Glycerol and carbohydrate based amphiphilic architectures for biomedical applications

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Targeted drug delivery using nanocarriers, which addresses specific tissues or organs in the human body, is an area of research interest that has gained significant attention in recent years. Polymeric micelles with a characteristic core-shell structure are useful nanocarriers for systemic and controlled delivery of drugs due to their high loading, small size, longer duration of circulation in the body, and passive accumulation in tissues. Furthermore, the size, stability and morphology of polymeric architectures are found to be sensitively dependent on the molecular structure as well as their physico-chemical properties. Thus, the fabrication of defined structures and morphologies has been a persistent challenge in the field of polymer synthesis.
We have designed and developed a cleaner and greener chemo-enzymatic method for the synthesis of new bio-based building blocks i.e. carbohydrates and glycerol for the synthesis of amphiphilic polymeric architectures. These polymeric architectures form nano-sized aggregates in aqueous medium and are capable of encapsulating hydrophobic drugs and dyes.
The synthetic methodology, characterization and transport study results will be discussed during the symposium [1-10].

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BIO

Dr. Sunil K. Sharma joined the Department of Chemistry in March 2004 as Associate Professor and appointed full Professor in March 2010. He obtained BSc (Hons), MSc, and PhD degrees from the University of Delhi, India. His doctoral work was in the areas of synthetic and natural product chemistry. He has Postdoctoral / Visiting Scientist research experience of more than ten years at Freie Universitat Berlin (Germany), Massachusetts Institute of Technology (MIT, USA), University of Massachusetts (USA), Boston College (USA), Copenhagen University & University of Southern Denmark (Denmark), University of Liverpool (UK), and CSIC (Spain). He is a recipient of DBT-CREST Award (2011), DBT Overseas Associate Award (2007), International Authors Award from Royal Society of Chemistry (UK, 1999), and fellowships from University Grants Commission (India, 1986), Spanish Ministry of Education and Science (Spain, 1993), Danish International Development Agency (Denmark, 1996), and NIH (USA, 2000). Prof. Sharma's current research interests focus on Organic synthesis, Bio-catalysis, Stimuli-responsive polymer-based functional materials and Nanotechnology. Prof. Sharma has published over 167 peer reviewed journal papers with: average impact 4.3; total citations 5600 ; i10 index 133; H-index 38. Presently Prof. Sharma has a research group of seven PhD students. Twenty three PhD and two MPhil degrees have been awarded to students under his supervision. He has been granted research projects funded by BIRAC-DBT, CSIR, DBT, SERB-DST, DRDO, Government of India, Indo-German Science & Technology Center (IGSTC), Polytechnic University, New York (USA), and University of Delhi. Professor Sharma is having active research collaborations with various National and International (Germany, Italy, USA) groups. He has been the part of key office bearers of many National and International Conferences organized by the Department.