

**Table S2. Primer sequences**

RT for Set-2	Name	Sequence (5' → 3')
SMART template-switching oligo <sup>2b</sup>	TSO-biog	/5Biosg/CCAAGCTGGCTAGCACCATGACAGrGrGrG
SMART template-switching oligo <sup>2b</sup>	TSO-P1	/5Biosg/CCAAGCTGGCTAGCACCATGACAGctagctCAGrGrGrG
SMART template-switching oligo <sup>2b</sup>	TSO-P2	/5Biosg/CCAAGCTGGCTAGCACCATGACAGctagctCAGrGrGrG
SMART template-switching oligo <sup>2b</sup>	TSO-P3	/5Biosg/CCAAGCTGGCTAGCACCATGACAGctagctCAGrGrGrG
SMART template-switching oligo <sup>2b</sup>	TSO-P4	/5Biosg/CCAAGCTGGCTAGCACCATGACAGctagctCAGrGrGrG
SMART template-switching oligo <sup>2b</sup>	TSO-P5	/5Biosg/CCAAGCTGGCTAGCACCATGACAGctagctCAGrGrGrG
SMART template-switching oligo <sup>2b</sup>	TSO-P6	/5Biosg/CCAAGCTGGCTAGCACCATGACAGctagctCAGrGrGrG
SMART template-switching oligo <sup>2b</sup>	TSO-P7	/5Biosg/CCAAGCTGGCTAGCACCATGACAGctagctCAGrGrGrG
SMART template-switching oligo <sup>2b</sup>	TSO-P8	/5Biosg/CCAAGCTGGCTAGCACCATGACAGctagctCAGrGrGrG
SMART template-switching oligo <sup>2b</sup>	TSO-P9	/5Biosg/CCAAGCTGGCTAGCACCATGACAGctagctCAGrGrGrG
SMART template-switching oligo <sup>2b</sup>	TSO-P10	/5Biosg/CCAAGCTGGCTAGCACCATGACAGctagctCAGrGrGrG
SMART template-switching oligo <sup>2b</sup>	TSO-P11	/5Biosg/CCAAGCTGGCTAGCACCATGACAGctagctCAGrGrGrG
SMART template-switching oligo <sup>2b</sup>	TSO-P12	/5Biosg/CCAAGCTGGCTAGCACCATGACAGctagctCAGrGrGrG
gene-specific reverse primers	mlg-RV1	GAGATGGTTTCTCGATGGG
gene-specific reverse primers	mlg-RV1	GAATGGCCACATCGA
gene-specific reverse primers	mlg-RV1	CTAACACTCTTCTTGAAG
gene-specific reverse primers	mlg-L23-RV1	AGACATTCTCGAGAGACA
gene-specific reverse primers	mlg-L145-RV1	AACASTCAGCAGCGGACA

Primary PCR for Set-2	Name	Sequence (5' → 3')
Forward primer <sup>1</sup>	5Anchor-1	GGTAGatagctcCAAGCTGGCTAGCACCATGA
Forward primer <sup>1</sup>	5Anchor-2	GGTAGacagctcCAAGCTGGCTAGCACCATGA
Forward primer <sup>1</sup>	5Anchor-3	GGTAGgtagctcCAAGCTGGCTAGCACCATGA
Forward primer <sup>1</sup>	5Anchor-4	GGTAGgtagctcCAAGCTGGCTAGCACCATGA
Forward primer <sup>1</sup>	5Anchor-5	GGTAGgtagctcCAAGCTGGCTAGCACCATGA
Forward primer <sup>1</sup>	5Anchor-6	GGTAGgtagctcCAAGCTGGCTAGCACCATGA
Forward primer <sup>1</sup>	5Anchor-7	GGTAGgtagctcCAAGCTGGCTAGCACCATGA
Forward primer <sup>1</sup>	5Anchor-8	GGTAGgtagctcCAAGCTGGCTAGCACCATGA
Forward primer <sup>1</sup>	5Anchor-9	GGTAGgtagctcCAAGCTGGCTAGCACCATGA
Forward primer <sup>1</sup>	5Anchor-10	GGTAGgtagctcCAAGCTGGCTAGCACCATGA
Forward primer <sup>1</sup>	5Anchor-11	GGTAGgtagctcCAAGCTGGCTAGCACCATGA
Forward primer <sup>1</sup>	5Anchor-12	GGTAGgtagctcCAAGCTGGCTAGCACCATGA
Reverse primer for IgH	mlg-RV2	AOCYTCATTTGAAGCTCTTG

Secondary PCR for Set-2	Name	Sequence (5' → 3')
Forward primer <sup>1</sup>	5Anchor-1	GGTAGatagctcCAAGCTGGCTAGCACCATGA
Forward primer <sup>1</sup>	5Anchor-2	GGTAGacagctcCAAGCTGGCTAGCACCATGA
Forward primer <sup>1</sup>	5Anchor-3	GGTAGgtagctcCAAGCTGGCTAGCACCATGA
Forward primer <sup>1</sup>	5Anchor-4	GGTAGgtagctcCAAGCTGGCTAGCACCATGA
Forward primer <sup>1</sup>	5Anchor-5	GGTAGgtagctcCAAGCTGGCTAGCACCATGA
Forward primer <sup>1</sup>	5Anchor-6	GGTAGgtagctcCAAGCTGGCTAGCACCATGA
Forward primer <sup>1</sup>	5Anchor-7	GGTAGgtagctcCAAGCTGGCTAGCACCATGA
Forward primer <sup>1</sup>	5Anchor-8	GGTAGgtagctcCAAGCTGGCTAGCACCATGA
Forward primer <sup>1</sup>	5Anchor-9	GGTAGgtagctcCAAGCTGGCTAGCACCATGA
Forward primer <sup>1</sup>	5Anchor-10	GGTAGgtagctcCAAGCTGGCTAGCACCATGA
Forward primer <sup>1</sup>	5Anchor-11	GGTAGgtagctcCAAGCTGGCTAGCACCATGA
Forward primer <sup>1</sup>	5Anchor-12	GGTAGgtagctcCAAGCTGGCTAGCACCATGA
Reverse primer for IgH	mlgM-A	GGTAGgtagctcGAGGTGGCTAGGTASTTGCC
Reverse primer for IgH	mlgM-B	GGTAGgtagctcGAGGTGGCTAGGTASTTGCC
Reverse primer for IgH	mlgM-C	GGTAGgtagctcGAGGTGGCTAGGTASTTGCC
Reverse primer for IgH	mlgM-D	GGTAGgtagctcGAGGTGGCTAGGTASTTGCC
Reverse primer for IgH	mlgM-E	GGTAGgtagctcGAGGTGGCTAGGTASTTGCC
Reverse primer for IgH	mlgM-F	GGTAGgtagctcGAGGTGGCTAGGTASTTGCC
Reverse primer for IgH	mlgM-G	GGTAGgtagctcGAGGTGGCTAGGTASTTGCC
Reverse primer for IgH <sup>2</sup>	mlgM-H	GGTAGgtagctcGAGGTGGCTAGGTASTTGCC
Reverse primer for IgH	mlgG12b-A	GGTAGgtagctcGGGACAGTCACTGAGCTG
Reverse primer for IgH	mlgG12b-B	GGTAGgtagctcGGGACAGTCACTGAGCTG
Reverse primer for IgH	mlgG12b-C	GGTAGgtagctcGGGACAGTCACTGAGCTG
Reverse primer for IgH	mlgG12b-D	GGTAGgtagctcGGGACAGTCACTGAGCTG
Reverse primer for IgH	mlgG12b-E	GGTAGgtagctcGGGACAGTCACTGAGCTG
Reverse primer for IgH	mlgG12b-F	GGTAGgtagctcGGGACAGTCACTGAGCTG
Reverse primer for IgH	mlgG12b-G	GGTAGgtagctcGGGACAGTCACTGAGCTG
Reverse primer for IgH	mlgG12b-H	GGTAGgtagctcGGGACAGTCACTGAGCTG
Reverse primer for IgH	mlgG2ac-A	GGTAGgtagctcGAGGTACAGTCACTGAGCTG
Reverse primer for IgH	mlgG2ac-B	GGTAGgtagctcGAGGTACAGTCACTGAGCTG
Reverse primer for IgH	mlgG2ac-C	GGTAGgtagctcGAGGTACAGTCACTGAGCTG
Reverse primer for IgH	mlgG2ac-D	GGTAGgtagctcGAGGTACAGTCACTGAGCTG
Reverse primer for IgH	mlgG2ac-E	GGTAGgtagctcGAGGTACAGTCACTGAGCTG
Reverse primer for IgH	mlgG2ac-F	GGTAGgtagctcGAGGTACAGTCACTGAGCTG
Reverse primer for IgH	mlgG2ac-G	GGTAGgtagctcGAGGTACAGTCACTGAGCTG
Reverse primer for IgH	mlgG2ac-H	GGTAGgtagctcGAGGTACAGTCACTGAGCTG
Reverse primer for IgH	mlgG3-A	GGTAGgtagctcGGGTACAGTCACTGAGCTG
Reverse primer for IgH	mlgG3-B	GGTAGgtagctcGGGTACAGTCACTGAGCTG
Reverse primer for IgH	mlgG3-C	GGTAGgtagctcGGGTACAGTCACTGAGCTG
Reverse primer for IgH	mlgG3-D	GGTAGgtagctcGGGTACAGTCACTGAGCTG
Reverse primer for IgH	mlgG3-E	GGTAGgtagctcGGGTACAGTCACTGAGCTG
Reverse primer for IgH	mlgG3-F	GGTAGgtagctcGGGTACAGTCACTGAGCTG
Reverse primer for IgH	mlgG3-G	GGTAGgtagctcGGGTACAGTCACTGAGCTG
Reverse primer for IgH <sup>2</sup>	mlgG3-H	GGTAGgtagctcGGGTACAGTCACTGAGCTG

<sup>1</sup>/5Biosg/ represents a biotin at 5' end. There are three riboguanosines (rGrGrG) at 3' end.  
<sup>2</sup>These primers contain plate-associated barcodes (0-12) that are indicated in lowercase letters.  
<sup>3</sup>These primers contain well-associated barcodes (1-12) that are indicated in lowercase letters.  
<sup>4</sup>These primers contain well-associated barcodes (A-H) that are indicated in lowercase letters.

RT for Set-1	Name	Sequence (5' → 3')
gene-specific reverse primers	mlgG-RV1	GAGATGGTTTCTCGATGGG
gene-specific reverse primers	mlgK2-RV1	CAGGACCTTGTCTCTAACAC
gene-specific reverse primers	mlgL23-RV1	GTTCCYAGGCTAAGGAAAC
gene-specific reverse primers	mlgLC1-RT	CCTCTGTGGTAAATGAAAG
gene-specific reverse primers	mlgLC4-RT	CCTCTGTGGTAAAGTGAG

Primary PCR for Set-1	Name	Sequence (5' → 3')
Forward primer	mVH1-1	agRYcagctcaRcaigtct
Forward primer	mVH1-2	aggtccaacagccagccagc
Forward primer	mVH2	ctctctctctctctctctctct
Forward primer	mVH3	ctctctctctctctctctctct
Forward primer	mVH4	gaagtgaaagctctctctctct
Forward primer	mVH5	gaagtgaaagctctctctctct
Forward primer	mVH6	agtgactgagagctctctctctct
Forward primer	mVH7	ctctctctctctctctctctct
Forward primer	mVH8	ctctctctctctctctctctct
Forward primer	mVH9	ctctctctctctctctctctct
Forward primer	mVH10	ctctctctctctctctctctct
Forward primer	mVH11	atggagtggaagctctctctct
Forward primer	mVH12	agctctctctctctctctctct
Forward primer	mVH13	ctctctctctctctctctctct
Forward primer	mVH14	atgcaagctctctctctctctct
Forward primer	mVH15	ctctctctctctctctctctct
Forward primer	mVH16	ctctctctctctctctctctct
Reverse primer for IgH	mlgHC-RV2	GTTCAGCTGTCATTGAACTC

Secondary PCR for Set-1	Name	Sequence (5' → 3')
Forward primer <sup>1</sup>	mlgHV-FW-1	GGTAGatagctcGAGGTGACAGTGCAGGAGTCTGG
Forward primer <sup>1</sup>	mlgHV-FW-2	GGTAGacagctcGAGGTGACAGTGCAGGAGTCTGG
Forward primer <sup>1</sup>	mlgHV-FW-3	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Forward primer <sup>1</sup>	mlgHV-FW-4	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Forward primer <sup>1</sup>	mlgHV-FW-5	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Forward primer <sup>1</sup>	mlgHV-FW-6	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Forward primer <sup>1</sup>	mlgHV-FW-7	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Forward primer <sup>1</sup>	mlgHV-FW-8	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Forward primer <sup>1</sup>	mlgHV-FW-9	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Forward primer <sup>1</sup>	mlgHV-FW-10	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Forward primer <sup>1</sup>	mlgHV-FW-11	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Forward primer <sup>1</sup>	mlgHV-FW-12	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Reverse primer for IgH	mlgHC12b-RV-A	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Reverse primer for IgH	mlgHC12b-RV-B	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Reverse primer for IgH	mlgHC12b-RV-C	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Reverse primer for IgH	mlgHC12b-RV-D	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Reverse primer for IgH	mlgHC12b-RV-E	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Reverse primer for IgH	mlgHC12b-RV-F	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Reverse primer for IgH	mlgHC12b-RV-G	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Reverse primer for IgH	mlgHC12b-RV-H	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Reverse primer for IgH	mlgHC2ac-RV-A	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Reverse primer for IgH	mlgHC2ac-RV-B	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Reverse primer for IgH	mlgHC2ac-RV-C	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Reverse primer for IgH	mlgHC2ac-RV-D	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Reverse primer for IgH	mlgHC2ac-RV-E	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Reverse primer for IgH	mlgHC2ac-RV-F	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Reverse primer for IgH	mlgHC2ac-RV-G	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG
Reverse primer for IgH	mlgHC2ac-RV-H	GGTAGgtagctcGAGGTGACAGTGCAGGAGTCTGG

<sup>1</sup>These primers contain well-associated barcodes (1-12) that are indicated in lowercase letters.  
<sup>2</sup>These primers contain well-associated barcodes (A-H) that are indicated in lowercase letters.