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MODIFICATIONS OF PLASMA PROTEOME IN HEALTHY HUMANS FED ON A COENZYME Q10-SUPPLEMENTED DIET

**Mónica Santos-González¹, José López-Miranda², Francisco Pérez Jiménez²
and José Manuel Villalba¹**

¹Departamento de Biología Celular, Fisiología e Inmunología, Universidad de Córdoba, Córdoba, Spain;

²Unidad de Lípidos y Arteriosclerosis, Hospital Universitario Reina Sofía. Córdoba, Spain.

Nutrition and ageing have been associated, and the role of dietary components which could counteract oxidative stress as anti-ageing therapy has been recently studied. Coenzyme Q (CoQ, ubiquinone) (2,3-dimethoxy-5-methyl-6-polyprenyl-1,4-benzoquinone) is a prenylated benzoquinone that is present in all cellular membranes and in high and low density lipoproteins as well. CoQ participates as an electron carrier in both mitochondrial and extramitochondrial membranes and it is a powerful antioxidant. Dietary CoQ₁₀-supplementation prolongs lifespan, modulates the activity of GSH-dependent antioxidant systems in the liver, and alters the levels of plasma proteins in rats fed lifelong on a PUFA n -6-enriched diet. The aim of our work was to analyze changes in the levels of plasma proteins of healthy humans fed on a Mediterranean diet (rich in olive oil) supplemented with CoQ₁₀ (200 mg/day) compared with a Mediterranean diet alone, by using proteomic techniques. This approach could give us new insights into the mechanisms related with the potential beneficial effects of CoQ₁₀ supplementation in humans. Plasma was obtained from twenty healthy adults consuming the two different diets for four weeks each, according to a randomized crossover design. At the end of the dietary intervention, and after 12 hours of fasting, participants were given a fat overload for the postprandial study. Blood samples were taken at 0, 30, 60, 120 and 240 min. Possible changes in the protein patterns of blood plasma were assessed at 0 and 240 minutes. After depletion of the twenty most abundant proteins by affinity chromatography using a commercial Kit, levels of less abundant plasma proteins were studied by using 2D-electrophoresis and MALDI-TOF mass fingerprinting analysis. In addition, to ensure the effectiveness of the supplement, plasma levels of CoQ₁₀ were measured by HPLC at 0, 60, 120 and 240 min. Our results have shown that dietary supplementation with CoQ₁₀ induced significant decreases of Apolipoprotein A-IV and α -2-HS glycoprotein, and increases of Apolipoprotein J and inter-alpha inhibitor H4 heavy chain. The nature of proteins whose levels are altered supports the effect of CoQ₁₀ supplementation on lipid metabolism and inflammation.