Monthly Neuro Seminar Series

Spring 2023



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Molecular Mechanisms and Translational Discovery in Parkinson's Disease

A complex interplay between environmental insults, gene defects and aging-related neurotoxic stress aberrantly activates multiple pathophysiological processes to initiate the nigrostriatal dopaminergic neuronal degeneration in Parkinson's Disease (PD). Therefore, understanding the cellular mechanism governing the environmental neurotoxic stressinduced selective neuronal vulnerability will not only provide mechanistic insight into the pathogenesis of neurodegenerative diseases but will also yield early diagnostic biomarkers and therapeutic strategies. This presentation will highlight 1) key cell signaling cascades that regulates cell death and cell survival underlying dopaminergic neuronal degeneration in PD, 2) how environmental neurotoxic exposure induces aggregation of alpha-synuclein proteins and the cell-to-cell propagation of pathological

alpha-synuclein via extracellular vesicles leading to activation of pro-inflammatory inflammasome signaling, and 3) the development of innovative translational research strategies, including bioengineered, self-replicating gut bacterial biotherapeutics, that offer an entirely new drug delivery paradigm capable of ensuring long-term efficacy and a promising peripheral prodromal diagnostic assay platform that can detect pathological forms of alpha-synuclein in peripheral tissues, such as the skin of PD patients. Overall, our multi-disciplinary research approaches enabled us to uncover novel mechanisms underlying dopaminergic neuronal degeneration and to devise tangible translational strategies that will greatly benefit Parkinson's and other related neurodegenerative disease communities.

Tuesday, March 14 4:00 PM Coverdell S175



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