

## New initiatives in organic chemistry research funding

Science and Engineering Research Council (SERC) of the Department of Science and Technology, through its Program Advisory Committee (PAC) on Organic Chemistry, has launched a new initiative in organic chemistry research funding. The PAC on Organic Chemistry discussed the current scenario in the subject and identified problem areas at its first meeting held in June 2001. While it was generally felt that the quality of organic chemistry has improved over the years, it was recognized that a lot still needs to be done to encourage research in this area, especially among young researchers to remain at the internationally competitive level. So far, the approach of the PAC had been to examine proposals submitted to it by the project investigators, functioning as it were in a reactive manner. It was decided to go in additionally for a proactive mode of action and after a brainstorming meeting held in Madurai in September 2001, wherein 20 young researchers and a few senior scientists were invited, five areas were identified as being specially important and critical for organic chemistry as it is practised in India. These are: (i) C–H bond activation; (ii) Hybrid and pseudo-natural products; (iii) Chemistry in supercritical and ionic liquids; (iv) Polymorphism in molecular crystals; and (v) Structural and functional mimicry of bio-systems. These areas were selected with the following considerations in mind: (a) scientific importance and topicality; (b) existing strength in the country; (c) importance in a fundamental and/or applied context; (d) feasibility in India and yet challenging to carry out; (e) areas wherein the gap between India and the advanced countries is not overwhelmingly large; (f) spread across different areas of this vast discipline. These five topics combine classical synthesis, biological and materials applications, organometallic chemistry, supramolecular chemistry and green chemistry.

As pointed out by Whitesides (*Nature*, 2001, **410**, 749), organic chemistry is happening not only at the core (synthesis), but is thriving in border areas as well (biology, materials science and chemical engineering). While one of the identified areas, namely, hybrid and

pseudo-natural products represents the core area – classical synthesis, the others represent border areas. C–H bond activation (representing the border area with inorganic chemistry) is important because it can result in the production of essential chemicals in an economical way. Supercritical and ionic liquids (bordering environmental chemistry and chemical engineering) have been receiving a lot of attention because of their importance in green chemistry. Polymorphism (which borders with materials science), has a definite role to play in drug formulation and structural and functional mimicry (with biology as a border area) is increasingly becoming important as biology turns from cataloguing the genome to understanding the functions of proteins.

These five areas were given wide publicity and were advertised in *Current Science* (25 December 2001) inviting proposals. Twenty eight proposals were received in all the 5 areas, and they were subjected to critical peer review, which was more rigorous than normal projects. While most of the 28 proposals were considered to be worthy of funding as normal projects, 7 were identified for support under the ‘invited category’ as they were significantly innovative and contemporary. One project deals with the synthesis of a few hybrid natural products (taxasugar hybrids) by coupling active portions of two natural products – taxol and eleutherobin-, and their biological evaluation. This investigation is expected to help in proposing a suitable common pharmacophore combining features of taxol and eleutherobin. Another project deals with the synthesis of dendritic cluster glycosides, and formation of self-assembled monolayers of these clusters on gold surfaces with a view to quantitatively assess the binding of dendrimer clusters to lectins. This project imaginatively combines the features of supramolecular and physical organic chemistry, and might help in unraveling the nature of interactions between carbohydrates and proteins. A project on ionic liquids proposes synthesis of a series of ionic liquids based on dialkyl imidazolium salts and their use as functional and environmentally benign solvents for

various organic transformations with a potential towards commercial exploitation. Among the two projects funded on polymorphism, one proposes to systematically study the phenomenon in systems such as 4,4-diphenyl-2,5-cyclohexadienone and pyrazine-2-carboxamide and the other deals with pseudopolymorphism in a family of host–guest compounds based on cyclitol derivatives. These investigations have significance both from a fundamental and a pharmaceutical point of view. A project on biomimicry deals with the design and synthesis of structural and functional mimics of phosphoglycan family of cell surface molecules expressed by the *Leishmania* parasite, and another focusses on the synthesis of backbone-modified dinucleotides and their abilities to bind and inhibit angiogenin, a study that has implications in cancer therapy.

These projects were from younger researchers who have either been consistently publishing in high quality journals, or were considered to have high promise. Most of these projects have two distinct components and more than one investigator, wherein the co-investigator also has a definite role to play. It is expected that high quality work resulting in publications in high impact factor journals will come out of these projects. The exercise is by no means over and in trying to build up a critical mass of high quality research in the country, it was felt necessary to advertise again and invite proposals in these areas as well as in 5 new areas (page 1280 of this issue). These 5 new areas are: (i) Organic reactions in aqueous media; (ii) Atom economy in organic processes; (iii) Self assembly; (iv) Bio-conjugates; and (v) Molecular materials. It is hoped that this initiative will encourage competent researchers, who are otherwise reluctant to venture into ‘risky’ areas, to submit projects and to carry out contemporary research so as to make a real impact at the international level.

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