INCREASED GLUTAMINYL CYCLASE EXPRESSION IN PERIPHERAL BLOOD OF ALZHEIMER’S DISEASE PATIENTS

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Objectives: The objective of our study was to quantify glutaminyl cyclase (QC) mRNA level and protein expression in peripheral blood from Alzheimer's Disease (AD) patients compared to age-matched controls. QC is an enzyme highly expressed in the brain and in peripheral tissues. It has been demonstrated that QC can convert the N-terminal glutamine of β-amyloid (Aβ) peptides to pyroglutamate. These pyroglutamate Aβ peptides can act as seeds for the formation of neurotoxic aggregates with higher amyloidogenicity and seeding capacity compared to the unmodified Aβ.

Methods: Using TaqMan real-time quantitative polymerase chain reaction, western blot, and sandwich enzyme-linked immunosorbent assay, we investigated QC mRNA level and protein expression in peripheral blood mononuclear cells from 25 AD patients and 22 age-matched controls.

Results: We found that in mononuclear cells from AD patients QC mRNA level and protein expression were higher than in the control group, and correlated with the severity of the disease. Importantly, QC level was not influenced by the age or the sex of the subject. Moreover, there was a significant negative correlation between QC mRNA level and protein expression and Mini Mental State Examination within the AD group.

Conclusions: These findings suggest the potential use of QC mRNA level and/or protein expression as a peripheral and clinically useful marker to monitor AD progression. The possibility to identify blood biomarkers able to assess disease stage, or response to treatment has recently become an interesting topic of discussion and warrants further investigations.