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Review article

Pyrrole: An emerging scaffold for construction of valuable therapeutic agents

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ABSTRACT

Pyrrole derivatives comprise a class of biologically active heterocyclic compounds which can serve as promising scaffolds for antimicrobial, antiviral, antimalarial, antitubercular, anti-inflammatory and enzyme inhibiting drugs. Due to their inimitable anticancer and anti-tubercular properties, researchers were inspired to develop novel pyrrole derivatives for the treatment of MDR pathogens. In the present review the main target is to focus on the development of pyrrole mimics, with emphasis based on their structure activity relationship (SAR). The present review is being obliging for the future development of pyrrole therapeutics.

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1. Introduction

Heterocyclic chemistry is being a significant division of organic chemistry. The molecules belonging this division have gain immense attention not only biological and industrial applicability but also developing human society. Heterocyclic compounds are pharmacologically active compounds accessed in laboratory as well as from natural sources. A wide practical applications of heterocycles can functioned as additives and modifiers in industries including cosmetics, polymers, solvents, antioxidants etc. Hence, synthesis of heterocyclic compounds has been a main objective of modern researchers. Among the new heterocyclic compounds, pyrrole has gain remarkable attention due to its biological potential as antimalarial and enzyme inhibiting properties.

Pyrrole is a five membered heterocyclic aromatic compound with molecular formula C_4H_5N. It is a colorless volatile liquid that darkens readily upon exposure to air. Pyrrole is an essential component of more complex macromolecules including porphyrins of heme, chlorophyll, chlorins etc. It was first detected by F.F Runge in 1834 as a constituent of coal tar. In 1857, it was isolated from the pyrolysate of bone. Its name came from Greek pyrrols (fiery) from the reaction used to detect it-the red colour that it imparts to wood when moistened with hydrochloric acid.

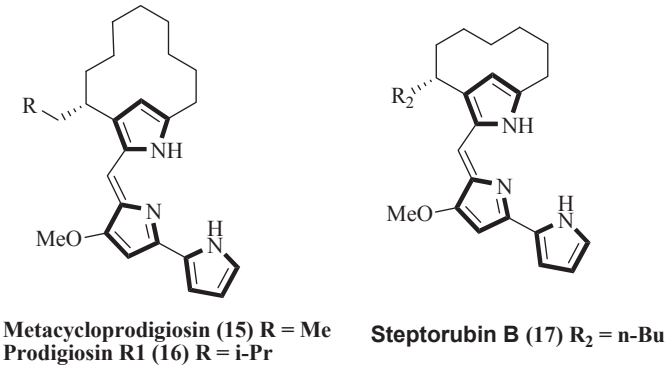

Fig. 2. Chemical structures of metacycloprodigiosin (15), prodigiosin R1(16) and streptorubin B (17).

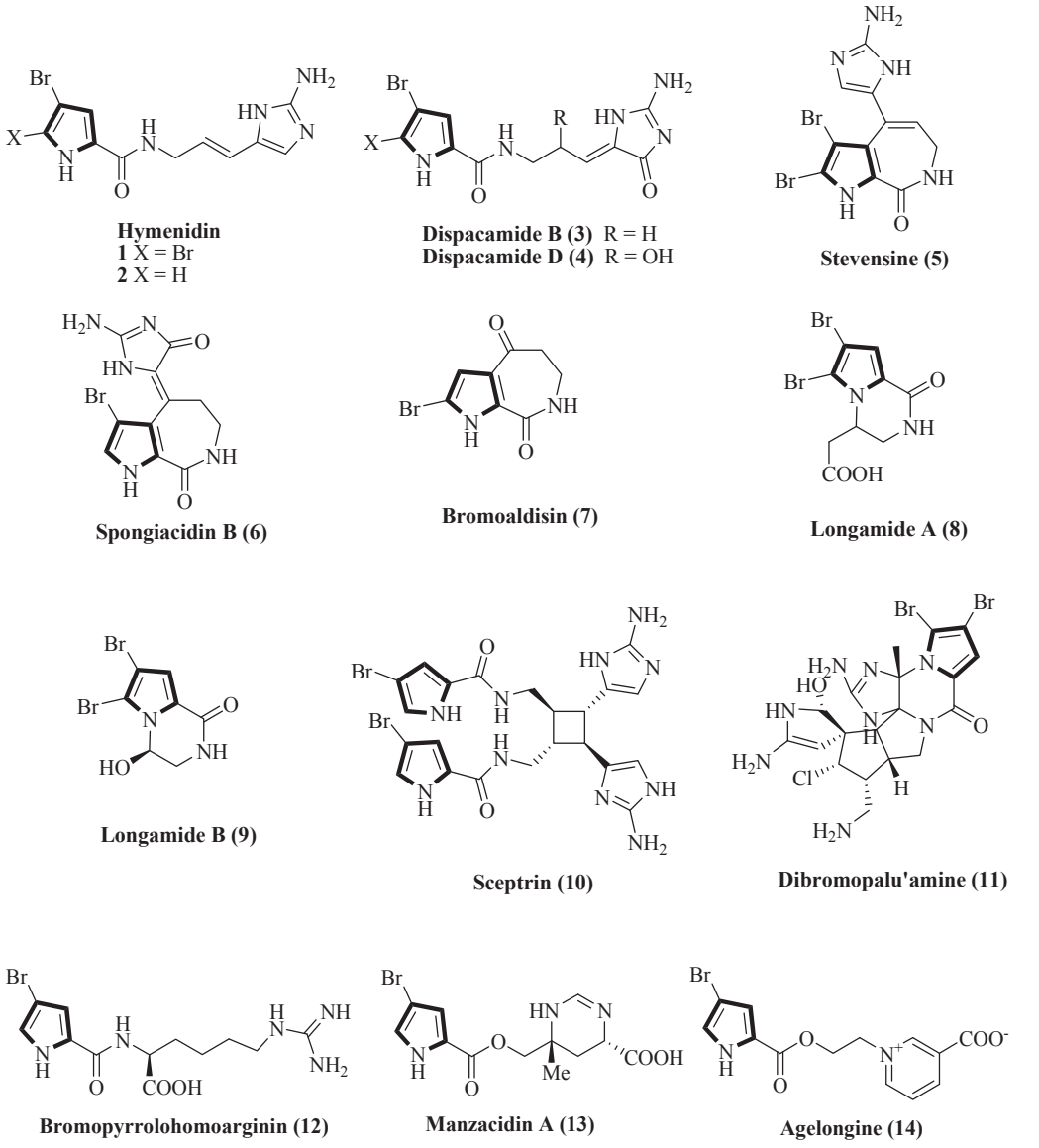

Fig. 1. Potentially active pyrrole based natural products.