J Biotechnol Biomater 2012, 2:6
http://dx.doi.org/10.4172/2155-952X.S1.020

OMICS Group Conferences
Accelerating Scientific Discovery

3rd World Congress on
Biotechnology

September 13-15, 2012 Hyderabad International Convention Centre, Hyderabad, India

Selection of aptamers against cell surface biomarkers in cancer diagnosis

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Nucleic acid aptamers can be selected from pool of randomly sequenced oligonucleotides to bind a wide range of biomedically significant proteins with high affinities and specificities that are comparable to antibodies. While efforts to identify disease-specific biomarkers using a variety of technologies has increased, effective use of disease-specific biomarkers is still scarce. Additionally, it is straight forward to conjugate aptamers to other agents without losing their affinity and they have successfully been used in vitro and in vivo to deliver drugs, siRNA, nanoparticles or contrast agents to target cells. Hence, aptamers identified against cell surface biomarkers represent a promising class of ligands to detect specific type of cancer cells. Specific Cell-SELEX method has been developed to identify aptamers for cell surface associated proteins as well as some of the methods that are used to study their binding to living cells. In contrast to conventional methods, the novelty of cell-SELEX-based biomarker discovery is rooted in its focus on finding specific cell membrane markers. Moreover, cell- SELEX does not require any prior knowledge on the molecular contents of the cell surface. Trillions of random DNA sequences in the initial DNA library, combined with the unique negative selection strategy, ensures that any disease marker molecules on cell membranes can be recognized whether they are known or unknown to us. Provided the molecules in question are expressed in a substantially different way on diseased and normal cells, they can be identified. In addition, the aptamers generated during this process can serve as high-affinity and specific probes for the identified biomarkers. This will be great advancement in future diagnostic applications for cancer therapy.

Biography

Arghya Sett completed his MTech in Biotechnology from VIT University. He is currently pursuing his PhD in Dept. of Biotechnology, IIT Guwahati. His current research interest is in development of novel molecular marker based breast cancer diagnostics.

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Culture-dependent diversity of actinomycetes in Indian solar salterns

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Solar salterns are extreme, hypersaline environments in many tropical and subtropical regions throughout the world. In India, there are several coastal solar salterns along the coastal lines but their actinomycetes diversity was largely unexplored. In the present study, soil sediments were collected from ponds of solar salterns and subjected to detailed physico-chemical analysis. Actinomycetes were selectively isolated by employing selective processing methods and agar media. Twelve representatives were selected from entire actinomycete isolates by Amplified Ribosomal DNA Restriction Analysis (ARDRA) with restriction endonuclease HaeIII. Sequencing and analysis of 16S rDNA from chosen representative isolates displayed the presence of members of bacterial genera: Streptomyces, Micromonospora, Nocardia, Nocardiapsis, Sacropolyspora and Nonomurae. The genus Streptomyces was found to be the dominant followed by Micromoonopora among the actinomycete isolates. To our knowledge, the presence of a rare actinomycete species, Nonomurae was revealed for the first time from Indian solar salterns. As actinomycetes encompass recurrently foremost sources of biotechnologically important members of the microbial communities, the actinomycetes retrieved from the Indian saltern sediments left platform to search for novel biotechnologically significant substances for bio-pharmaceutical applications.

Keywords: Actinomycetes, Diversity, Solar saltern, 16S rDNA, ARDRA.

Biography

Arul Jose Polpass has completed M.Sc., M.Phil in Biochemistry and serviced as Lecturer at N.M.S.S.V.N. College, Madurai, India. Now, he is pursuing his Ph.D with Meritorious Student Research Fellowship from UGC under the guidance of Prof. RD. Jebakumar Solomon from Madurai Kamaraj University, Madurai, India.

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