

2nd International Conference and Expo on

Drug Discovery & Designing

October 27-29, 2016 Rome, Italy

Drug design strategies in neuroinflammatory disorders

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Target-identification and mechanism-of-action studies have important roles in drug discovery. During lead discovery, an intensive search ensues to find a drug-like molecule, typically termed a development candidate that will progress into preclinical, clinical development and ultimately be a marketed medicine. An important target of drug discovery is neuroinflammatory diseases. Neuroinflammation represents the response of the central nervous system (CNS) to altered homeostasis. It is mediated by the contribution of glia, lymphocytes, monocytes and macrophages of the hematopoietic system. N-palmitoylethanolamide (PEA) is an endogenous fatty acid amide belonging to the family of the N-acyl ethanolamines. PEA is an important analgesic, anti-inflammatory and neuroprotective mediator, acting at several molecular targets in central and sensory nervous systems as well as immune cells. However, PEA lacks an antioxidant capacity to prevent the formation of free radicals and to counteract the damage of DNA, lipids and proteins. Luteolin (Lut), a flavonoid present in many plants, has antioxidant and pharmacological activities. In our studies PEA and Lut was combined by a co-ultramicroemulsification process in a single compound namely coultra-PEALut[®]. Its therapeutic action was tested in two different neurological conditions: stroke and autism. Preclinical and clinical data demonstrated the co-ultra PEALut[®] is able to reduce the severity of cardinal signs of stroke in rats and improves neurological status, cognitive abilities and the degree of spasticity, pain and independence in daily living activities in patients. Moreover, coultra PEALut[®] ameliorated social and non-social behaviors in autistic mice and improved clinical picture with reduction of stereotypes in a 10-year-old male child.

Biography

Salvatore Cuzzocrea is a Full Professor of Pharmacology at School of Medicine, University of Messina. She is graduated in Pharmacy and was appointed as Assistant Professor in 1999 at University of Messina, Associate Professor in 2002 and Full Professor at same University since 2011. He is vice-rector for research and Chairman of the PhD program in Experimental medicine University of Messina. Author of more than 595 publications including articles in peer reviewed international journals and scientific books. Editor and referee for several international journals. He encompasses research activities with specific competences at international levels in the field of autoimmunity, inflammation and neurodegenerative disorders as well as drug development.

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