EDITORIAL

"Discovery and Development of New Anticancer Drugs Inspired from Natural Product Leads" Part 1

Historically, natural products have been the source of most of the active ingredients of medicines. This is commonly recognized to be a fact with respect to drug discovery. The justifications for the efficiency of natural products are at least two. Firstly, there is a high-level of correlation between the properties of drugs and natural products. Secondly, natural products generally have integral chirality and are thus exclusively suited to bind to complex biological proteins and receptors.

Globally, cancer has been assessed to be the principal cause of death by WHO [1]. Tumorigenesis occurs if normal cells gather adequate mutations for persistent proliferation, apoptosis and eventually tissue invasion leading to metastasis. Although a large number of anticancer agents have been discovered in the recent times, the concurrent drug-resistance and toxicity associated with them have triggered the need to discover novel selective and potent compounds for cancer chemotherapy [2].

Nature has been fascinating cradle of novel anticancer candidates as remarkable chemo-diversity is found in many of species of plants, microbes, marine organisms and animals. To many living beings, this chemo-diversity signifies the effect of evolution in the maintenance of self-defense that represents the tactics inherited to deter or destroy predators. Structural anticancer classes from nature include vinca alkaloids, epipodophyllotoxin, lignans, taxane, diterpenoids, combrestatins and camptothecin and quinolines. These natural products hold several most exciting new therapeutic agents presently existing for the clinical practice of cancer [3].

In the present special issue (Part 1) under the topic, "Discovery and development of new anticancer drugs inspired from natural product leads", we have collected important contributions in the field of the natural products-based drug discovery that are discussed extensively across the diverse classes of natural products to search potent and non-toxic anticancer lead compounds.

This special issue contains 10 articles including mini-review, review and research articles. In addition, wherever appropriate, illustrations, flow charts or tables for easier and straightforward understanding of the contents are presented. The first article of this special issue contributed by Professor Dianqing Sun aims to provide information about β-Carboline alkaloids focusing on their chemical structures, anticancer properties, structure-activity relationships, and mechanisms of action. The second article involves the research based on development of conjugates of azetidin-2-ones integrated with natural 4,5-dibromopyrrole motif as potent and non-toxic antineoplastic agents. The next research article presents the synthesis of novel coumarin-substituted thiazolidin-2,4-dione analogs as anticancer agents. The fourth review report is based on the recent progress towards development of structurally modified podophyllotoxins possessing apoptosis inducing ability.

The fifth contribution by Professor Adam Huczyński describes the possible role of Salinomycin in cancer therapy and gives an overview of its properties which showed strong activity against the proliferation of various cancer cells, including those that display multi-drug resistance (MDR), and cancer stem cells (CSCs), *i.e.* leukemic stem cells, colon carcinoma stem cells, prostate cancer stem cells and many others. The next review report gathers the recent efforts to elucidate the molecular mechanisms of action of chalcones, associated with their anticancer and anti-resistance potential. The emergence of MDR is a major challenge to successful cancer chemotherapy. Molecular investigations on MDR have revealed that the resistance is due to the overexpression of ABC transporters. Hence, the eighth contribution has revised the status of natural products for reversing MDR modulators by inhibiting ABC transporters. Next to this is a short review by Professor Lee on the synthetic strategies of duocarmycin analogs that are powerful DNA alkylating agents. Ninth article by Professor Neil Koorbanally describes a review report on the synthesis of bioactive anticancer quinolines substituted at the 2-position and their anticancer activity. Finally, different molecular mechanisms which are involved in curcumin mediated angiogenesis and metastasis, when given in combination with chemotherapeutics like cyclophosphamide, doxorubicin, mitomycin, etc. in treating breast cancer have been reviewed.

All these contributions in this issue (Part 1) will guide us to understand the role of natural products in the development of potent and non-toxic anticancer agents. The natural products discussed in this special issue can serve as important lead candidates/starting point for the development of future anticancer drugs by utilizing medicinal chemistry and drug design approaches which every contributing author has indicated in his ongoing research.

REFERENCES

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