

# Effect of Enzymatic Antioxidants on Oxidation of LDL-Cholesterol in Elderly People

Elisabeth Fabian, Michaela Bogner, Ibrahim Elmadfa  
Department of Nutritional Sciences, University of Vienna  
Vienna, Austria

**Background:** Elevated levels of circulating oxidized low density lipoproteins (oxLDL) are considered to be a prognostic indicator of cardiovascular outcomes. The formation of oxLDL might be impaired by enzymatic antioxidants such as superoxide dismutase (SOD), glutathione peroxidase (GSHPx), and catalase (CAT), which are defending against oxidative stress.

The objective of this study was to characterize the lipid profile and the impact of antioxidant enzymes on oxLDL as an atherosclerotic risk factor in elderly people.

**Methods and Materials:** A total of 102 subjects (45 men, 57 women, normo- and mild hypercholesterolemic) were recruited for this investigation. The participants were divided into three groups: A (70>75y; n=48), B (75>80y; n=35), and C (>80y; n=19). Plasma concentrations of total cholesterol (TC), HDL-cholesterol, and triglycerides were determined by enzymatic methods, LDL-cholesterol (according to the Friedewald equation), the TC/HDL, LDL/HDL, and oxLDL/LDL ratios were calculated. The activities of the erythrocyte antioxidant enzymes SOD, GSH-Px, and CAT were determined by photometrical methods, oxLDL using an ELISA kit.

**Results:** In this study, no significant differences of plasma TC, HDL-, LDL-cholesterol and triglycerides could be found between the investigated groups. The indices of atherogenicity, TC/HDL and LDL/HDL, were comparable in all age groups and indicated a rather positive lipid profile (up to 95% within the reference values). Further analyses exhibited an age related significant decrease of the activities of SOD (A>C, B>C:  $p<0.01$ ), CAT (A>C:  $p<0.05$ ), and GSH-Px (A>C:  $p<0.05$ ), accompanied by a significant increase of oxLDL levels (A<C:  $p<0.001$ ; B<C:  $p<0.05$ ). This resulted in a significantly enhanced age associated oxLDL/LDL ratio (A<C:  $p<0.001$ ; B<C:  $p<0.05$ ) and a significant negative correlation of SOD/oxLDL in all groups (A, B:  $p<0.05$ , C:  $p<0.01$ ).

**Conclusion:** The results of this study indicate no age associated modulation of plasma lipid profile components and the indices of atherogenicity, but suggest an impact of the significant age related decrease of enzymatic antioxidants on the atherosclerotic risk factor oxLDL in elderly people.