Aggregated α-synuclein in erythrocytes as a potential biomarker for idiopathic Parkinson's Disease.

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Mostly known for its implication in synucleinopathies, including Parkinson's disease (PD), α-synuclein is predominantly expressed in the nervous system [1]. Most of the peripheral α-synuclein is found in erythrocytes, and several studies have examined a possible association between erythrocytic α-synuclein and PD [2-4]. We have used a recently developed ELISA that selectively detects fibrillar and oligomeric α-synuclein to measure aggregated α-synuclein in red blood cells (RBCs) collected from PD patients and age/sex-matched control individuals (n=35). The PD group included patients without any common mutation (genetically undetermined group, GU-PD, n=56) as well as mutation carriers in the α-synuclein gene (A53T-PD, n=28) and glucocerebrosidase gene (GBA-PD, n=24). We found that the concentration of aggregated α-synuclein in erythrocytes was significantly increased in GU-PD patients compared to controls. A53T-PD and GBA-PD patients exhibited similar levels of erythrocytic aggregated α-synuclein as the control group. The levels of fibrillar/oligomeric α-synuclein in RBCs were reduced in respect to the age of control individuals suggesting that the observed increase in the GU-PD cohort was not due to normal aging. Parallel assessment of monomeric α-synuclein revealed that aggregated, but not total, could discriminate PD patients from control individuals. The elevation of aggregated α-synuclein in PD erythrocytes, which is not related to aging, suggests that these forms may be indicative of PD pathology and possibly accumulate upon disease establishment. As such, aggregated α-synuclein in RBCs could be a potential biomarker for PD diagnosis.

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