

LeXPrep IGTR Multiplex PCR Library Prep Kit

Background

The immune system serves as the core defense mechanism against foreign and harmful invaders in the human body. As the "special forces" of adaptive immunity, B lymphocytes recognize antigens via B cell receptors (BCRs, i.e., immunoglobulins, IG), while T lymphocytes utilize T cell receptors (TCRs/TRs) to initiate precise immune responses. The collective diversity of functional BCRs and TCRs within an individual constitutes the immune repertoire. Its dynamic characteristics determine the breadth and efficacy of antigen recognition and response, while also reflecting the evolution of immune status.

The N-nucleotides region of IG and TR molecules contains a highly variable domain termed the variable (V) region. Within the V-segments, three hypervariable loops—complementarity-determining regions (CDR1, CDR2, and CDR3)—serve as antigen-binding domains. Among them, CDR3 is formed through V(D)J recombination, involving the joining of V-genes with diversity (D)-, and joining (J)-segments. Due to nucleotide insertions or deletions at V(D)J junctions, CDR3 exhibits the highest diversity and directly interacts with antigens, making it the focal point for immune repertoire analysis.

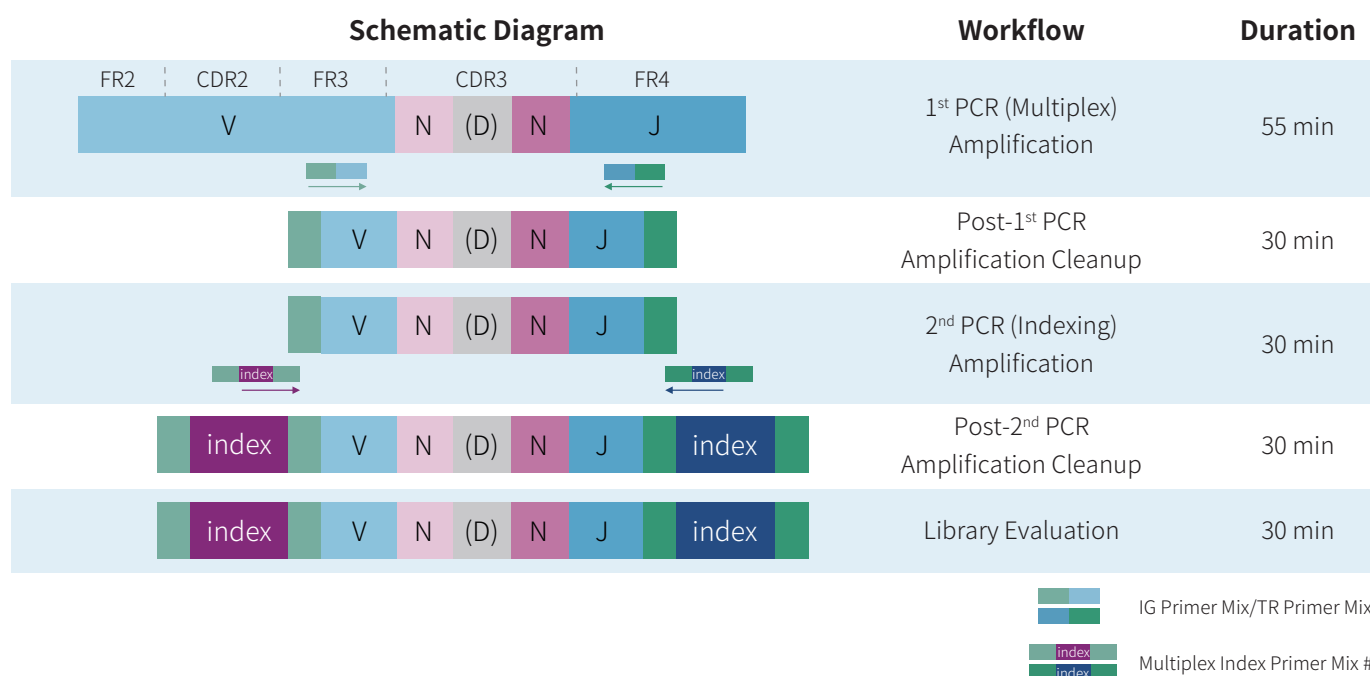
Introduction

LeXPrep IGTR Multiplex PCR Library Prep Kit is multiplex amplification-based library preparation kit. It utilizes hundreds of primers targeting *IGH*, *IGL*, *IGK*, *TRA*, *TRB*, *TRG*, and *TRD* loci for adaptive immune antigen receptors to efficiently enrich CDR3 regions across the immune repertoire, enabling precise assessment of B and T cell diversity and clonality via NGS.

This kit features a modular primer design with two independent primer mixes: IG Primer Mix (covering *IGH/IGL/IGK*) and TR Primer Mix (covering *TRA/TRB/TRG/TRD*), supporting both single-tube (IG or TR) and dual-tube (IG + TR) workflows.

This kit supports 50-2,000 ng of gDNA or cDNA (reverse transcription to generate 1st-strand cDNA) as initial samples. Libraries can be sequenced directly on Illumina® platforms or circularized using the LeXPrep Universal Circularization Kit v2 (Cat # LX02241) for MGI platforms. PE150 sequencing is recommended.

Workflow



Performance

Flexible Combination of IG/TR Primer Mixes in Separate Tubes for Precise Amplification of Target Regions

Spiking 0.001% of a mixture of RAMOS and JURKAT cell line gDNA into 2 µg leukocyte-derived gDNA, libraries were prepared using LeXPrep IGTR Multiplex PCR Library Prep Kit, with independent amplification (IG-only or TR-only) or combined amplification (IG + TR).

Table 1. Clone list generated by analysis tool.

Source		Clone List Generated by Analysis Tool							
Cell Line	Gene	CDR3 Sequence	IG Single-tube		TR Single-tube		IG + TR Dual-tube		
			Reads	Count	Rank	Reads	Count	Rank	
RAMOS	IGH	TGTGCGAGAGTTATTACTAGGGCGAGTCTGGCACAGACGGGAGGTACGGTATGGACGTCTGG	79	19,239	-	-	11	158,828	
	IGK	TGTCTACAACATGATAATTTCCCTCTAGATGTACACTTTT	91	17,040	-	-	7	240,949	
	IGL	TGCACCTCATATACAAACGACAGCAATTCTCAGGTATTC	401	1,117	-	-	173	1,462	
	IGL	TGCTGCTCATATGCAGCTAGTAGCACTTAAGGTGTTC	182	6,785	-	-	110	3,384	
JURKAT	TRA	TGTGCTGTGAGTGATCTCGAACCGAACAGCAGTGCTTCCAAGATAATCTTT	-	-	83	4,903	91	5,076	
	TRB	TGTGCCAGCAGTTTCTCGACCTGTTCTGGCTAACTATGGCTACACCTTC	-	-	53	14,543	61	12,668	
	TRG	TGTGCCTGTCAGATCCTCACAGGGCGGGTTTAAGAACTCTTT	-	-	12	143,279	119	2,866	
	TRG	TGTGCCACCTGGAAATTTATTATAAGAACTCTTT	-	-	22	74,346	5	296,057	

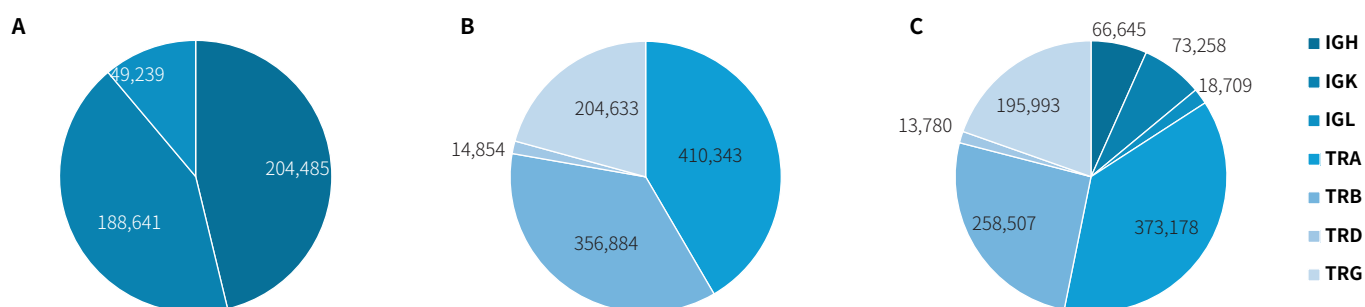


Figure 1. CDR3 diversity analysis using the LeXPrep IGTR Multiplex PCR Library Prep Kit. A. IG Primer Mix (single tube) (on-target: 86.49%); **B.** TR Primer Mix (single tube) (on-target: 93.36%); **C.** IG Primer Mix + TR Primer Mix (dual tubes) (on-target: 91.62%).

Note: Sequencing was performed on NovaSeq 6000 (PE150) with data of 2~2.4 Gb for analysis.

Ordering Information

Product	Detail	Catalog#
LeXPrep IGTR Multiplex Library Prep Kit, 6 rxn	Index #1-6	LX30001
LeXPrep IGTR Multiplex Library Prep Kit, 96 rxn	Index #1-24	LX30002

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LexigenBio Inc.
support@lexigenbio.com
www.lexigenbio.com
 521 Cottonwood Dr Suite 121, Milpitas, CA 95035