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THE WORTH OF NATURAL PRODUCTS TO FUTURE DRUG EXPLORATION

Prof. I.M. Vishal

ABSTRACT:

The role and contributions of natural products chemistry in advancements of the physical and biological sciences, its interdisciplinary domains, and emerging of new avenues by providing novel applications, constructive inputs, thrust, comprehensive understanding, broad perspective, and a new vision for futures outlined. The developmental prospects in bio-medical, health, nutrition, and other interrelated sciences along with some of the emerging trends in the subject area are also discussed as part of the current review of the basic and core developments, innovation in techniques, advances in methodology, and possible applications with their effects on the sciences in general and natural products chemistry in particular. The overview of the progress and ongoing developments in broader areas of the natural products chemistry discipline, its role and concurrent economic and scientific implications, contemporary objectives, future prospects as well as impending goals are also outlined.

Keywords: Natural products, bio medical, scientific implications.

1. INTRODUCTION

Compounds which have biological activities and are derived from natural sources, *e.g.*, plants, animals and microorganisms, are defined as natural products. Natural products have been used by human societies for millennia. Historically pharmaceutical company's utilized plant extracts to produce relatively crude therapeutic formulations, but with the advancement of antibiotics in the mid-twentieth century, drug formulations of fairly purified compounds have become more typical. Natural products have been the major sources of chemical diversity for starting materials for driving pharmaceutical discovery over the past century. Many natural products and synthetically modified natural product derivatives have been successfully developed for clinical use to treat human diseases in almost all therapeutic areas. Even so, pharmaceutical companies have significantly decreased activities in natural product discovery during the past few decades. Biotechnology companies working in the fields of combinatorial biosynthesis, genetic engineering and metagenomic approaches to identify novel natural product lead molecules have met with limited success. These disappointments have led the pharmaceutical industry to contemplate whether natural product

VOLUME-2 ISSUE-4
ISSN : 2799-18

chemical diversity can or will continue to provide valuable templates for drug development. This review will summarize the status of natural product discovery within the pharmaceutical industry and identify possible future trends. However, we will not discuss herbal medicines, although they are truly natural products in their more rudimentary formand interest in their use in human health continues to grow. For the definition of natural product discovery within this review, we will refer more narrowly to the isolation of a pure compound from a natural source which is used for the development of a prescription drug. We believe that natural product research has enormous yet unexploited potential, and describe the important advantages and disadvantages of natural product derived molecules as drug candidates for development. Our principal therapeutic focus areas in the review will be on anti-infective and anti-cancer research, but we provide insights into the value of natural products for other therapeutic areas. We also address the technical limitations, regulatory and business issues which define the prospects for increased discovery research on natural products within the pharmaceutical industry.

2. RELATED STUDY

An unprecedented revitalization has been taking place in the interest for natural products, and natural product's chemistry with their impact on various fields of scientific knowledge, technical advancements, and the economic activity. The thrust has been through a revival after the near loss of appeal for the subject. The decline of interests due to lack of prioritization, non-availability of precise tools and techniques with resulting inhibition, lack of interest, unavailability of upgraded analytical tools, and lack of wider academic and industrial programs along with the poor financial resources for advancements and research and development a opportunities for new discoveries and applications impacted the

(i) Advancement of knowledge in understanding of physical and biological science avenues and its interrelation of wider disciplines with economic impacts,

(ii) Progression of technological advancements, especially in analytical, biotechnical, and pharmaceutical domains,

(iii) Importance, outreach, and the discipline's role as a cool of modern research into chemical sciences for its broader applications, and

(iv) Later advances in mechanistic of natural world's biotic and a biotic processes, environment and ecosystems with their natural products, metabolites, and the involved chemistries, all impacted the discipline. The natural products and its chemistries understanding led approaches and analyses in

VOLUME-2 ISSUE-4
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purifications, characterization, structure determination, functions, inter-relational chemical and metabolic dynamics as well as vigorously diversified characteristics and pharmacology-based usage and roles led to streamlining of the advancements in the farther understanding and contributions to the discipline which is seeing an unprecedented growth in terms of knowledge of the more complex products and their implications in understanding and unravelling the superior analytical, bioengineering and medicinal uses. The finer details in natural resources ecological settings and impaction the constituents' generation, and its variations in design and diversification as well as levels of products' involvement in biomechanistics of the cellular and ultra-cellular processes opened up the developmental horizon for finer details and broader applications in the chemistry of terrestrial species and marine organisms(Atanasov et al., 2015). Although, concurrent approaches have significantly impacted phytomedicines, synthetic chemistry aspects, purification methods development, ecological understanding, agrarian sciences, the chemo-environmental outlook from the natural products' perspective and related technological advancements and economies.

3. PROPOSED METHODOLOGY

The entry of synthetic products as pharmacological agents laid down the foundations of modern drugs and drug discovery in amore conceptual and rational way. The natural products and their derived drugs dominated till the 1980s when over one-third of the drugs were originated from the natural resources. The synthetically originated drugs continued to surge and covered about half of all the drugs, while the other half is still dominated by the natural resource-based medicines. However, the claimed adverse effects and perceived toxicities, requirements for advanced facilities and infrastructure set-up, adherence to stricter regulatory mechanism and expertise in the design and up-scale preparation of synthetic drugs of semi-natural and purely synthetic origins led to the growth of phytoand marine–sourced drugs at steady pace with development of drug templates for various biological activities. The conjunction of the synthetic approaches with the naturally-sourced drugs and drug templates, of late, has been a sig-nificant contributor to the natural products chemistry discipline's progression and gradual advancements. The exercise realized the inter-dependence, molecular connectivity and structure-activity relationships (SAR) for several natural templates, particularly, anti-cancers and antibiotics drugs in several ways with leads from different research groups and institutions worldwide.

However, till recently, in major parts of the world, the natural products that were viewed as

VOLUME-2 ISSUE-4
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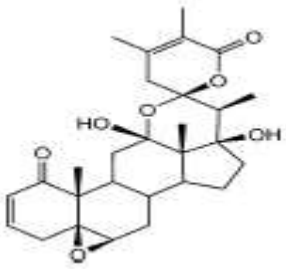
prophylactic agents as being nutraceuticals, food supplements, and herbal drugs, or as complementary and alternative medicinal agents, have started to reshape its appeal and perception. The mild and severe levels of adverse side effects of synthetic drugs for various chronic diseases of genetic, life-style-acquired, and occupational and other chronic conditions generated an opportunity to look out for safer and effective drugs from natural sources. The nature's products which constituted the major portions of the global tribal population' medicament also provided an opportunity to explore the traditional medicament resources and the knowledge for further development through systematic approach in bio-assay guided fractionation and activity location from the active constituent(s)as well as it also contributed towards synthesis development, semi-synthesis, and drug design avenues involving the obtained natural product(s) templates. Moreover, the semi-synthetic Analogs of natural product also focused on intricately modifying the structural features with inputs from SAR and QSAR, and with or without disturbing the starting molecular template for improving the existing drug-like features for the biological activity.



This made possible the crossovers of the original natural product templates in terms of clinical significance and generating a new biological activity in the redesigned entity through comparisons and predictions, also involving the use of in silico activity predictors. The natural products have also served as feasible starting material to generate substances with improved and new therapeutic efficacy that are, at times, unrelated to the known biological functions of the starting material itself.

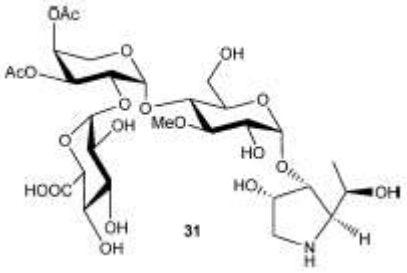


Fig.3.1. Natural product formation

5. CONCLUSION

Natural product research continues to provide significant value in the discovery of novel chemical structures and bioactive lead molecules for clinical development. The descriptions of ne

VOLUME-2 ISSUE-4
ISSN : 2799-18

compounds published in the past two years that have been cited above indicate that there is not a lack of new chemical diversity in this field. Technological advances summarized above which can accelerate lead identification and natural product structural elucidation, as well as scale-up and manufacture of final drug products, are encouraging. The large number of compounds derived from natural product sources that are currently undergoing evaluation in clinical trials is another positive indicator that natural product discovery provides good value for human medicine. Likewise, the increase in unmet medical needs arising from both a better understanding of disease *via* the human genome project, as well as from the development of resistance among many of the disease pathogens that historically have been controlled provides ample opportunity to rationalize drug discovery from natural products within the pharmaceutical industry.

REFERENCES

[1] D. Choi, S. Lee, D. Won and S. Kim, "Efficient Secure Group Communication for SCADA", IEEE Trans. Power Del., vol. 25, no. 2, **(2010)**, pp. 714-722.

[2] V. S. Miller, "Use of elliptic curves in cryptography," in Advances in Cryptology. Berlin, Germany: Springer-Verlag, 1986, pp. 417–426.

[3] Satyanarayana Vollala, B. Shameedha Begum and N. Ramasubramanian, Hardware Design for Multiplicative Modular Inverse, 2015 International Conference on Computing and Network Communications (CoCoNet'15), 16-19 Dec., 2015.

[4] C. McIvor, M. McLoone, and J. V. McCanny, "Modified Montgomery modular multiplication and RSA exponentiation techniques," IEEE Proc.- Comput. Digit. Techn., vol. 151, no. 6, pp. 402–408, Nov. 2004.

[5] Y. S. Kim, W. S. Kang, and J. R. Choi, "Asynchronous implementation of 1024-bit modular processor for RSA cryptosystem," in Proc. 2nd IEEE Asia-Pacific Conf. ASIC, Aug. 2000, pp. 187–190.

[6] A. L. Toom, " The complexity of a scheme of functional elements realizing the multiplication of integers," Soviet Mathematics Doklady, vol. 3,pp. 714–716,1963.

[7] A. Zanoni, "Toom-Cook 8-way for Long Integers Multiplication," 2009 11th International Symposium on Symbolic and Numeric Algorithms for Scientific Computing, Timisoara, 2009, pp. 54-57.

[8] C. D. Walter,"Montgomery exponentiation nedds no final substractions." Electronics Letters,vo. 35,no. 21,pp. 1831-1832.Oct 1999.

[9] J. Ding and S. Li, "Broken-Karatsuba multiplication and its application to Montgomery modular multiplication," 2017 27th International Conference on Field Programmable Logic and Applications (FPL), Ghent, 2017, pp. 1-4.

VOLUME-2 ISSUE-4
ISSN : 2799-18

[10] J. C. T. Chow, K.Eguro, W. Luk, and P. Leong, ”A Karatsuba-Based Montgomery Multiplier,” in 2010 International Conference on Field Programmable Logic and Applications, Aug 2010,pp.434–437.

[11] K. Javeed, X.Wang, and M. Scott, ”Serial and parallel interleaved modular multipliers on FPGA paltform,” in 2015 25th International Conference on Field Programmable Logic and Applications(FPL), Sept 2015,pp. 1–4.

[12] C. D. Walter,” Montgomery exponentiation nedds no final subtractions.” Electronics Letters,vo. 35,no. 21,pp. 1831-1832.Oct 1999.