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APOE-related brain hemodynamics

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The APOE gene (19q13.2) encodes apolipoprotein E that plays a paramount role in lipid homeostasis. Furthermore, it is involved in neurite differentiation, neural repair and immunoregulation. Functional genomic studies have revealed the association of particular APOE genotypes with the phenotypic expression of biological traits (e.g., brain atrophy, cognitive decline rate, β -amyloid deposition, lipid metabolism dysfunction, immunologic dysregulation and therapeutic outcome). We investigated the influence of APOE genotype on brain hemodynamics using Optical Topography (OT), which measures the cortical variability in hemoglobin concentration and oxygenation. Brain optical topography patterns have been assessed in response to photic stimulation in 159 subjects: 18 APOE-2/3 (11.25 %), age: 51.61 ± 20.36 years (range: 18-79 years); 4 APOE-2/4 (2.5 %), age: 66 ± 17.81 years (range: 44-83 years); 104 APOE-3/3 (65%), age: 54.95 ± 19.69 years (range: 7-89 years); 25 APOE-3/4 (15.625%), age: 61.35 ± 16.2 years (range: 25-83 years) and 8 APOE-4/4 (5%), age: 63.4 ± 10.39 years (range: 41-74 years). Statistic analysis shows significant differences in brain hemodynamics among different APOE genotypes: BDHb-2/3 vs. BDHb-4/4 $p < 0.009$; SDHb-2/3 vs. SDHb-4/4 $p < 0.02$; BTHb-2/3 vs. BTHb-4/4 $p < 0.03$; STHb-2/3 vs. STHb-4/4 $p < 0.03$; BOHb-2/3 vs. BOHb-3/3 $p < 0.05$; SOHb-2/3 vs. SOHb-4/4 $p < 0.03$; SDHb-3/3 vs. SDHb-4/4 $p < 0.03$; BTHb-3/3 vs. STHb-3/3 $p < 0.03$; STHb-3/3 vs. STHb-4/4 $p < 0.001$; BOHb-3/3 vs. SOHb-3/3 $p < 0.05$; SOHb-3/3 vs. SOHb-4/4 $p < 0.007$; BDHb-3/4 vs. BDHb-4/4 $p < 0.02$; STHb-3/4 vs. STHb-4/4 $p < 0.02$; SOHb-3/4 vs. SOHb-4/4 $p < 0.01$. According to our results, the presence of the APOE4 allele has a deleterious effect on brain hemodynamics altering brain oxygenation which may contribute to poor cerebrovascular perfusion and chronic brain damage.

Biography

Oscar Teijido Hermida is the Head of the Medical Epigenetics Department at EuroEspes Biomedical Research Center, Institute of Medical Science and Genomic Medicine, Corunna, Spain. He has received his PhD from the University of Barcelona, Spain in 2007. During his scientific career in University of A Corunna, Spain, University of Barcelona, Spain, New York University, USA and the National Institutes of Health, USA, he achieved more than 20 scientific publications in the molecular genetics, biochemistry and physiology fields and presented his work in more than 25 international conferences.

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