Measures of in vivo antioxidant status are important in understanding the role of oxidative events in the initiation and progression of numerous diseases, including cancer, atherosclerosis, and diabetes. In vivo antioxidant status can be assessed by measuring individual plasma or tissue levels of antioxidants such as vitamin C, vitamin E, or the carotenoids. However, the task is more difficult for numerous other compounds, including flavonoids and polyphenol-like compounds, that may influence in vivo antioxidant status.

To examine the plasma antioxidant status of Alzheimer's disease (AD) patients and to evaluate the influence of apolipoprotein E (APOE) genotype. There are reasons to suspect involvement of the free hydroxyl radical in the pathogenesis of AD. In contrast, studies in plasma of AD patients for the evaluation of levels of biomarkers of oxidation are controversial. Twenty AD patients diagnosed using the National Institute for Neurological Disorders/Alzheimer's Disease and Related Disorders (NINDS/ADRDA) criteria and 22 controls chosen amongst different subjects without cognitive damage. All the subjects–both AD patients and controls–were stratified by their APOE genotype (3/3, 3/4 or 4/4), which was determined by PCR. Plasma total antioxidant capacity (TAC) was determined using two complementary procedures: FRAP, which measures the ferric reduction capacity, and ABTS, which measures the radical scavenging capacity. In addition, 2-amino-adipic semialdehyde (2-AAS), a biomarker of protein oxidation, was evaluated. No significant difference was observed between the AD and control groups regarding plasma TAC. When the subjects were classified by their APOE genotype, significant differences were found in the APOE 4/4 group in the TCA determined by the FRAP method. Subjects with APOE genotype 4/4, which is the group with higher incidence in AD, showed lower antioxidant capacity of plasma. It is the first time that antioxidant capacity in plasma is evaluated in AD patients characterized by their APOE genotypes [1)].

1)
Pulido R, Jiménez-Escrig A, Orensanz L, Saura-Calixto F, Jiménez-Escrig A. Study of plasma antioxidant status in Alzheimer's disease. Eur J Neurol. 2005 Jul;12(7):531-5. PubMed PMID: 15958093.