

EDITORIAL

Parkinson's and Alzheimer's Diseases and Natural Products: Pathologies and Medication of the New Times

Nowadays, many compounds have been discovered from natural origins. They are available either in nature or formulated by the pharmaceutical industries for their multiple therapeutic properties. These natural compounds have been employed in better management of various pathological conditions of the Central Nervous System (CNS). Some alternative surgeries have been proposed for Parkinson's disease (PD). These surgeries may require the control drug administration to the brain or electrical implants to minimize involuntary muscular spasms [1, 2]. Thereby, both these approaches are not considered ideal reliable alternatives to PD patients. Alzheimer's disease (AD) is a chronic progressive neurodegenerative disorder wherein memory loss slowly worsens over time [3, 4]. In the early stages of AD, memory impairment is modest. However, late-stage Alzheimer's dementia symptoms are so severe that the patients lose their ability to perform basic care tasks [5].

Currently, chiral compounds and the complex heterocycles and hydrocarbon-cycles originated from marine and natural compounds have been prepared by synthetic procedures. Molecular modeling simulation with respect to interactions within and between common crystallized biological receptors has been widely explored. They were aimed to obtain computationally designed medicines with ideal biological activity in explicit mental disorders.

Notably, the isolated natural alkaloids from marine and terrestrial resources have structural complexity. This results from the living organisms' requirements from their surroundings, the unpredictable pharmacological implementation of these compounds at visceral and cutaneous level, and the chemical properties of these products depending on the nitrogen atoms incorporated to feasible extensions of the aromatic system.

In the present special issue under the topic: "Parkinson's and Alzheimer's Diseases and Natural Products: Pathologies and Medication of the New Times", we have collected the scientific contributions in the field of neurochemistry in search of novel therapeutic applications in treating Parkinson's and Alzheimer's disease. We employed designed heterocyclic and cyclic hydrocarbon compositions originated from natural resources. Therefore, we included pharmacological-clinical trials, studies with the content of synthesis and isolation, as well as theoretical investigations focusing on the structure-activity relationship in this issue.

This special issue contains 3 mini-review and full-review articles. We provided suitable figures, flow charts or tables for a better understanding of the contents, whenever feasible. The first article presented in this special issue illustrated the summary of symptoms affecting an individual's cognition state. Since dementia is severely debilitating, attempts to perceive an efficient treatment for this condition is crucial. In this article, the authors attributed the demonstrated consequences of polydatin from a mechanistic approach.

In the second article, Tewari *et al.* described the reactive nitrogen species (RNS) and reactive oxygen species (ROS), well known as reactive oxygen and nitrogen species (RONS), as the products of normal cellular metabolism. They stated that RONS can interact with various vital biological molecules including nucleic acid, proteins, and membrane lipids.

Thereafter, the authors showed the critical role of nitric oxide (NO) for normal function of the human body. They also attributed the significance of different natural products in various neurodegenerative diseases to their inhibitory effects on NO production from the mechanistic perspective.

In the end, the last article in this issue by Singh *et al.* demonstrated that AD is the consequence of a multidirectional pathology in the brain. They concluded that based on the AD pathophysiology, a multi-target-directed ligand (MTDL) strategy is warranted.

This affirmation is the key for development and repurposing new agents for better management of AD with pyrimidine based natural products. This biomolecule plays its role as a lead. In this review, the authors provided a list of herbal chemical compounds to heal AD and alleviate its bothersome symptoms. Furthermore, they employed the active scaffolds of pyrimidine/fused pyrimidines to protect against different potential targets of AD.

REFERENCES

- [1] Steffen, J.K.; Reker, P.; Mennicken, F. K.; Dembek, T. A.; Dafsari, H. S; Fink, G. R.; Barbe, M. T.; Fink, G. R.; Visser-Vandewalle, V. Bipolar directional deep brain stimulation in essential and parkinsonian tremor. *Neuromodulation*, **2020**, *23*, 543-549.
- [2] Singleton, W. G. B.; Ashida, Reiko.; Patel, N. K. Deep brain stimulation for facial pain. *Prog. Neurol. Surg.*, **2020**, *35*, 141-161.
- [3] Yang, X.; Chen, Q Efficacy of the combined use of donepezil with either quetiapine or sodium valproate in patients with Alzheimer's disease with behavioral and psychological symptoms of dementia, and their effects on vascular endothelial growth factors. *Exp. Ther. Med.*, (**2021**), *21*, 10.
- [4] Wada-Isoe, K.; Kikuchi, T.; Umeda-Kameyama, Y.; Akishita, M.; Mori, T.; Nakamura, Y. ABC dementia scale classifies alzheimer's disease patients into subgroups characterized by activities of daily living, behavioral and psychological symptoms of dementia, and cognitive function. *J. Alzheimers Dis.*, (**2020**), *73*, 383-392.
- [5] Lu, X.; Chen, J.; Shu, H.; Wang, Z.; Shi, Y.; Yuan, Y.; Xie, C.; Liao, W.; Su, F.; Shi, Y.; Zhang, Z. Predicting conversion to Alzheimer's disease among individual high-risk patients using the characterizing AD risk events index model. *CNS Neurosci. Ther.*, (**2020**), *26*, 720-726.

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