

Evaluation of Central Nervous System Activity of Synthesized 5, 5-Diphenylimidazolidine-2, 4-Dione Derivatives

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Abstract : Background: Epilepsy is a chronic non-communicable central nervous system (CNS) disorder which affects a large population of all ages. Different classes of drugs are used for the treatment of this neurological disorder, but due to augmented drug resistance and side effects, these drugs become incompetent. Therefore, we design the synthesis of ten new derivatives of Phenytoin. The moiety of Phenytoin was hybridized with different phenols by using three step approach. The synthesized molecules were then investigated for different physicochemical parameters, such as Log P values using diverse software programs and to predict the potential to cross the blood-brain barrier. Objective: The Phenytoin derivatives were designed, synthesized, and characterized to meet the structural necessities indispensable for antiepileptic activity. Method: Firstly, the chloroacetylation of the 5,5-diphenyl hydantoin was carried out, and then various substituted phenols were added to it. The synthesized compounds were characterized and evaluated for antianxiety activity by elevated plus maze method and antiepileptic activity by using subcutaneous pentylenetetrazole (scPTZ) and maximal electroshock (MES) models and neurotoxicity. Result: The number of derivatives of 5,5-diphenyl hydantoin was developed and optimized. The number of parameters was optimized which reveal that the compound containing chloro group such as C3 and C6 showed imperative potential when compared with the standard drug Diazepam. Other compounds containing nitro and methyl group were also found to possess activity. Conclusion: It was summarized that the new compounds of 5,5-diphenyl hydantoin derivatives were synthesized. The results of the data show that the compound containing chloro group is more potent for CNS activity. The new compounds have the probability of being optimized further to engender new scaffolds to treat various CNS disorders.

Keywords : phenytoin, parameters, CNS activity, blood-brain barrier, Log P, CNS active

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