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Exploration of synthetic strategies and biological assessment: Unveiling the potential of some natural and marine natural compounds of medicinal interest

Abstract:

The need for efficient and practical synthesis of biologically active molecules remains one of the greatest intellectual challenges with which chemists are faced in the 21st Century. Throughout the ages humans have relied on Nature to cater for their basic needs, not the least of which are medicines for the treatment of a wide spectrum of diseases. The synthesis of complex natural products continues to occupy an important position in organic chemistry research, not only because nature provides us with some of the most synthetically challenging molecules that we can ever aspire to synthesize, but also because research in this area frequently drives important breakthroughs in methodology. Structurally complex, biologically active naturally occurring substances of marine origin continue to spur the interest of both chemists and biologists as they demonstrate antiviral, antimicrobial, anti-oxidant, and many more biological activities. This is an important area to work on as the major challenge with the biologically active isolated natural products is their limited availability through natural resources and their isolation is very tedious and time consuming process. Further, they are usually isolated in very small quantities, hindering further studies to establish their biological activities as well as structural modifications and their constant supply from natural sources is problematic or virtually impossible. In addition, chemoselective derivatization of marine natural products themselves is usually quite difficult because of their sensitive and elaborate molecular structures, and access to their structural analogs is severely restricted in many cases. Therefore, chemical synthesis of natural and marine compounds in larger quantities and by sufficient means is necessary to investigate their biological implications and this strategic synthetic methodology is focused in our lab [1,2]. Further, considering significance of fluorine incorporation in heterocycles and taking an overview on their biological activities, synthesis of fluorinated analogues of some natural products is planned. An understanding of mechanism, coupled with knowledge of physicochemical properties affected by fluorine substitution has aided in rational drug design of many pharmaceutical agents. Design, strategic synthesis and significance of target molecules will be presented.

Biography

Sunita Bhagat is Professor, Department of Chemistry, ARSD College, University of Delhi. She has teaching and research experience of about thirty years and has published 55 research papers in various international and national journals of repute, authored three books, three book chapters and filed two patents to her credit. She has delivered talks and made presentations in more than forty international and national conferences/workshops. Currently she is Fellow, Delhi School of Public Health, Institute of Eminence, University of Delhi. She is recipient of many prestigious awards viz. Excellence Awards for Teachers March 2023, University of Delhi, INSA Teacher Award 2017, Chemistry Teacher Award for Excellence in Teaching and Research in 2014 by Coastal Chemical Research Society, Andhra University, Best Chemistry Teacher Award (Undergraduate category) in 2013 by Tata Chemicals, CII, Royal Society of Chemistry. She is carrying out research work actively in the area of Natural Product Synthesis, Fluorine Chemistry, Development of Fluorinating Reagents for Synthesis of Fluorinated Heterocycles of Biological Importance, Fluorination Strategies, Green Chemistry etc. She has been awarded many research projects from DST, SERB, ICMR, UGC and has supervised eleven Ph.D. students. She is a reviewer of a number of esteemed journals and member of many professional bodies viz. ACS, OWSD, RSC LONDON, Life Member of CRSI, ISCB, ISCA and IACT.