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The structure activity relationship of antidepressants and the specificity in drug therapy

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Antidepressants are prescribed commonly in depression therapy in the pharmaceutical methods; however, the long term administration time which is approximately 10 to 20 days and the unpleasant side effects are still accompanied during the medication therapy. Consequently, the full profile of the medicinal chemistry of the antidepressants is discussed for an ideal structure in drug affinity. Antidepressants can be divided into different types that depend on different neurotransmitters as a target to serve as reuptake inhibitors. Furthermore, antidepressants can be categorized into (SSRIs) selective serotonin reuptake inhibitors and (SNRIs) selective norepinephrine selective reuptake inhibitors. The structure activity relationship of antidepressants is the goal in this project to explore the full profile of specific structure in binding affinity and specificity. A better view of the structure in antidepressants is beneficial to establish a highly potent and precise antidepressant design. Halogens are found common in the antidepressants compound for the purpose of drug affinity. Especially, the fluorine atom will serve as hydrogen bond acceptors that contribute to a high affinity in protein-ligand interaction, particularly in association with O-H or N-H group in the binding protein. Both the fluoxetine and paroxetine contains fluorine as the substituted group. However, the position matters when it comes to the affinity that the substituted group in fluoxetine occupy only 4'-position while paroxetine occupies both 4'- and 3'-position on the aryloxy ring that proposes the spatial configuration of the substitution group is significant. Furthermore, the fluoxetine contains trifluoromethyl group on the phenolic rings in the Para-position exhibit 6-fold potency in SSRI activity compared to its parent non-fluorinated structure. In summary, a more clear direction in the development of antidepressants can be suggested to be related to both the types and positions of substituents on the aromatic rings. Mostly, these antidepressants are not only treated to depression disorder but also can be used in other health condition such as NRIs in chronic pains and ADHD. Hence, an outcome of improved efficacy in terms of its specificity and potency of antidepressants can benefit people to overcome the healthy condition and provide a more profile in the drug design.

Biography

Shu-yi Sophie Chen is the final year student in the Department of Applied Biology and Chemistry Technology at the Hong Kong Polytechnic University in Hong Kong. She had been a visitor student in the Department of Life Sciences at the Peking University in Beijing, China in 2017. Shu-yi Sophie Chen had received the Talents Development scholarship by the Hong Kong S.A.R. government in 2017 and Reaching Out Award in 2016 for her medical volunteer placement in Sri Lanka by the Hong Kong S.A.R. government respectively. She had been exploring the medicinal chemistry in pharmacological therapy in antidepressants research as her final year project under the guided by Dr Ga-Lai LAW at the Hong Kong Polytechnic University. Shu-yi Sophie Chen had also completed a medical placement and volunteer works in the Paediatric Surgery Units in the Karapitiya Teaching Hospital in Sri Lanka in 2016.

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