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Bioinformatics for Molecular Modeling of human iPS-derived motor neurons reveals pathophysiological mechanisms of Amyotrophic Lateral Sclerosis

The detailed mechanisms related to neurodegeneration in neurodegenerative disorders are still unknown. The methodology to study genetic, molecular and cellular events of human neurological diseases is current under development, increasing the expectation the discovery of therapeutic targets that allow effective translation of proposed clinical trials. Amyotrophic Lateral Sclerosis (ALS) is a fatal neurodegenerative disease that leads to widespread motor neuron death, general palsy and respiratory failure. We have developed the methodology to allow gene expression modeling of sporadic ALS, the most prevalent form of disease, by employing human induced pluripotent stem cell (hiPSC)-differentiated motor neurons linked to DAVID Functional Annotation Bioinformatics Microarray Analysis using a whole human genome platform. DAVID analyses of differentially expressed genes identified molecular function/biological process-related genes through Gene Ontology terms, summarized by REVIGO, and also genes related to KEGG signaling pathways. Specific software for Protein Interaction Network Analysis showed the degree of interaction of deregulated gene expression. The overall analysis showed a strong association between mitochondrial function and cellular processes possibly related to motor neuron degeneration Supported by: FAPESP and CNPq, Brazil.

Biography

Gerson Chadi is Full Professor at the Department of Neurology of the University of Sao Paulo Medical School (USP), Brazil, since 1998. He specialized in Neurodegenerative Diseases and Advanced Research on Regeneration of Central Nervous System (CNS) at Karolinska Institute, Sweden (1991-1994), and also at the Clarke Inst of Psychiatry of University of Toronto and at the Montreal Neurological Inst of the McGill Univ (1999). He introduced in Brazil the concepts and research methods in the CNS Regeneration (1994) and was one of the signatories of the Beijing Letter which created the Neurorestauratology Discipline in the field of Neurology. He heads the Translational Neurology Unit, the Translational Neurology Laboratory and the Neuroregeneration Research Center at Dep of Neurology of USP. He coordinates the Neurological Genomic Project and the Cell Therapy Project of his Medical School. He introduced the first Brazilian Systematic Translational Research on Amyotrophic Lateral Sclerosis (ALS, bench to bed, side 2010), being responsible for various clinical and laboratory projects on ALS research. He published more than 100 scientific peer reviewed papers in International Scientific Journals, graduated over than 60 Master, PhD and post doctoral students.

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Notes:

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