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Dioxo/isoindoline derivatives as novel drugs for neurodegenerative disease: Parkinson's and Alzheimer's disease (*in silico*, *in vitro* and *in vivo* study)

Erik Andrade Jorge, Cristina Cessa Montero, Marvin Antonio Soriano Ursúa and **José Guadalupe Trujillo Ferrara**
National Polytechnic Institute, Mexico

Neurodegenerative diseases are a heterogeneous group of disorders that are characterized by the progressive loss of the structure or function of neurons, including the death of neuron cells. Common neurodegenerative diseases include Alzheimer's disease and Parkinson's disease. Isoindoline represents an important family of compounds presents in a wide array bioactive molecules and also it has been seen this kind of compounds has effect in the central nervous system. This is the main reason they have attracted the attention of many researchers, even our work group. Therefore, the aim of the present study was to design and evaluate a series of isoindoline to test their selectivity for the dopamine D2 receptor, and a series of dioxoisoindoline as possible inhibitors of acetylcholinesterase. In the study of the molecular and toxicological properties, dioxoisoindoline and isoindolines showed that possess favorable characteristics as potential drugs. Taking into account the in silico results, the synthesis of the molecule Ia1 (isoindoline) and Da1 (dioxoisoindoline), and their structures were confirmed by IR, ^{1}H and ^{13}C NMR and mass spectroscopy was carried out. The in vivo evaluation for the isoindoline (Ia1) showed that this compound has an effect on the motor activity of male C57BL/6 mice in the MPTP model. While molecule Da1 (dioxoisoindoline) was tested in an intro experiment, results showed that this molecule has the ability to inhibit acetylcholinesterase. These results allow us to try other candidates who might possess the same properties and also perform others studies that can give us more evidence about selectivity.

Biography

Erik Andrade Jorge is a Doctorate student in the Department of Biochemistry at Instituto Politecnico Nacional. He is a Chemist-Pharmaceutical-Biologist and has a Master's degree in Pharmacology and is currently pursuing Doctorate research in medicine. He has two different research lines, one is cancer cell proliferation and another one is Parkinson's disease. His work focuses on the rational drug design based on the molecular mechanisms of different pathologies and in the physicochemical properties of the ligands.

andrade136@hotmail.com

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