

COTTON Innovate



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INSTITUTE RESEARCH COMMITTEE MEETING

Institute Research Committee (IRC) meeting was held at CICR, Nagpur from 20th to 22nd of March 2014. The IRC meeting was presided by Dr. K. R. Kranthi, Director, CICR, Nagpur. Mr. K. Velmourougane, IRC, Secretary welcomed the Chairman, IRC, Heads of various Divisions, Heads, Regional Stations and all the scientists. The RAC recommendations and QRT recommendations were presented by Dr. M.V. Venugopalan, Head, PME Unit. All the Scientists of CICR, Nagpur, CICR, RS, Coimbatore and CICR, RS, Sirsa presented the research achievements during 2013-2014 and future plan of work for 2014-15.



LITERATURE SCAN

DNA Clamp

The DNA clamp is designed to recognize complementary DNA target sequences like a clamp-switch. As soon as it recognizes them, it binds with them to form a stable triple helix structure, fluorescing at the same time and identifies single point mutations. DNA triplexes are formed through Hoogsteen hydrogen bonding of double-stranded DNA stretches in a sequence-specific manner by Triplex-forming oligonucleotides (TFOs) which bind to the major groove of homopurine and homopyrimidine. TFOs / TFOs conjugate added to reactive molecules can be used to direct sequence-specific DNA damage and results in the induction of several DNA metabolic activities. Triplex technology is highly utilized as a tool to study

- Gene regulation,
- Molecular mechanisms of DNA repair,
- Recombination,
- Mutagenesis and
- Therapeutics to modulate DNA structure and function

Nanometer-scale DNA clamp, recognizes genetic mutations more strongly and specifically. The DNA clamp acts as a diagnostic nano machine. It's capable of detecting genetic mutations. The nucleotide sequence that makes up a DNA strand is altered; it is understood to be a mutation. Even if one single nucleotide base has been inserted, deleted or changed, it can change the entire DNA sequence called as a single point mutation. The DNA clamp (nano machine) accurately differentiates between mutant and non-mutant DNA. DNA repair pathways can interact in concert or compete with each other in processing DNA lesions directed by TFOs. Triplet forming oligonucleotide target Sequence (TTS) is large in all the genome, display a high frequency of single nucleotide polymorphisms (SNPs). Using SNP prediction software, Pupus View, can be mapped SNPs in the genome provided by Ensemble. Contemporary research is focused on improving the effectiveness of this approach to genome modification primarily through chemical modifications of TFOs and improved cellular delivery systems. Though restrictions still exist, triplex technology has been a key strategy in moving the field of targeted genome manipulation forward.

LITERATURE SCAN

References:

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Anirban Mukherjee and Karen M. Vasquez. Triplex technology in studies of DNA damage, DNA repair, and mutagenesis. Biochimie. 2011 August; 93(8): 1197–1208. DOI:10.1016/j.biochi.2011.04.001

Contributed by Dr. J. Amudha, Senior Scientist, Biotechnology Division, CICR, Nagpur

The above literature scan was awarded with cash prize under 'Most Exciting Discoveries in Agricultural sciences after 2010' as a part of National Science day Celebration 2014 under Scientists' category.



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