Chemotherapeutics against Infectious Diseases: Syntheses and Biological Targets – Part II

Infectious diseases are defined as disorders caused by pathogenic microorganisms, such as bacteria, viruses, parasites, or fungi, that can be spread directly or indirectly from one individual to another. Many organisms live in and on our bodies. They are normally harmless and even helpful. However, under certain conditions, some organisms may cause diseases. Some infectious diseases can be passed from person to person. Some are transmitted by insects or other animals. Moreover, you may be infected by others through the consumption of contaminated food or water or by being exposed to organisms in the environment. Infectious diseases pose one of the major health challenges across the globe. Even though some drugs are available commercially, they have developed several resistance mechanisms. Thus, the search for new drugs capable of reducing or eliminating the moribundity of various infectious diseases has been one of the main focuses of organic synthesis.

Eight manuscripts have been selected for this special issue dealing with recent advances in chemotherapy strategies involving important classes of compounds such as quinones, flavonoids, triazoles, dihydroorotate dehydrogenase (DHODH), and quorum sensing modulators in the treatment against infectious diseases.

França et al. discussed the medicinal chemistry of nitrotriazoles through the analysis of their potential in terms of biological activity against the etiological agents of several diseases, such as Chagas disease, sleeping sickness, and leishmaniasis, which are caused by kinetoplastid parasites, tuberculosis, which is caused by the mycobacteria Mycobacterium tuberculosis, and against different species of pathogenic fungi [1]. Furthermore, aspects related to enzymatic activities, molecular modeling, and organic synthesis of these substances are also addressed.

Hossain and German reported the therapeutic strategies, which include active or passive immune therapy and small molecules that inhibit quorum sensing (QS) pathways [2]. The authors discussed the most pathogenic virulence factors of P. aeruginosa and potent inhibitors. However, there are other factors beyond the scope of this review that modulate a multitude of signaling pathways towards pathogenesis. These pathogeneses include, but are not limited to, cell cytotoxicity, iron acquisition, biofilm formation, antibiotic permeability, antibiotic resistance, inflammation, and immune evasion.

Poonia et al. focused on the recent advances (2016-2021) of 1,2,3-triazole derivatives obtained by CuAAC as potential antifungal agents that may facilitate the triazole-based antifungal development process [3].

Froes et al. gave special attention to the understanding and application of methodologies developed and made available by the FTMap and FRAGMap servers and accessory programs to map and assess how the hot spots were explored during the development of inhibitors for the DHODH enzyme, an important target for infectious diseases [4]. This review paper focused on the human enzyme DHODH, as a target against viral diseases, in particular, against SARS-CoV-2, which is responsible for COVID-19, and Trypanosoma cruzi DHODH, as a target for Chagas disease.

REFERENCES


