Editorial

Medicinal Chemistry from Fungi and Back: Discovery of Novel Anti-Fungal Drugs and Mycotherapy of Cancer and Other Diseases with Fungal Metabolites

Fungi are important organisms for human population and could find important applications namely, in many pharmaceutical and food industries. A variety of compounds has been isolated from medicinal and edible mushrooms, and their health-beneficial effects have been reported. On the other hand, it is important to control microfungi as parasites and contaminants since they can provoke, in some cases, serious issues to human health.

The following issue is devoted to recent findings in the fields of novel antifungal drugs, mycotherapy of cancer and other diseases with compounds recently isolated from fungi. It is covered by eight hot topic manuscripts from the mentioned relevant fields.

A review on antifungal activity of mushrooms (Basidiomycetes) and their isolated compounds including high (e.g. peptides and proteins) and low (e.g. sesquiterpenes and other terpenes, steroids, organic acids, acylcyclopentenediones and quinolines) molecular weight compounds is presented. Furthermore, antioxidant protective effects of mushroom metabolites is presented covering antioxidant features of numerous compounds isolated from mushrooms, such as phenolic compounds, vitamins, polysaccharides, peptides, proteins, organic acids, carotenoids, alkaloids, and nucleotides. Cyclodextrins are usually used in antifungal formulations as auxiliary substances to improve solubility, stability, or other physicochemical properties of the active compound. Nevertheless, recent research and practical use results indicate that cyclodextrins might also act as active compounds in pharmaceutical formulations. Furthermore, Recent advances in synthesis of compounds and their biological evaluation considering antifungal activity is also presented, covering the broad spectrum of compounds from different chemical classes. Therapeutic properties of mushrooms in managing adverse effects in the metabolic syndrome deeply discusses the use of edible mushrooms, their extracts, polysaccharide fractions and isolated compounds as hypoglycaemic agents, as holders of cholesterol and triglyceride lowering ability, hypotensive agents, as well as weight managing holders. New and highly potent antitumor natural products from marine-derived fungi presents recent finding on cytotoxic activities of fungal compounds. Essential oils for the control of fungi and the production of aflatoxins, especially the most toxic aflatoxins B1 and G1, is essential and decisive, therefore highlighting the possibilities of utilizing essential oils in biological control of aflatoxin contamination. The last paper focuses on recent update of cytotoxic and antitumor activity of mushroom extracts and compounds belonging to the heteropolysaccharides, β-glucans, α-glucans, proteins, complexes of polysaccharides with proteins, fatty acids, nucleoside antagonists, terpenoids, sesquiterpenes, lanostanoids, sterols and phenolic compounds. Molecular mechanisms of cytotoxic and antitumor activities are briefly discussed.

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