Reversal of Rotenone Induced Neurotoxicity on Parkinson's Affected Neuronal Cells through Antioxidants Glutathione, Piperlongumine, and Piperlonguminine

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Abstract

Parkinson's Disease (PD) is the second most common form of dementia and currently affects over 10 million people. Parkinson's is a neurodegenerative disease that results in significant loss of cholinergic neurons. Symptoms include tremors, Bradykinesia (slowed movement), rigid muscles, impaired posture/balance, loss of automatic/unconscious movements, speech changes, and writing changes.

Rotenone is an odorless, colorless, crystalline isoflavone used as a broad-spectrum insecticide. By inhibiting the mitochondrial complex I, ROS (Reactive oxidative stress) levels substantially increase in the cells, and the number of dead cells is remarkably higher. As a result of this deficiency in complex I in the mitochondria, an increase in ROS and the reduction of energy stores ensues, eventually contributing to neurodegeneration of cholinergic neurons. Through this process, rotenone triggers morphological changes in cells. Rotenone is a naturally occurring insecticide that is used worldwide because it has broad pesticidal properties. Due to the widespread use of rotenone, the reversal of this neurotoxicity is the current need for Parkinson's Disease patients. Because there is evidence that antioxidants Glutathione, Piperlongumine, and Piperlonguminine protect the mitochondrial complex I, this study focuses on the protective effects of these respective chemicals on Parkinson's neuronal cells exposed to rotenone.

Biography:

Jessica Guo is currently a sophomore at Ward Melville High School. She has completed a 6 week summer internship at the Weill Cornell Medical College, and is currently a student researcher at the SUNY Old Westbury Neuroscience Research Institute. She is mentored by Professor Wei Zhu, who received his Ph.D. from the Catholic University of Leuven, Belgium, and completed his Post- Doctoral fellowship at the Mind Body Medical Institute at Harvard University.

Speaker Publications:

1."Neurotoxicity on Parkinson's Affected Neuronal Cells through Antioxidants Glutathione". Pg 20-40
2. "Reversal of Rotenone Induced Neurotoxicity on Parkinson's Affected Neuronal Cells through Antioxidants Glutathione, Piperlongumine". Pg 60-80.
3. "Parkinson's Affected Neuronal Cells through Antioxidants Glutathione, Piperlongumine, and Piperlonguminine". Pg 120-160.

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