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Epigenomic profile in dementia-related disorders

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Cerebrovascular and neurodegenerative disorders are among the leading causes of death in the World, according to the WHO. A number of these disorders are characterized by the onset of dementia. Alzheimer's disease (AD) is the major cause of dementia in Western countries, affecting 45-60% of the population, followed by vascular dementia (VD) and mixed dementia (MD) with prevalence of 30-40% and 10-20%, respectively. Epigenomic mechanisms (DNA methylation, chromatin remodeling/histone modifications, miRNA regulation) are involved in the transcriptional and post-translational regulation of genes in physiological and pathological conditions leading to potentially reversible phenotypes. Epigenetics is sited among the major regulatory elements that control metabolic pathways at the molecular level, which allows a deeper study of complex multifactorial diseases, such as dementia-related disorders. Therefore, epigenomic signatures may help in the prediction, early diagnosis and prognosis of those pathologies. Human exome sequencing and genome-wide association studies have linked several neurobiological disorders to epigenetically regulated genes. We have evaluated the main epigenetic mechanisms affecting genes associated with dementia-related disorders such as Alzheimer's disease (AD), dementia with Lewy bodies (DLB) and frontotemporal dementia (FTD). We also evaluated genes related with lipid metabolism and vascular physiology which are not directly involved in brain disorders, although their epigenetic profile may be nevertheless associated with dementia-related disorders. Epigenetic drug discovery, application of pharmacoeigenomic procedures for personalized therapeutics, novel approaches to decode and resolve drug resistance and targeting miRNAs in prevention and treatment of dementia-related disorders are promising areas of future development.

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 received his PhD in the University of Barcelona, Spain in 2007 with his Thesis titled: Biochemical characterization and location of the protein MLC1, involved in the Megalencephalic Leukoencephalopathy with Subcortical Cysts. 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), Dr. Teijido achieved more than 20 scientific publications in the molecular genetics, biochemistry, and physiology fields and presented his work in more than 25 International Conferences and invited presentations.

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