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IL_II-4 Diabetes mellitus type 2 may reduce the activity of albumin-bound food antioxidants

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Dietary interventions based on antioxidants are a cornerstone in the management of diabetes mellitus type 2 (DM2). Pharmacokinetic factors, such as antioxidant interaction with plasma albumin, however, may influence their activity. Albumin modification due to glycooxidation may additionally affect antioxidant-albumin association [1]. The aim of the study was to examine binding effects of three pronounced antioxidants present in the Mediterranean diet: resveratrol, (dihydro)lipoic acid and oleuropein using albumin isolated from patients with DM2 and healthy persons. Average fluorescence spectra of the isolated albumin from two study groups were similar, whereas relative amounts of advanced glycation endproducts and dityrosines were greater in albumin isolated from patients. Calculated binding constants were similar for two study groups for all three ligands. Kinetic fluorescence measurements revealed more extensive structural change in albumin from patients than from healthy persons, when the protein was exposed to oxidizing agent 2,2'-Azobis(2-amidinopropane) dihydrochloride. Binding of resveratrol or DHLA to albumin prior to oxidative stress reduced protein oxidation in both study groups, but the protection was more efficient in the case of albumin from healthy persons. Samples that remained after kinetic measurements were subjected to native electrophoresis and immunoblotting with anti-albumin antibody. Besides albumin monomer as a major protein species in our isolates, a dimer was present as well. Interaction with resveratrol, but not DHLA, affected albumin in terms of the appearance of additional molecular forms - complexes (signal widening). These findings imply that certain structural changes of albumin due to diabetes modify behaviour of bound antioxidants possibly affecting their physiological role. Although additional confirmations are needed, as well as experiments employing other antioxidants, the results of this study warn that patients with DM2 may have reduced benefits from the consumption of antioxidants compared to healthy persons in respect to their activity.

References

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