From the Editor's Desk

We sign off the International Year of Chemistry (IYC 2011) with this issue highlighting the importance of chemistry in understanding biological problems. It is noteworthy that chemistry has significantly started to contribute to overlapping areas in biology and materials chemistry. The Nobel Prize given to the discovery of quasicrystals stands as a resounding evidence to this new role adopted by chemistry. I, along with all the members of the editorial board record our special thanks to Professor G. Mugesh for his sincere efforts to bring this issue on chemical biology with an array of articles covering various aspects heralding the significance of chemistry in drug discovery at a molecular level. Year 2012 promises more from us, starting with an issue on sustainable technologies edited by Professors Chanakya and Reddy followed by two issues on nanobiotechnology and cancer by guest editors Professor Ghosh and Professor Kondiah respectively. The last issue of 2012 will be related to neurosciences to be edited by Shymala Mani. I am sure we look forward to these reviews in 2012 which incidentally also happens to be the year of sustainable technologies.

T. N. Guru Row
Editor
ssctng@sscu.iisc.ernet.in

Guest Editor's Desk

Chemical Biology and Drug Discovery

Chemical biology is an interdisciplinary area that highlights the importance of chemistry in understanding biological problems and that addresses the biosynthesis, metabolism and complex molecular rearrangements. This research area is growing very fast in recent years and is uniquely placed to increase our understanding of biological processes. Chemical biology methods in combination with drug discovery studies provide a unique approach to understand how diseases are controlled at the molecular and physiological level. The aim of this special issue is to highlight some of the new concepts and findings in the area of chemical biology and drug design.

This special issue consists of five articles that highlight some recent developments in the area of chemical biology and drug discovery. The first article by D.B. Ramachary and I. Kumar describes the concept of dynamic equilibrium related to chemical biology and drug development. This is an important concept in proteins and nucleic acids, which undergo conformational changes. In drug discovery, understanding of the dynamic equilibrium process is important as drug molecules exhibit different bioactive conformations. In the second article, B. Adhikari and A. Banerjee highlight various molecular self-assembly processes that play an important role in the construction of various nanostructures. They describe how peptides can be used as building blocks for different nanostructures and how peptide based nanostructures can offer various biological applications in tissue engineering, cell culture, regenerative medicine and drug delivery.

The third article by A.J. Bhattacharyya and S.S. Mandal describes the method of encapsulation of bio-relevant molecules in specially designed nanostructures to improve the molecular stability, activity and function desired for various biotechnological applications. They show that nanomaterials can be utilized to control specific chemical properties of biomolecules such as regioselectivity, enantioselectivity etc. The forth article by R. Thirupathi, S. Sravanthi, A. Kumar and E.N. Prabhakaran brings out the importance of protein-protein complexes and their roles in different biological processes. They discuss about the interactions of proteins along their surfaces, the nature of interacting domains and the effect of amino acid residues on the interaction characteristics of protein-protein complexes. They conclude that these amino acid residues may become prime targets for drug design and therapeutics. In the fifth article,

P. Ghosh discusses about different methods for efficient construction of C–C or C-heteroatom bonds in chemo- and regioselective fashion, which are useful for the synthesis of organic compounds related to drug discovery. He concludes that the late-transition metal catalysts based on N/O-functionalized N-heterocyclic carbenes can be used for a variety of synthetically useful organic transformations.

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Prof. G. Mugesh
Associate Professor
Department of Inorganic and
Physical Chemistry, IISc
mugesh@ipc.iisc.ernet.in