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TMI-seq: Tn5 Transposase Mediated Production of Complex Libraries for Short Read Sequencing

Tech ID: 32761 / UC Case 2015-974-0

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INVENTORS

- Cole, Charles
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OTHER INFORMATION

KEYWORDS

Illumina (R) sequencing, Short Read Sequencing, Transposase, Tn5, TMI-Seq, Antibody sequencing, Immune Repertoire Sequencing, cDNA libraries

CATEGORIZED AS

- **Biotechnology**
  - Bioinformatics
- **Research Tools**
  - Nucleic Acids/DNA/RNA

RELATED CASES

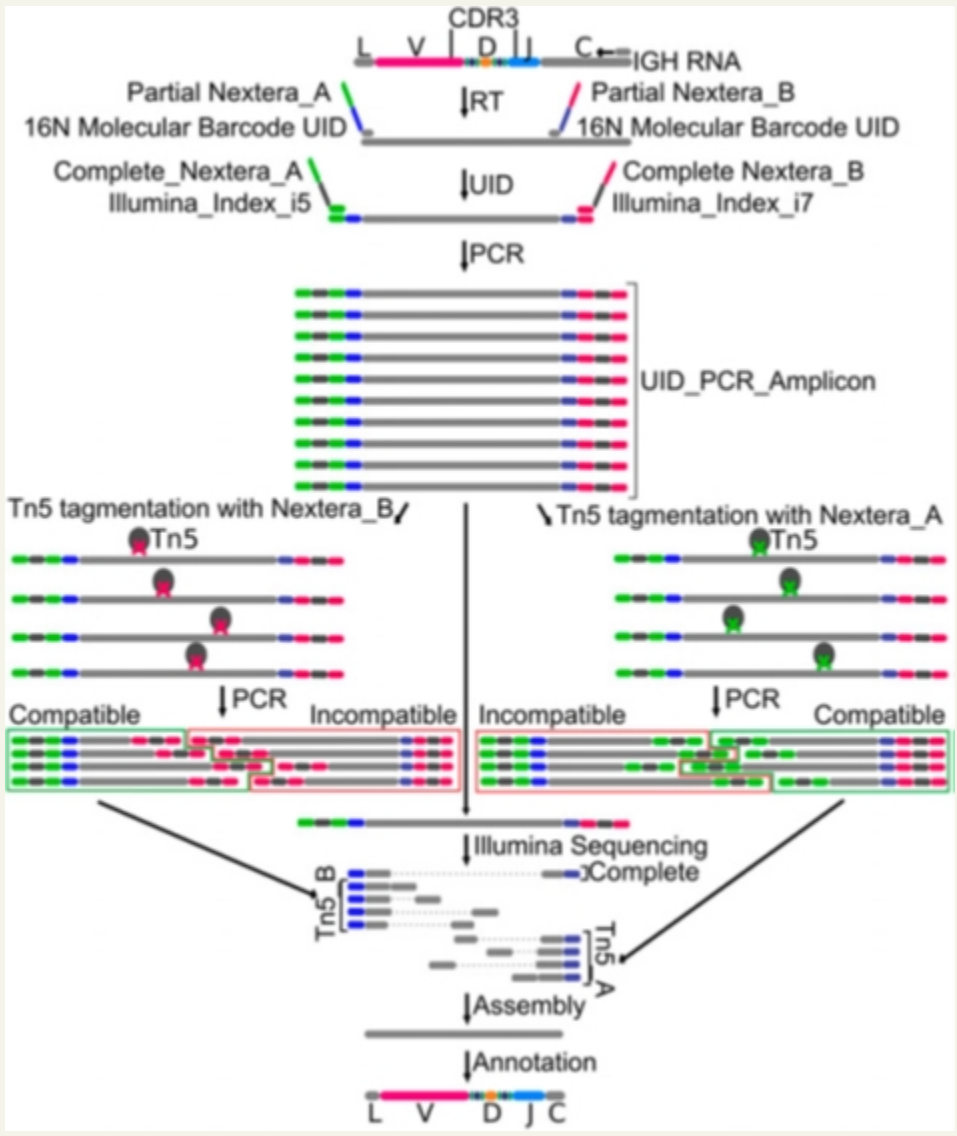
2015-974-0

BACKGROUND

Although Next Generation Sequencing has vastly improved sequencing throughput while reducing sequencing costs, preparation of nucleic acid libraries for sequencing has become a bottleneck. In addition, it is difficult using short read next generation sequencing to assemble highly variable sequences that exceed 500 base pairs such as cDNAs derived from antibody heavy chain, antibody light chain, and T cell variable regions RNA.

TECHNOLOGY DESCRIPTION

The technology, termed “TMI-seq” is a library preparation that combines molecular barcoding of individual molecules with “tagmentation” – a process by which the TN5 transposase both fragments and adds tags to DNA. In one use of the method, RNA is reverse transcribed to integrate a molecular barcode and a partial forward and reverse sequencing primer. It is then amplified by PCR, which integrates index sequences and full forward and reverse sequencing primers to yield a full length cDNA library. One aliquot of the library is tagmented with Tn5 and the forward sequencing primer, resulting in a library of barcoded overlapping fragments focused on the 5’ region of the target sequence. A second aliquot is tagmented with Tn5 and the reverse sequencing primer, resulting in a library of barcoded overlapping fragments focused on the 3’ region of the target sequence.



APPLICATIONS

- RNA → cDNA library sequencing
- Sequencing of T Cell receptors and antibodies

ADVANTAGES

- Fast prep and accurate assembly for short read sequencers like Illumina sequencers.
- High quality data from immune repertoire sequences
- Accurate TCR and antibody repertoire sequences

INTELLECTUAL PROPERTY INFORMATION

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,319,576	05/03/2022	2015-974
United States Of America	Issued Patent	10,280,449	05/07/2019	2015-974

RELATED MATERIALS

- Cole et al, Highly Accurate Sequencing of Full-Length Immune Repertoire Amplicons using Tn5-Enabled and Molecular Identifier-Guided Amplicon Assembly, J Immunol 2016; 196:2902-2907 - 02/01/2016

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Simplified Workflow For Hybridoma Antibody Sequencing

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