البحث الثانى

العنوان:

Computational study of the therapeutic potentials of a new series of imidazole derivatives against SARS-CoV-2

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Abstract:

Owing to the urgent need for therapeutic interventions against the SARS-coronavirus 2 (SARS-CoV-2) pandemic, we employed an in silico approach to evaluate the SARS-CoV-2 inhibitory potential of newly synthesized imidazoles. The inhibitory potentials of the compounds against SARS-CoV-2 drug targets - main protease (Mpro), spike protein (Spro) and RNA-dependent RNA polymerase (RdRp) were investigated through molecular docking analysis. The binding free energy of the protein-ligand complexes were estimated, pharmacophore models were generated and the absorption, distribution, metabolism, excretion and toxicity (ADMET) properties of the compounds were determined. The compounds displayed various levels of binding affinities for the SARS-CoV-2 drug targets. Bisimidazole C2 scored highest against all the targets, with its aromatic rings including the two imidazole groups contributing to the binding. Among the phenyl-substituted 1H-imidazoles, C9 scored highest against all targets.

C11 scored highest against Spro and C12 against Mpro and RdRp among the thiophene-imidazoles. The compounds interacted with HIS 41 - CYS 145 and GLU 288 e ASP 289 e GLU 290 of Mpro, ASN 501 of Spro receptor binding motif and some active site amino acids of RdRp. These novel imidazole compounds could be further developed as drug candidates against SARS-CoV-2 following lead optimization and experimental studies.