allied academies

13th World Congress on

Dementia and Alzheimer's Disease

September 16-17, 2019 | Paris, France

Human plasma HDL prevents the formation of α-synuclein oligomers and fibrils

Giovanni Bellomo, Sara Bologna, Linda Cerofolini, Silvia Paciotti, Leonardo Gatticchi, Enrico Ravera, Lucilla Parnetti, Marco Fragai and Claudio Luchinat

Magnetic Resonance Centre (CERM), University of Florence, Italy

High-density lipoproteins (HDL) are the smallest particles among the five major groups of lipoproteins. The most abundant protein constituents of HDL in central nervous system are apolipoprotein-A1 (apoA1) and apolipoprotein-E (apoE). The APOE-ε4 allele is strongly associated with the sporadic late-onset of Alzheimer's Disease. Conversely, no association has been found between apoE and Parkinson's Disease (PD). ApoA1 is the main component of HDL in plasma but it is also necessary for cholesterol transportation in the central nervous system. Lower levels of apoA1 were rather measured in the plasma of PD patients with respect to controls. Lower levels of apoA1 were found to be associated with the age of PD onset and severity of motor symptoms in 254 research volunteers enrolled in the Parkinson's Progression Markers Initiative (PPMI), suggesting that apoA1-rich lipoproteins may be both a protective factor and a candidate biomarker for PD. In our work we investigated the protective role of apoA1-rich HDL against alpha-synuclein (α-syn) aggregation by Thioflavin-T fluorescence, NMR and conformational antibodies. In our experiments human plasma HDL strongly inhibited the formation of fibrillary and oligomeric aggregates produced by α-syn. Conversely, we did not observe any relevant interaction between monomeric α-syn and HDL from NMR experiments. These findings suggest that the antiaggregatory effect of HDL and α-syn may involve an interaction with α-syn oligomeric intermediates, by preventing them to grow and to convert into fibrillar amyloids.

e: bellomo@cerm.unifi.it