Pharmaceut Reg Affairs 2012, 1:4
http://dx.doi.org/10.4172/2167-7689.S1.008

OMICS Group Conferences
Accelerating Scientific Discovery

2nd International Conference and Exhibition on
Pharmaceutical Regulatory Affairs

November 23-24, 2012 Hyderabad International Convention Centre, India

Highly facile chemoenzymatic synthesis of complex sialic acids

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Carbohydrates containing sialic acid play pivotal roles in many pathologically and physiologically important biological processes such as cellular recognition, adhesion, migration, invasion, and communication, bacterial and viral infection, and tumor metastasis etc. Compared to five- or six- carbons monosaccharides, sialic acids contain a 9-carbon backbone and are much more structurally complex molecules. They have been predominantly found as the terminal carbohydrate units on glycoproteins and glycolipids of vertebrates, as well as components of capsular polysaccharides or lipooligosaccharides of pathogenic bacteria and represent the most important recognition elements as terminal sugars. Three basic forms of sialic acids include Neu5Ac, Neu5Gc, KDN, and their structural modifications with different substitutions lead to more than 50 different naturally occurring sialic acids that further increases the complexicity of sialic acid-containing structures. To investigate their biological significances, homogenous sialosides especially naturally occurring sialic acid variations on disialyl structures are needed. In this text a detailed discussions about an efficient two-step multienzyme approach for the synthesis of a series of GD3 ganglioside oligosaccharides and other disialyl glycans containing a terminal Siaα2−8Sia component with different natural and non-natural sialic acids will be presented.

Biography

Vinod K. Tiwari was born in Bihar, India in 1976. After his M.Sc. (1998) from Banaras Hindu University, he worked on Carbohydrate based Biodynamic Agents with Dr. R. P. Tripathi at Central Drug Research Institute, Lucknow, India since 2000 and awarded PhD from JNU, New Delhi (2004). He has interest on Benzotriazole Methodology since 2005 through his Postdoctoral research with Prof. A. R. Katritzky, UF, USA. He worked on 'Chemoenzymatic synthesis of Complex Carbohydrate based Molecules' as visiting post-doctoral fellow with Prof. Xi Chen at University of California, Davis, USA (2007) and then on '"Novel Intramolecular Glycosidic Bond Formation Methodology' as visiting Scientist with Prof. Dr. Richard R. Schmidt at Universitat Konstanz, Germany. He was offered a Lecturership at Bundelkhand University, Jhansi (2004-2005) before being appointed in BHU, India (2005-continued) where he started his independent research career. He has over 90 publications including 08 Patents of high national and international repute. His research received many prestigious awards mainly Dr. D. S. Bhakuni Award, Indian Chemical Society (2004); Young Investigator Prize (2004); DST Fast Track Research for Young Scientist (2005), Most Cited Paper Award (2006); Vidya Ratan Award and Gold Medal (2008), NESA Gold Medal (2010), Dr Arvind Kumar Memorial Award, Indian Council of Chemist (2010), UP CST Young Scientist Award (2010), Prof. R C Shah Memorial Award, Indian Science Congress (2011), Prof. Ghanshyam Srivastava Memorial Award-2012, Indian Chemical Society, etc. He supervised for five PhD Thesis and six MSc project. He has wide experience in Editorial job for Book Review as well as Journal where recently he invited for the Editor Position for Journal "Trends Carbohydrate Res" and recently managing as Facilitator to publish special Arkivoc issue. His recently edited book review on "Opportunity, Challenge and Scope of Natural Products in Medicinal Chemistry" received great citations. He delivered numerous invited lectures (over 50) at different university/institutes in India, USA, and Germany.

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