

Illumina, Inc.
5200 Illumina Way
San Diego, CA 92122 U.S.A.
1.858.202.4500
1.858.202.4545 (fax)
www.illumina.com

August 12, 2014

Dear Customer,

We are providing this letter in response to your request for nucleotide sequence information about oligonucleotides used in Illumina sequencing technologies. As explained below, this letter and its contents are provided to you so you may understand and publish the results of your sequencing experiments.

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This letter is updated periodically to reflect current Illumina products. Please contact us for the most current version or if you have any other questions.

Sincerely yours,

Customer Solutions

1.858.202.4566

Illumina Nextera® Sample Preparation Kits^{1,2}

Nextera® DNA, Nextera® XT, Nextera® Enrichment, and Nextera® Rapid Capture

Nextera® transposase sequences

5' TCGTCGGCAGCGTCAGATGTGTATAAGAGACAG

(a) Read 1 -->

5' GTCTCGTGGGCTCGGAGATGTGTATAAGAGACAG

(d) Read 2 -->

Nextera® Index Kit - PCR primers

5' AATGATACGGCGACCACCGAGATCTACAC [i5] TCGTCGGCAGCGTC

(c) i5 Index read -->

5' CAAGCAGAAGACGGCATACGAGAT [i7] GTCTCGTGGGCTCGG

<-- i7 Index read (b)

Nextera® codes for entry on sample sheet

Naming for the i5 adapters varies for different products, with Nextera DNA using N50x, Nextera XT using S50x, and Nextera Enrichment and Nextera Rapid Capture using E50x. The i7 indexes use N7xx across the product line.

All 24-index and 96-index Nextera kits (including Nextera XT and Nextera Enrichment) use the following i5 and i7 indexes:

i5 bases for entry on sample sheet			
i5 bases in adapter	i5 index name	GA/HiSeq/MiSeq	NextSeq
TAGATCGC	[N/S/E]501	TAGATCGC	GCGATCTA
CTCTCTAT	[N/S/E]502	CTCTCTAT	ATAGAGAG
TATCCTCT	[N/S/E]503	TATCCTCT	AGAGGATA
AGAGTAGA	[N/S/E]504	AGAGTAGA	TCTACTCT
GTAAGGAG	[N/S/E]505	GTAAGGAG	CTCCTTAC
ACTGCATA	[N/S/E]506	ACTGCATA	TATGCAGT
AAGGAGTA	[N/S/E]507	AAGGAGTA	TACTCCTT

¹ Provided in reagents and used in methods protected by U.S. Patents 5,965,443; 6,437,109; and patents pending.

² Used in the methods of U.S. Patent 8,053,192 and 8,182,989.

CTAAGCCT	[N/S/E]508	CTAAGCCT	AGGCTTAG
GCGTAAGA	[N/S/E]517	GCGTAAGA	TCTTACGC

i7 bases in adapter	i7 index name	i7 bases for entry on sample sheet
TCGCCTTA	N701	TAAGGCGA
CTAGTACG	N702	CGTACTAG
TTCTGCCT	N703	AGGCAGAA
GCTCAGGA	N704	TCCTGAGC
AGGAGTCC	N705	GGACTCCT
CATGCCTA	N706	TAGGCATG
GTAGAGAG	N707	CTCTCTAC
CCTCTCTG	N708	CAGAGAGG
AGCGTAGC	N709	GCTACGCT
CAGCCTCG	N710	CGAGGCTG
TGCCTCTT	N711	AAGAGGCA
TCCTCTAC	N712	GTAGAGGA

The Nextera XT Index Kit v2 uses the following i5 and i7 indexes:

i5 bases for entry on sample sheet			
i5 bases in adapter	i5 index name	GA/HiSeq/MiSeq	NextSeq
CTCTCTAT	S502	CTCTCTAT	ATAGAGAG
TATCCTCT	S503	TATCCTCT	AGAGGATA
GTAAGGAG	S505	GTAAGGAG	CTCCTTAC
ACTGCATA	S506	ACTGCATA	TATGCAGT
AAGGAGTA	S507	AAGGAGTA	TACTCCTT
CTAAGCCT	S508	CTAAGCCT	AGGCTTAG
CGTCTAAT	S510	CGTCTAAT	ATTAGACG
TCTCTCCG	S511	TCTCTCCG	CGGAGAGA
TCGACTAG	S513	TCGACTAG	CTAGTCGA

TTCTAGCT	S515	TTCTAGCT	AGCTAGAA
CCTAGAGT	S516	CCTAGAGT	ACTCTAGG
GCGTAAGA	S517	GCGTAAGA	TCTTACGC
CTATTAAG	S518	CTATTAAG	CTTAATAG
AAGGCTAT	S520	AAGGCTAT	ATAGCCTT
GAGCCTTA	S521	GAGCCTTA	TAAGGCTC
TTATGCGA	S522	TTATGCGA	TCGCATAA

i7 bases in adapter	i7 index name	i7 bases for entry on sample sheet
TCGCCTTA	N701	TAAGGCGA
CTAGTACG	N702	CGTACTAG
TTCTGCCT	N703	AGGCAGAA
GCTCAGGA	N704	TCCTGAGC
AGGAGTCC	N705	GGACTCCT
CATGCCTA	N706	TAGGCATG
GTAGAGAG	N707	CTCTCTAC
CAGCCTCG	N710	CGAGGCTG
TGCCTCTT	N711	AAGAGGCA
TCCTCTAC	N712	GTAGAGGA
TCATGAGC	N714	GCTCATGA
CCTGAGAT	N715	ATCTCAGG
TAGCGAGT	N716	ACTCGCTA
GTAGCTCC	N718	GGAGCTAC
TACTACGC	N719	GCGTAGTA
AGGCTCCG	N720	CGGAGCCT
GCAGCGTA	N721	TACGCTGC
CTGCGCAT	N722	ATGCGCAG
GAGCGCTA	N723	TAGCGCTC
CGCTCAGT	N724	ACTGAGCG

GTCTTAGG	N726	CCTAAGAC
ACTGATCG	N727	CGATCAGT
TAGCTGCA	N728	TGCAGCTA
GACGTCGA	N729	TCGACGTC

TruSeq® Custom Amplicon or TruSeq® Amplicon – Cancer Panel**Codes for entry on sample sheet ^{2,3}****i5 bases for entry on sample sheet**

i5 index name	GA/HiSeq/MiSeq	NextSeq
A501	TGAACCTT	AAGGTTCA
A502	TGCTAAGT	ACTTAGCA
A503	TGTTCTCT	AGAGAACA
A504	TAAGACAC	GTGTCTTA
A505	CTAATCGA	TCGATTAG
A506	CTAGAACA	TGTTCTAG
A507	TAAGTTCC	GGAACCTA
A508	TAGACCTA	TAGGTCTA

i7 index name i7 bases for entry on sample sheet

A701	ATCACGAC
A702	ACAGTGGT
A703	CAGATCCA
A704	ACAAACGG
A705	ACCCAGCA
A706	AACCCCTC
A707	CCCAACCT
A708	CACCACAC
A709	GAAACCCA
A710	TGTGACCA
A711	AGGGTCAA
A712	AGGAGTGG

TruSeq® Targeted RNA Expression

Codes for entry on sample sheet ^{2,3}

i5 bases for entry on sample sheet

i5 index name	GA/HiSeq/MiSeq	NextSeq
A501	TGAACCTT	AAGGTTCA
A502	TGCTAAGT	ACTTAGCA
A503	TGTTCTCT	AGAGAACA
A504	TAAGACAC	GTGTCTTA
A505	CTAATCGA	TCGATTAG
A506	CTAGAACA	TGTTCTAG
A507	TAAGTTCC	GGAACCTA
A508	TAGACCTA	TAGGTCTA

i7 index name	i7 bases for entry on sample sheet	i7 index name	i7 bases for entry on sample sheet
R701	ATCACG	R725	ACTGAT
R702	CGATGT	R726	ATGAGC
R703	TTAGGC	R727	ATTCCT
R704	TGACCA	R728	CAAAAG
R705	ACAGTG	R729	CAACTA
R706	GCCAAT	R730	CACCGG
R707	CAGATC	R731	CACGAT
R708	ACTTGA	R732	CACTCA
R709	GATCAG	R733	CAGGCG
R710	TAGCTT	R734	CATGGC
R711	GGCTAC	R735	CATTTT
R712	CTTGTA	R736	CCAACA
R713	AGTCAA	R737	CGGAAT
R714	AGTTCC	R738	CTAGCT

R715	ATGTCA	R739	CTATAC
R716	CCGTCC	R740	CTCAGA
R717	GTAGAG	R741	GACGAC
R718	GTCCGC	R742	TAATCG
R719	GTGAAA	R743	TACAGC
R720	GTGGCC	R744	TATAAT
R721	GTTTCG	R745	TCATTC
R722	CGTACG	R746	TCCCGA
R723	GAGTGG	R747	TCGAAG
R724	GGTAGC	R748	TCGGCA

TruSeq® HT Sample Prep Kits ^{2,3,4}

TruSeq® DNA HT and TruSeq® Stranded RNA HT

D501–D508 adaptersAATGATACGGCGACCACCGAGATCTACAC [**i5**] ACACTCTTTCCCTACACGACGCTCTTCCGATCT**D701–D712 adapters**GATCGGAAGAGCACACGTCTGAACTCCAGTCAC [**i7**] ATCTCGTATGCCGTCTTCTGCTTG**Codes for entry on sample sheet** ^{2,3}**i5 bases for entry on sample sheet**

i5 index name	GA/HiSeq/MiSeq	NextSeq
D501	TATAGCCT	AGGCTATA
D502	ATAGAGGC	GCCTCTAT
D503	CCTATCCT	AGGATAGG
D504	GGCTCTGA	TCAGAGCC
D505	AGGCGAAG	CTTCGCCT
D506	TAATCTTA	TAAGATTA
D507	CAGGACGT	ACGTCCTG
D508	GTACTGAC	GTCAGTAC

i7 index name **i7 bases for entry on sample sheet**

D701	ATTACTCG
D702	TCCGGAGA
D703	CGCTCATT
D704	GAGATTCC
D705	ATTCAGAA
D706	GAATTCGT

³ For TruSeq process control sequences, see Appendix.⁴ Used in the methods of U.S. Patent 7,741,953.

D707	CTGAAGCT
D708	TAATGCGC
D709	CGGCTATG
D710	TCCGCGAA
D711	TCTCGCGC
D712	AGCGATAG

TruSeq[®] v1/v2/LT Sample Prep Kits ^{2,5}

TruSeq[®] DNA (v1/v2/LT), TruSeq[®] DNA PCR-Free, TruSeq[®] Nano DNA, TruSeq[®] RNA (v1/v2/LT), TruSeq[®] Stranded RNA LT, TruSeq[®] RNA Access, and TruSeq[®] ChIP

TruSeq Universal Adapter

5' AATGATACGGCGACCACCGAGATCTACACTCTTTCCCTACACGACGCTCTTCCGATCT

TruSeq Adapter, Index 1 ⁵

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACATCACGATCTCGTATGCCGTCTTCTGCTTG

TruSeq Adapter, Index 2

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACCGATGTATCTCGTATGCCGTCTTCTGCTTG

TruSeq Adapter, Index 3

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACTTAGGCATCTCGTATGCCGTCTTCTGCTTG

TruSeq Adapter, Index 4

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACTGACCAATCTCGTATGCCGTCTTCTGCTTG

TruSeq Adapter, Index 5

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACACAGTGATCTCGTATGCCGTCTTCTGCTTG

TruSeq Adapter, Index 6

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACGCCAATATCTCGTATGCCGTCTTCTGCTTG

TruSeq Adapter, Index 7

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACCAGATCATCTCGTATGCCGTCTTCTGCTTG

TruSeq Adapter, Index 8

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACACTTGAACTCTCGTATGCCGTCTTCTGCTTG

TruSeq Adapter, Index 9

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACGATCAGATCTCGTATGCCGTCTTCTGCTTG

TruSeq Adapter, Index 10

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACTAGCTTATCTCGTATGCCGTCTTCTGCTTG

TruSeq Adapter, Index 11

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACGGCTACATCTCGTATGCCGTCTTCTGCTTG

⁵ Index sequences are 6 bases as underlined. Please enter only these 6 bases on the sample sheet.

TruSeq Adapter, Index 125' GATCGGAAGAGCACACGTCTGAACTCCAGTCACCTTGTAATCTCGTATGCCGTCTTCTGCTTG**TruSeq Adapter, Index 13**5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACAGTCAACAATCTCGTATGCCGTCTTCTGCTTG**TruSeq Adapter, Index 14**5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACAGTTCCGATCTCGTATGCCGTCTTCTGCTTG**TruSeq Adapter, Index 15**5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACATGTCAGAATCTCGTATGCCGTCTTCTGCTTG**TruSeq Adapter, Index 16**5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACCCGTCCCGATCTCGTATGCCGTCTTCTGCTTG**TruSeq Adapter, Index 18⁶**5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACGTCGCACATCTCGTATGCCGTCTTCTGCTTG**TruSeq Adapter, Index 19**5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACGTAACGATCTCGTATGCCGTCTTCTGCTTG**TruSeq Adapter, Index 20**5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACGTCCTTATCTCGTATGCCGTCTTCTGCTTG**TruSeq Adapter, Index 21**5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACGTTTCGGAATCTCGTATGCCGTCTTCTGCTTG**TruSeq Adapter, Index 22**5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACCGTACGTAATCTCGTATGCCGTCTTCTGCTTG**TruSeq Adapter, Index 23**5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACGAGTGGATATCTCGTATGCCGTCTTCTGCTTG**TruSeq Adapter, Index 25**5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACACTGATATATCTCGTATGCCGTCTTCTGCTTG**TruSeq Adapter, Index 27**5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACATTCCTTTATCTCGTATGCCGTCTTCTGCTTG

⁶ Index numbers 17, 24, and 26 are reserved.

TruSeq® Synthetic Long-Read DNA Library Prep Kits

Long Reads Adapter

5' CCGGTTCTTCCCTGCCGAACCCTATCTTCGTCGGCAGCGTCAGATGTGTATAAGAGACAGTACG
CTTGCA

Double stranded DNA adapter containing long range PCR primer binding site, sequencing primer binding site, and end marker sequence.

TruSeq® Small RNA Sample Prep Kits**RNA 5' Adapter (RA5), part # 15013205**

5' GUUCAGAGUUCUACAGUCCGACGAUC

RNA 3' Adapter (RA3), part # 15013207

5' TGAATTCTCGGGTGCCAAGG

Stop Oligo (STP) ⁷

5' GAAUCCACCACGUUCCCGUGG

RNA RT Primer (RTP), part # 15013981

5' GCCTTGGCACCCGAGAATTCCA

RNA PCR Primer (RP1), part # 15013198

5' AATGATACGGCGACCACCGAGATCTACACGTTCTCAGAGTTCTACAGTCCGA

RNA PCR Primer, Index 1 (RPI1) ^{2,8}5' CAAGCAGAAGACGGCATACGAGATCGTGATGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 2 (RPI2)**5' CAAGCAGAAGACGGCATACGAGATACATCGGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 3 (RPI3)**5' CAAGCAGAAGACGGCATACGAGATGCCTAAGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 4 (RPI4)**5' CAAGCAGAAGACGGCATACGAGATTGGTCAGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 5 (RPI5)**5' CAAGCAGAAGACGGCATACGAGATCACTGTGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 6 (RPI6)**5' CAAGCAGAAGACGGCATACGAGATATTGGCGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 7 (RPI7)**5' CAAGCAGAAGACGGCATACGAGATGATCTGGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 8 (RPI8)**5' CAAGCAGAAGACGGCATACGAGATTCAAGTGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 9 (RPI9)**5' CAAGCAGAAGACGGCATACGAGATCTGATCGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

⁷ Patent pending.

⁸ Index sequence is 6 bases as underlined; please enter only these 6 bases on the sample sheet. Please note the index sequence is read in the reverse complement in TruSeq small RNA libraries.

RNA PCR Primer, Index 10 (RPI10)5' CAAGCAGAAGACGGCATAACGAGATAAAGCTAGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 11 (RPI11)**5' CAAGCAGAAGACGGCATAACGAGATGTAGCCGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 12 (RPI12)**5' CAAGCAGAAGACGGCATAACGAGATTACAAGGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 13 (RPI13)**5' CAAGCAGAAGACGGCATAACGAGATTTTGACTTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 14 (RPI14)**5' CAAGCAGAAGACGGCATAACGAGATGGAAGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 15 (RPI15)**5' CAAGCAGAAGACGGCATAACGAGATTGACATGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 16 (RPI16)**5' CAAGCAGAAGACGGCATAACGAGATGGACGGGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 17 (RPI17)**5' CAAGCAGAAGACGGCATAACGAGATCTCTACGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 18 (RPI18)**5' CAAGCAGAAGACGGCATAACGAGATGCGGACGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 19 (RPI19)**5' CAAGCAGAAGACGGCATAACGAGATTTTTCACGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 20 (RPI20)**5' CAAGCAGAAGACGGCATAACGAGATGGCCACGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 21 (RPI21)**5' CAAGCAGAAGACGGCATAACGAGATCGAAACGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 22 (RPI22)**5' CAAGCAGAAGACGGCATAACGAGATCGTACGGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 23 (RPI23)**5' CAAGCAGAAGACGGCATAACGAGATCCACTCGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 24 (RPI24)**5' CAAGCAGAAGACGGCATAACGAGATGCTACCGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 25 (RPI25)**5' CAAGCAGAAGACGGCATAACGAGATATCAGTGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

RNA PCR Primer, Index 26 (RPI26)5' CAAGCAGAAGACGGCATAACGAGATGCTCATGTGACTGGAGTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 27 (RPI27)**5' CAAGCAGAAGACGGCATAACGAGATAGGAATGTGACTGGAGTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 28 (RPI28)**5' CAAGCAGAAGACGGCATAACGAGATCTTTTGGTGGAGTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 29 (RPI29)**5' CAAGCAGAAGACGGCATAACGAGATTAGTTGGTGGAGTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 30 (RPI30)**5' CAAGCAGAAGACGGCATAACGAGATCCGGTGGTGGAGTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 31 (RPI31)**5' CAAGCAGAAGACGGCATAACGAGATATCGTGGTGGAGTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 32 (RPI32)**5' CAAGCAGAAGACGGCATAACGAGATTGAGTGGTGGAGTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 33 (RPI33)**5' CAAGCAGAAGACGGCATAACGAGATCGCCTGGTGGAGTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 34 (RPI34)**5' CAAGCAGAAGACGGCATAACGAGATGCCATGGTGGAGTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 35 (RPI35)**5' CAAGCAGAAGACGGCATAACGAGATAAAATGGTGGAGTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 36 (RPI36)**5' CAAGCAGAAGACGGCATAACGAGATTGTTGGGTGGAGTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 37 (RPI37)**5' CAAGCAGAAGACGGCATAACGAGATATTCCGTGGAGTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 38 (RPI38)**5' CAAGCAGAAGACGGCATAACGAGATAGCTAGTGGAGTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 39 (RPI39)**5' CAAGCAGAAGACGGCATAACGAGATGTATAGTGGAGTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 40 (RPI40)**5' CAAGCAGAAGACGGCATAACGAGATTCTGAGTGGAGTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 41 (RPI41)**5' CAAGCAGAAGACGGCATAACGAGATGTCGTCGACTGGAGTCCTTGGCACCCGAGAATTCCA

RNA PCR Primer, Index 42 (RPI42)5' CAAGCAGAAGACGGCATAACGAGATCGATTAGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 43 (RPI43)**5' CAAGCAGAAGACGGCATAACGAGATGCTGTAGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 44 (RPI44)**5' CAAGCAGAAGACGGCATAACGAGATATTATAGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 45 (RPI45)**5' CAAGCAGAAGACGGCATAACGAGATGAATGAGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 46 (RPI46)**5' CAAGCAGAAGACGGCATAACGAGATTCGGGAGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 47 (RPI47)**5' CAAGCAGAAGACGGCATAACGAGATCTTCGAGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA**RNA PCR Primer, Index 48 (RPI48)**5' CAAGCAGAAGACGGCATAACGAGATTGCCGAGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

Nextera® DNA Sample Prep Kit

(Epicentre Biotechnologies) ^{1,2,9}

Transposon Sequences

5' –GCCTCCCTCGCGCCATCAGAGATGTGTATAAGAGACAG

5' –GCCTTGCCAGCCCGCTCAGAGATGTGTATAAGAGACAG

Adapters (showing optional bar code)

5' –AATGATACGGCGACCACCGAGATCTACACGCCTCCCTCGCGCCATCAG

5' –CAAGCAGAAGACGGCATACGAGAT [**barcode**] CGGTCTGCCTTGCCAGCCCGCTCAG–3'

PCR Primers

5' –AATGATACGGCGACCACCGA

5' –CAAGCAGAAGACGGCATACGA

⁹ These kits are no longer available for purchase. As a replacement, we recommend FC-121-1031

Oligonucleotide sequences for Genomic DNA

Adapters

5' P-GATCGGAAGAGCTCGTATGCCGTCTTCTGCTTG

5' ACACTCTTTCCCTACACGACGCTCTTCCGATCT

PCR Primers

5' AATGATACGGCGACCACCGAGATCTACACTCTTTCCCTACACGACGCTCTTCCGATCT

5' CAAGCAGAAGACGGCATACGAGCTCTTCCGATCT

Genomic DNA Sequencing Primer

5' ACACTCTTTCCCTACACGACGCTCTTCCGATCT

Oligonucleotide sequences for Paired End DNA

PE Adapters

5' P-GATCGGAAGAGCGGTTCAGCAGGAATGCCGAG

5' ACACTCTTTCCCTACACGACGCTCTTCCGATCT

PE PCR Primer 1.0

5' AATGATACGGCGACCACCGAGATCTACACTCTTTCCCTACACGACGCTCTTCCGATCT

PE PCR Primer 2.0

5' CAAGCAGAAGACGGCATACGAGATCGGTCTCGGCATTCCTGCTGAACCGCTCTTCCGATCT

PE Read 1 Sequencing Primer

5' ACACTCTTTCCCTACACGACGCTCTTCCGATCT

PE Read 2 Sequencing Primer

5' CGGTCTCGGCATTCCTGCTGAACCGCTCTTCCGATCT

Oligonucleotide sequences for the Multiplexing Sample Prep Oligo Only Kit²

Multiplexing Adapters

5' P-GATCGGAAGAGCACACGTCT

5' ACACTCTTTCCCTACACGACGCTCTTCCGATCT

Multiplexing PCR Primer 1.0

5' AATGATACGGCGACCACCGAGATCTACACTCTTTCCCTACACGACGCTCTTCCGATCT

Multiplexing PCR Primer 2.0

5' GTGACTGGAGTTCAGACGTGTGCTCTTCCGATCT

Multiplexing Read 1 Sequencing Primer

5' ACACTCTTTCCCTACACGACGCTCTTCCGATCT

Multiplexing Index Read Sequencing Primer

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCAC

Multiplexing Read 2 Sequencing Primer

5' GTGACTGGAGTTCAGACGTGTGCTCTTCCGATCT

PCR Primer, Index 1

5' CAAGCAGAAGACGGCATACGAGATCGTGATGTGACTGGAGTTC

PCR Primer, Index 2

5' CAAGCAGAAGACGGCATACGAGATACATCGGTGACTGGAGTTC

PCR Primer, Index 3

5' CAAGCAGAAGACGGCATACGAGATGCCTAAGTGACTGGAGTTC

PCR Primer, Index 4

5' CAAGCAGAAGACGGCATACGAGATTGGTCAGTGACTGGAGTTC

PCR Primer, Index 5

5' CAAGCAGAAGACGGCATACGAGATCACTGTGTGACTGGAGTTC

PCR Primer, Index 6

5' CAAGCAGAAGACGGCATACGAGATATTGGCGTGACTGGAGTTC

PCR Primer, Index 7

5' CAAGCAGAAGACGGCATACGAGATGATCTGGTGACTGGAGTTC

PCR Primer, Index 8

5' CAAGCAGAAGACGGCATACGAGATTCAAGTGACTGGAGTTC

PCR Primer, Index 9

5' CAAGCAGAAGACGGCATACGAGATCTGATCGTGACTGGAGTTC

PCR Primer, Index 10

5' CAAGCAGAAGACGGCATACGAGATAAGCTAGTGACTGGAGTTC

PCR Primer, Index 11

5' CAAGCAGAAGACGGCATACGAGATGTAGCCGTGACTGGAGTTC

PCR Primer, Index 12

5' CAAGCAGAAGACGGCATACGAGATTACAAGGTGACTGGAGTTC

Oligonucleotide sequences for the v1 and v1.5 Small RNA Kits

RT Primer

5 ' CAAGCAGAAGACGGCATACGA

5' RNA Adapter

5 ' GUUCAGAGUUCUACAGUCCGACGAUC

3' RNA Adapter

5 ' P-UCGUAUGCCGUCUUCUGCUUGUIdT

v1.5 Small RNA 3' Adapter

5 ' /5rApp/ATCTCGTATGCCGTCTTCTGCTTG/3ddC/

Small RNA PCR Primer 1

5 ' CAAGCAGAAGACGGCATACGA

Small RNA PCR Primer 2

5 ' AATGATACGGCGACCACCGACAGGTTCTACAGTCCGA

Small RNA Sequencing Primer

5 ' CGACAGGTTCTACAGTCCGACGATC

Appendix

Process Controls for TruSeq[®] Sample Preparation KitsIncluded in TruSeq DNA and RNA (v1/v2/LT/HT) and TruSeq Exome Kits ¹⁰**CTE2 - 150bp**

ATCCTGCAGATGCATCCAGTACTAGTATGGCCCCGGGGGATCCTACGTTCCAAATGCAGCGAGCTCGTATAACCC
TTTAAGAGTTGCTCTTTTTGTTTGGTAAGTTGCAAATCGAAGTTTTAGATTGAGTTCTACGTCGAGCGGCCGCG
AT

CTE2 - 250bp

ATCCTGCAGATGCATCCAGTACTAGTATGGCCCCGGGGGATCCTTATCTGTCAAAACCGCTAATGTCCGTTCTAA
GACCGTCTGGAGAACACTTGCCCATCAGTGCTTTTGAACCTTTTTTTCACAGGTCCCTTCCGATTACACTGAGA
AGCTGACCACACCTGCTAGAAGATGGAGGTATGCAGCCCGTTAGTAGGAGTAATACTACCCAGCTTATAACCCT
CAAACGTAGGGCAGATGGCGGCCGCGAT

CTE2 - 350bp

ATCCTGCAGATGCATCCAGTACTAGTATGGCCCCGGGGGATCCTAGAGACCATTTCGCGATTCCATGAGACTCCAA
GGGTTCTGCACAACCTTATGCACCTCTATTAGATCATTGTGTTCTACGAAGCCTGGACTGCATTACATATTCACA
ACCAACATGAGAAGAGCGGAATAGATGGCCGGATGTTTGGTGGCTTTGATATATTGTGAGGAGCATTGCGAACC
CTAGAGCTGTCCGGTCAAATAACCCCTCACAATAAGTGTAAATGTCATGGGATAATCAAAGACTAAGGGAGGG
CTTTTATAGAAGGCGTGAGGTCATGCTATCCCCCTCTGAAGACGCGGCCGCGAT

CTE2 - 450bp

ATCCTGCAGATGCATCCAGTACTAGTATGGCCCCGGGGGATCCGTATACGTTTCTAATTTGTAGTTAACGGTTGG
ATACCACTTTGAGGCATGTAATATGGTACTGAGCTTCGGCACAGGGCTCAAATTGCATCATTAAATGTCTCCGA
TGTGGCTATATGTCATGGATAAAGGCAGCCCCCTATATCTTTTTTTGTGGCAGCATGGGTCCATCAAAGCAATT
ATTCAGGGTCTTAATGACCTCCACAGCTCTAAACGTAATTCATCTGGCTTTGCCTGTACTTACTTCCTCCATGA
AAAAAAGTGTGATAATGCTCATAATGCTGCCCAGCAATTTCTCCCTTCTCAAGACTATTCTGGCTTCCTGGG
TACTTAAAAACAGGGCTTAGAGTATGGCTGCTGACAAAATTGCACTCTAAACGCTAGCTTAGGTCTTCTGCGGC
CGCGAT

CTE2 - 550bp

ATCCTGCAGATGCATCCAGTACTAGTATGGCCCCGGGGGATCCGTAGCTATCGTTTCGCGAGAAAGTTAGTAGAC
ACACAGGACCCAGGCGTGCAAGTCAATTTAGCTGACTACACCGATTCTGGTTAAAAGAGCCTATGGCCACCCT
TATTTTAGAGAAAAAAACCACACCTCTAATGTGTTGGGCACTAGAAAAAGCTAACTACCTAGTCCGTTTCTGG
ACGACTTCATTGGGAATAACATAACCCCCCACTGTGATTAAGACTGGCACTGTCCTAATGCTTTCTTCAATAGGT
TTGGCTCATGTGTGATTCCCTCTGGCAAACCTTATAGAGGACAAGCAGAATAAACCAATTCAAGGTCGTTGTAGC
TGAAGGCCTGGCCTGCCTGACAGTTAATTATGAGCATGTCTTGCCCTTCATGGTGGATATTACAGCTGAAAGT
GGTATTGGCATTTTTTTCTGAGGACACAACGAGGAAATCTGATAAATACGGCCACCTGAAGTCTAGCTCGGAGT
TAACAATTTACCACGTTTAGAGCGGCCGCGAT

CTE2 - 650bp

ATCCTGCAGATGCATCCAGTACTAGTATGGCCCCGGGGGATCCGCTCGCACTTAGCCTGTTAAGGGGTTTCGCGCT
CGTCTAGTCTGTGCTGTTGCCTGGATAGTAAATTATCATGGTACAACTTTTAAGAGCCAGTTAAATGGAGATG
GATTTAAAAAGAGTTATTGTAAAGTCTCCCCAGGTGTGTCAATTAATATCCCAACAGATTGCCCTGGCCTGACC
CCCTAAATGCAATTTTGGGATTCCCTTTTAGTTGCTTTCATTAATGTACCAGCGCAGTAAAAAAGCACAAA
GTATATTGTTTATGTAACCTCACTATCTCATTTGCACTGGTTACATGGCAGCTTCAGACTGACTAAAACCTACCT

¹⁰ Patent pending

TTTCCCACCATGGTTCAAAGATCAACAGAACTGGGCCAACAAAAGCAATTTTTTCATGTGGTCTAACTACCAAC
TTATTATGAGTTAAGTTACTTTTAGGTTTAAATCACAGCAGTTTTTCCCTCCACACCTCCAGAGATACTTTC
AGGGTGGCTAAACTTGGCTAAAGGCTTCCGGACCAACCCTTGTTTCTTTATGGTGCTTGTGTCTGACAACCG
GTAAGGCATGGAATTCAGCTATTTATCCGATCGTTTATATGGGCGTGCGGCCGCGAT

CTE2 - 750bp

ATCCTGCAGATGCATCCAGTACTAGTATGGCCCCGGGGGATCCTTGGACCGTTAATTCATATATCGAAGTAGCAG
GTTGTTGCCCCGCCTGATGTTGCCACTACTTGCTCATGACAGTTTTTTTTAGGCAATGCAAACTACTATTTGATA
TTTTTTTTCCAAGTACAGTTGTAGGGTACTCCTTATACTGATTCTTCTGAGCCTGTACGGGGAGCATTAGGTACT
GATGTAGTAGGAGTTGAGCTTCACAAATTCACCAGGTAAGCCCCAAATTTATTTTCTGCTTGGACAGGTCCACCT
CACATGGGTCTGTCTAATATATTAAAGAGGGATTTTCTTTGCTGTATTGCAGCCCAGTATATCTGTTACTTAC
AGTAGTAGTCCATTATTGCTGGCCTAGGGGCTTTTGCTCCTACACGAACACCCTCTGTAAAATTTGAGGTCGT
CCTTAGAGTCAAACCATTCATGGAGCGCTCTGTGCATCTACCAACTATCGCTAAGCATTCACTTGGTTGGTTTA
AGTGGAGGCAACTCCATTATCTTCTAGCATACCCTTCCCAGGCTACATGTAGAAAGAGATCTGTTGGGCCCCAC
TATTTTTTTCACCCAGGGAAGCCTACTTTAGTTATAGCTTGCCAGAGATTTTCTGTGTCATGTAGAAGTCATCCA
CTTTTAACACCAGGAGGTGGATGTGGGGCCAGGAAATATGTCAATAACGATACGGGACTTCTAACAGTGACTCG
CGGCCGCGAT

CTE2 - 850bp

ATCCTGCAGATGCATCCAGTACTAGTATGGCCCCGGGGGATCCTTAAGTCGTGTCCTTCTCCTACGATCTTGTGA
ACGATGGATATTTTCTTTCTAACTTTAAACAAACAGTGGAGAGATGTTGTTGTGTGTGGAACGACGCTTAGCC
TACCGAGGAAGATCCAGACTACAATAGAATATGTGGCCAAAACCTCTCCGCAACTTCAGCAGCAAAAAGGATATT
ATTGACATAACCTCCTCACAAAAAGTACACAAATGGCTAAATAACAGAGCCCCTCTTTTTACTAGGGAAATGGT
GGATGTGGACTTTAGAATTTAAGATAATAAAGCTCTTGATCCCAATGTTATTTCCATGTGAGGGACATTAAATT
GAGTAACCTTTGCCACATACCCTCTCCCAGAGTCCATTCTCTAAAACTTGAAGCTCCGCCCTTTTTACGCACA
TTAGGCTTTCAATTACGGTCAATGGTCTTGAAGATTGGGAGCTTTTGAAGAGTAATAAGAACCATCACAAAAG
GAACCCAGAAAGCCGGGAGTGTCTACCAAAAAAATTCAAGGGTTAAAAAAAAGTGACATTTTCTCTGTTTTTTA
CACATGATTTTGAATGCTGATGGGTCCACGTCCAGCTCTAAAGGTAGGTTTCATGGTTCTCCAAAGTTGCTTTCT
TGTCAGAATTGAGCCACATCAGGTAGGTGGGGAAGTAGATCAGTGAGGATGCTTCACATGTGTGGGCACTGGGA
ACAGAATGCTTCAATAACACGAGCTGACGAGGGCCCGCTATGAAAAAAAGATTCTCTGTGCCCCCTGGCGCCT
CCGCACTTAAAGAATTGATGACCGTGCGGCCGCGAT

CTE1 - 123bp

GATCCTACGTTCCAAATGCAGCGAGCTCGTATAACCCTTTAAGAGTTGCTCTTTTTGTTTGGTAAGTTGCAAT
CGAAGTTTTAGATTGAGTTCTACGTCGAGCGCCGCGATATCCTGCAGATGCA

CTE1 - 223bp

GATCCTTATCTGTCAAACCGCTAATGTCCGTTCTAAGACCGTCTGGAGAACACTTGCCCATCAGTGCTTTTGA
ACCTTTTTTTTACAGGTCCCTTCCGATTACACTGAGAAGCTGACCACACCTGCTAGAAGATGGAGGTATGCAGC
CCGTTAGTAGGAGTAATACTACCCAGCTTATAACCCCTCAAACGTAGGGCAGATGGCGGCCGCGATATCCTGCAG
ATGCA

CTE1 - 323bp

GATCCTAGAGACCATTCGCGATTCCATGAGACTCCAAGGGTTCTGCACAACTTATGCACCTCTATTAGATCATT
GTGTTCTACGAAGCCTGGACTGCATTACATATTCACAACCAACATGAGAAGAGCGGAATAGATGGCCGGATGTT
TGGTGGCTTTGATATATTGTGAGGAGCATTGCGAACCTAGAGCTGTCCGGTCAAATAACCCCTCACATAAG
TGTAATGTCATGGGATAATCAAAGACTAAGGGAGGGCTTTTATAGAAGGCGTGAGGTCATGCTATCCCCCTCT
GAAGACGCGGCCGCGATATCCTGCAGATGCA

CTE1 - 423bp

GATCCGTATACGTTTCTAATTTGTAGTTAACGGTTGGATACCACTTTGAGGCATGTAATATGGTACTGAGCTTC
GGCACAGGGCTCAAATTGCATCATTAATGTCTCCGATGTGGCTATATGTCATGGATAAAGGCAGCCCCCTATA
TCTTTTTTTGTGGCAGCATGGGTCCATCAAAGCAATTATTCAGGGTCTTAATGACCTCCACAGCTCTAAACGTA
ATTCATCTGGCTTTGCCTGTACTTACTTCCCTCCATGAAAAAAGTGTTGATAATGCTCATAATGCTGCCAGCA

ATTTCTCCCTTCTCAAGACTATTCTGGCTTCTGGGTACTTAAAAACAGGGCTTAGAGTATGGCTGCTGACAA
AATTGCACTCTAAACGCTAGCTTAGGTCTTCTGCGGCCGCGATATCCTGCAGATGCA

CTE1 - 523bp

GATCCGTTAGCTATCGTTTCGCGAGAAAGTTAGTAGACACACAGGACCCAGGCGTGCAAGTCAATTTTCAGCTGAC
TACACCGATTCTGGTTAAAAGAGCCTATGGCCACCCTTATTTTAGAGAAAAAAACCACACCTCTAATGTGTTG
GGCACTAGAAAAAGCTAACTACCTAGTCCGTTTCTGGACGACTTCATTGGGAATAACATACCCCCCACTGTGAT
TAAGACTGGCACTGTCCTAATGCTTTCTTCAATAGGTTTGGCTCATGTGTGATTCCCTCTGGCAAACCTTATAGA
GGACAAGCAGAATAAACCAATTCAAGGTCGTTGTAGCTGAAGGCCTGGCCTGCCTGACAGTTAATTATGAGCAT
GTCTTGCCCTTCATGGTGGATATTACAGCTGAAAGTGGTATTGGCATTTTTTTCTGAGGACACAACGAGGAAA
TCTGATAAATACGGCCACCTGAAGTCTAGCTCGGAGTTAACAATTTACCACGTTTAGAGCGGCCGCGATATCCT
GCAGATGCA

CTE1 - 623bp

GATCCGCTCGCACTTAGCCTGTTAAGGGGTTTCGCGCTCGTCTAGTCTGTGCTGTTGCCTGGATAGTAAATTATC
ATGGTACAACTTTTTAAGAGCCAGTTAAATGGAGATGGATTTAAAAAGAGTTATTGTAAAGTCTCCCCAGGTGT
GTCATTAAATATCCCAACAGATTGCCCTGGCCTGACCCCTAAATGCAATTTTGGGATTCCCTTTTAGTTGCTT
TCATTAAATGTACCAGCGCAGTAAAAAAGCACAAAGTATATTGTTTATGTAACCTACTATCTCATTTCAGCT
GGTTACATGGCAGCTTCAGACTGACTAAACTACACTTTTCCCACCATGGTTCAAAGATCAACAGAACTGGGCC
AACAAAAGCAATTTTTTTCATGTGGTCTAACTACCAACTTATTATGAGTTAAGTTACTTTTAGGTTTAAATCAC
AGCAGTTTTTCCCTCCACACCTCCCAGAGATACTTTCAGGGTGGCTAAACTTGGCTAAAGGCTTCCGGACCAAC
CCTTGTTTCTTTATGGTGTCTGTGTCCTGACAACCGCGTAAGGCATGGAAATTCAGCTATTTATCCGATCGTTT
ATATGGGCGTGCGGCCGCGATATCCTGCAGATGCA

CTE1 - 723bp

GATCCTTGACCGTTAATTCATATATCGAAGTAGCAGGTTGTTGCCCCGCTGATGTTGCCACTACTTGCTCAT
GACAGTTTTTTTAGGCAATGCAAACTACTATTTGATATTTTTTCCAAGTACAGTTGTAGGGTACTCCTTATAC
TGATTCTTCTGAGCCTGTACGGGGAGCATTAGGTACTGATGTAGTAGGAGTTGAGCTTCACAAATTCACCAGGT
AAGCCCAAATTTATTTTCTGCTTGGACAGGTCCACCTCACATGGGTCTGTCTAATATATTTAAAGAGGGATTTT
CTTTGCTGTATTGCAGCCCAGTATATCTGTTACTTACAGTAGTAGTCCATTATTGCTGGCCTAGGGGCTTTTGC
TCCTACACGAACACCACTCTGTAAATTTGAGGTCTCCTTAGAGTCAAACCATTTCATGGAGCGCTCTGTGCAT
CTACCAACTATCGCTAAGCATTCACTTGGTTGGTTTAAAGTGGAGGCAACTCCATTATCTTCTAGCATACCCTTC
CCAGGCTACATGTAGAAAGAGATCTGTTGGGCCCCACTATTTTTTCAACCAGGGAAGCCTACTTTAGTTATAGC
TTGCCAGAGATTTTCTGTGTCTGTAGAAAGTCACTTTTAAACACCAGGAGGTGGATGTGGGGCCAGGAAAT
ATGTCAATAACGATACGGGACTTCTAACAGTGACTCGCGGCCGCGATATCCTGCAGATGCA

CTE1 - 823bp

GATCCTTAAGTCGTGTCCTTCTCCTACGATCTTGTGAACGATGGATATTTTCTTTCTAACTTTAAACAAACAG
TGGAGAGATGTTGTTGTGTGTGGAACGACGCTTAGCCTACCGAGGAAGATCCAGACTACAATAGAATATGTGGC
CAAACTCTCCGCAACTTCAGCAGCAAAAAGGATATTATTGACATAACCTCCTCACAAAAGTACACAAATGGC
TAAATAACAGAGCCCCCTTTTTTACTAGGGAAATGGTGGATGTGGACTTTAGAATTTAAGATAATAAAGCTCTT
GATCCCAATGTTATTTCCATGTGAGGGACATTAAATTGAGTAACCTTTGCCACATACCCTCTCCCAGAGTCCAT
TCTCTAAACTTGAAGCTCCGCCCCCTTTTTACGCACATTAGGCTTCCAATTACGGTCAATGGTCTTGAAGATTG
GGAGCTTTTGAAGAGTAATAAGAACCATCACAAAAGGAACCCAGAAGCCGGGAGTGTCTACCAAAAAAATTCA
AGGGTTAAAAAAAGTGACATTTTCTCCTGTTTTTTACACATGATTTTGAATGCTGATGGGTCCACGTCCAGCT
CTAAAGGTAGGTTTCATGGTTCTCCAAAGTTGCTTTCTTGTGAGAATTGAGCCACATCAGGTAGGTGGGGAAGTA
GATCAGTGAGGATGCTTCACATGTGTGGGCACTGGGAACAGAATGCTTCAATAACACGAGCTGACGAGGGCCCG
CTATGAAAAAAAGATTCTCTGTGCCCCCTGGCGCCTCCGCACTTAAAGAATTGATGACCGTGCGGCCGCGATA
TCCTGCAGATGCA

CTA - 150bp

GGGGGATCCTACGTTCCAAATGCAGCGAGCTCGTATAACCCTTTAAGAGTTGCTCTTTTTGTTTGGTAAGTTGC
AAATCGAAGTTTTAGATTGAGTTCTACGTCGAGCGGCCGCGATATCCTGCAGATGCATCCAGTACTAGTATGGC
CC

CTA - 250bp

GGGGGATCCTTATCTGTCAAACCGCTAATGTCCGTTCTAAGACCGTCTGGAGAACACTTGCCCATCAGTGCTT
TTGAACCTTTTTTTTACAGGTCCCTTCCGATTACACTGAGAAGCTGACCACACCTGCTAGAAGATGGAGGTATG
CAGCCCGTTAGTAGGAGTAATACTACCCAGCTTATAACCCTCAAACGTAGGGCAGATGGCGGCCGCGATATCCT
GCAGATGCATCCAGTACTAGTATGGCCC

CTA - 350bp

GGGGGATCCTAGAGACCATTCGCGATTCCATGAGACTCCAAGGGTTCTGCACAACCTTATGCACCTCTATTAGAT
CATTGTGTTCTACGAAGCCTGGACTGCATTACATATTACAACCAACATGAGAAGAGCGGAATAGATGGCCGGA
TGTTTTGGTGGCTTTGATATATTGTGAGGAGCATTGCGAACCTAGAGCTGTCCGGTCAAATAACCCCCCTACAA
TAAGTGTAATGTCATGGGATAATCAAAGACTAAGGGAGGGCTTTTATAGAAGGCGTGAGGTCATGCTATCCCC
CTCTGAAGACGCGGCCGCGATATCCTGCAGATGCATCCAGTACTAGTATGGCCC

CTA - 450bp

GGGGGATCCGTATACGTTTCTAATTTGTAGTTAACGGTTGGATACCACTTTGAGGCATGTAATATGGTACTGAG
CTTCGGCACAGGGCTCAAATTGCATCATTAAATGTCTCCGATGTGGCTATATGTCATGGATAAAGGCAGCCCCC
TATATCTTTTTTTGTGGCAGCATGGGTCCATCAAAGCAATTATTACAGGGTCTTAATGACCTCCACAGCTCTAAA
CGTAATTCATCTGGCTTTGCCTGTACTTACTTCCCTCCATGAAAAAAGTGTTGATAATGCTCATAATGCTGCCC
AGCAATTTCTCTCCCTTCTCAAGACTATTCTGGCTTCTGGGTACTTAAAAACAGGGCTTAGAGTATGGCTGCTG
ACAAAATTGCACTCTAAACGCTAGCTTAGGTCTTCTGCGGCCGCGATATCCTGCAGATGCATCCAGTACTAGTA
TGGCCC

CTA - 550bp

GGGGGATCCGTTAGCTATCGTTTCGCGAGAAAGTTAGTAGACACACAGGACCCAGGCGTGCAAGTCAATTTACAGC
TGACTACACCGATTCTGGTTAAAAGAGCCTATGGCCACCCTTATTTTAGAGAAAAAAACCACACCTCTAATGT
GTTGGGCACTAGAAAAAGCTAACTACCTAGTCCGTTTCTGGACGACTTCATTGGGAATAACATACCCCCCACTG
TGATTAAGACTGGCACTGTCTAATGCTTTCTTCAATAGGTTTGGCTCATGTGTGATTCCCTCTGGCAAACCTTA
TAGAGGACAAGCAGAATAAACCAATTCAAGGTGCTTGTAGCTGAAGGCCTGGCCTGCCTGACAGTTAATTATGA
GCATGTCTTGCCCTTCATGGTGGATATTCACAGCTGAAAGTGGTATTGGCATTTTTTTCTGAGGACACAACGAG
GAAATCTGATAAATACGGCCACCTGAAGTCTAGCTCGGAGTTAACAATTTACCACGTTTAGAGCGGCCGCGATA
TCCTGCAGATGCATCCAGTACTAGTATGGCCC

CTA - 650bp

GGGGGATCCGCTCGCACTTAGCCTGTAAAGGGGTTTCGCGCTCGTCTAGTCTGTGCTGTTGCCTGGATAGTAAAT
TATCATGGTACAACTTTTAAAGAGCCAGTTAAATGGAGATGGATTTAAAAAGAGTTATTGTAAAGTCTCCCCAG
GTGTGTCATTAAATATCCCAACAGATTGCCCTGGCCTGACCCCTAAATGCAATTTTGGGATTCCCTTTTAGTT
GCTTTTCAATAAATGTACCAGCGCAGTAAAAAAGCACAAAGTATATTGTTTATGTAACCTACTATCTCATTTG
CACTGGTTACATGGCAGCTTCAGACTGACTAAACTACACTTTTCCCACCATGGTTCAAAGATCAACAGAACTG
GGCCAACAAAAGCAATTTTTTTCATGTGGTCTAACTACCAACTTATTATGAGTTAAGTTACTTTTAGGTTTAAAA
TCACAGCAGTTTTTCCCTCCACACCTCCAGAGATACTTTACAGGTGGCTAAACTTGGCTAAAGGCTTCCGGAC
CAACCCTTGTTTCTTTATGGTGCTTGTGTCTTGACAACCGCGTAAGGCATGGAAATTCAGCTATTTATCCGATC
GTTTATATGGGCGTGCGGCCGCGATATCCTGCAGATGCATCCAGTACTAGTATGGCCC

CTA - 750bp

GGGGGATCCTTGGACCGTTAATTCATATATCGAAGTAGCAGGTTGTTGCCCCGCTGATGTTGCCACTACTTGC
TCATGACAGTTTTTTTTAGGCAATGCAAACTACTATTTGATATTTTTTCCAAGTACAGTTGTAGGGTACTCCTT
ATACTGATTCTTCTGAGCCTGTACGGGGAGCATTAGGTACTGATGTAGTAGGAGTTGAGCTTCACAAATTCACC
AGGTAAGCCCAAATTTATTTTCTGCTTGGACAGGTCCACCTCACATGGGTCTGTCTAATATATTAAAAGAGGGA
TTTTCTTTGCTGTATTGCAGCCCAGTATATCTGTTACTTACAGTAGTAGTCCATTATTGCTGGCCTAGGGGCTT
TTGCTCCTACACGAACACCACTCTGTAAAATTTGAGGTGCTCCTTAGAGTCAAACCATTCATGGAGCGCTCTGT
GCATCTACCAACTATCGCTAAGCATTCACTTGGTTGGTTTAAAGTGGAGGCAACTCCATTATCTTCTAGCATACC
CTTCCCAGGCTACATGTAGAAAGAGATCTGTTGGGCCCCACTATTTTTTCAACCAGGGAAGCCTACTTTAGTTA
TAGCTTGCCAGAGATTTTCTGTGTCATGTAGAAGTCATCCACTTTTAAACACCAGGAGGTGGATGTGGGGCCAGG

AAATATGTCAATAACGATACGGGACTTCTAACAGTGACTCGCGGCCGCGATATCCTGCAGATGCATCCAGTACT
AGTATGGCCC

CTA - 850bp

GGGGGATCCTTAAGTCGTGTCCTTCTCCTACGATCTTGTGAACGATGGATATTTTCTTTCTAAACTTTAAACAA
ACAGTGGAGAGATGTTGTTGTGTGTGGAACGACGCTTAGCCTACCGAGGAAGATCCAGACTACAATAGAATATG
TGGCCAAAACCTCTCCGCAACTTCAGCAGCAAAAAGGATATTATTGACATAACCTCCTCACAAAAAGTACACAAA
TGGCTAAATAACAGAGCCCCCTCTTTTTACTAGGGAAATGGTGGATGTGGACTTTAGAATTTAAGATAATAAAGC
TCTTGATCCCAATGTTATTTCCATGTGAGGGACATTAAATTGAGTAACCTTTGCCACATACCCTCTCCCAGAGT
CCATTCTCTAAACTTTGAAGCTCCGCCCCCTTTTTACGCACATTAGGCTTCCAATTACGGTCAATGGTCTTGAAG
ATTGGGAGCTTTTGAAGAGTAATAAGAACCATCACAAAAAGGAACCCAGAAGCCGGGAGTGTCTACCAAAAAA
TTCAAGGGTTAAAAAAAAGTGACATTTTCTCCTGTTTTTACACATGATTTTGAATGCTGATGGGTCCACGTCC
AGCTCTAAAGGTAGGTTTCATGGTTCTCCAAAGTTGCTTTCTTGTGAGAATTGAGCCACATCAGGTAGGTGGGGA
AGTAGATCAGTGAGGATGCTTCACATGTGTGGGCACTGGGAACAGAATGCTTCAATAACACGAGCTGACGAGGG
CCCCTATGAAAAAAGATTCTCTGTGCCCCCTGGCGCCTCCGCACTTAAAGAATTGATGACCGTGCGGCCG
GATATCCTGCAGATGCATCCAGTACTAGTATGGCCC

CTL - 150bp

AGTATGGCCCGGGGATCCTACGTTCCAAATGCAGCGAGCTCGTATAACCCTTTAAAGAGTTGCTCTTTTTGTTT
GGTAAGTTGCAATCGAAGTTTTAGATTGAGTTCTACGTCGAGCGGCCGCGATATCCTGCAGATGCATCCAGTA
CA

CTL - 250bp

AGTATGGCCCGGGGATCCTTATCTGTCAAAACCGCTAATGTCCGTTCTAAGACCGTCTGGAGAACACTTGCCC
ATCAGTGCTTTTGAACCTTTTTTTCACAGGTCCCTTCCGATTACACTGAGAAGCTGACCACACCTGCTAGAAGA
TGGAGGTATGCAGCCCGTTAGTAGGAGTAATACTACCCAGCTTATAACCCCTCAAACGTAGGGCAGATGGCGGCC
GCGATATCCTGCAGATGCATCCAGTACA

CTL - 350bp

AGTATGGCCCGGGGATCCTAGAGACCATTTCGCGATTCCATGAGACTCCAAGGGTTCTGCACAACCTTATGCACC
TCTATTAGATCATTGTGTTCTACGAAGCCTGGACTGCATTACATATTACAACCAACATGAGAAGAGCGGAATA
GATGGCCGGATGTTTGGTGGCTTTGATATATTGTGAGGAGCATTGCGAACCTTAGAGCTGTCCGGTCAAATAAC
CCCCTCACAATAAGTGTAATGTCATGGGATAATCAAAGACTAAGGGAGGGCTTTTATAGAAGGCGTGAGGTCA
TGCTATCCCCCTCTGAAGACGCGGCCGCGATATCCTGCAGATGCATCCAGTACA

CTL - 450bp

AGTATGGCCCGGGGATCCGTATACGTTTCTAATTTGTAGTTAACGGTTGGATACCACTTTGAGGCATGTAATA
TGGTACTGAGCTTCGGCACAGGGCTCAAATTGCATCATTAAATGTCTCCGATGTGGCTATATGTCATGGATAAA
GGCAGCCCCCTATATCTTTTTTGTGGCAGCATGGGTCCATCAAAGCAATTATTACGGGTCTTAATGACCTCCA
CAGCTCTAAACGTAATTCATCTGGCTTTGCCTGTACTTACTTCCCTCCATGAAAAAAGTGTTGATAATGCTCAT
AATGCTGCCAGCAATTTCTCCCTTCTCAAGACTATTCTGGCTTCTGCGTACTTAAAAACAGGGCTTAGAGT
ATGGCTGCTGACAAAATTGCACTCTAAACGCTAGCTTAGGTCTTCTGCGGCCGCGATATCCTGCAGATGCATCC
AGTACA

CTL - 550bp

AGTATGGCCCGGGGATCCGTTAGCTATCGTTTCGCGAGAAAGTTAGTAGACACACAGGACCCAGGCGTGCAAGT
CAATTTTCACTGACTACACCGATTCTGGTTAAAAGAGCCTATGGCCACCCTTATTTTATAGAGAAAAAACCACA
CCTCTAATGTGTTGGGCACTAGAAAAAGCTAACTACCTAGTCCGTTTCTGGACGACTTCATTGGGAATAACATA
CCCCCACTGTGATTAAGACTGGCACTGTCCTAATGCTTTCTTCAATAGGTTTGGCTCATGTGTGATTCCCTCT
GGCAAACCTTATAGAGGACAAGCAGAATAAACCAATTCAAGGTCGTTGTAGCTGAAGGCCTGGCCTGCCTGACAG
TTAATTATGAGCATGTCTTGCCCTTCATGGTGGATATTCACAGCTGAAAGTGGTATTGGCATTTTTTTCTGAGG
ACACAACGAGGAAATCTGATAAATACGGCCACCTGAAGTCTAGCTCGGAGTTAACAATTTACCACGTTTAGAGC
GGCCGCGATATCCTGCAGATGCATCCAGTACA

CTL - 650bp

AGTATGGCCCGGGGATCCGCTCGCACTTAGCCTGTTAAGGGGTTTCGCGCTCGTCTAGTCTGTGCTGTTGCCTG
GATAGTAAATTATCATGGTACAACTTTTTAAGAGCCAGTTAAATGGAGATGGATTTAAAAAGAGTTATTGTAAA
GTCTCCCCAGGTGTGTCATTAAATATCCCAACAGATTGCCCTGGCCTGACCCCTAAATGCAATTTTGGGATTC
CCTTTTAGTTGCTTTTCATTAAATGTACCAGCGCAGTAAAAAAGCACAAAGTATATTGTTTATGTAACCTACT
ATCTCATTTGCACTGGTTACATGGCAGCTTCAGACTGACTAAACTACACTTTTCCCACCATGGTTCAAAGATC
AACAGAACTGGGCCAACAAAAGCAATTTTTTCATGTGGTCTAACTACCAACTTATTATGAGTTAAGTTACTTTT
AGGTTTAAAATCACAGCAGTTTTTCCCTCCACACCTCCCAGAGATACTTTCAGGGTGGCTAAACTTGGCTAAAG
GCTTCCGGACCAACCCTTGTTTCTTTATGGTGCTTGTGTCTGACAACCGCGTAAGGCATGGAAATTCAGCTAT
TTATCCGATCGTTTATATGGGCGTGC GGCCGCGATATCCTGCAGATGCATCCAGTACA

CTL - 750bp

AGTATGGCCCGGGGATCCTTGGACCGTTAATTCATATATCGAAGTAGCAGGTTGTTGCCCCGCTGATGTTGC
CACTACTTGCTCATGACAGTTTTTTTTAGGCAATGCAAACTACTATTTGATATTTTTTTCCAAGTACAGTTGTAG
GGTACTCCTTATACTGATTCTTCTGAGCCTGTACGGGGAGCATTAGGTACTGATGTAGTAGGAGTTGAGCTTCA
CAAATTCACCAGGTAAGCCCAAATTTATTTTCTGCTTGGACAGGTCCACCTCACATGGGTCTGTCTAATATATT
AAAAGAGGGATTTTCTTTGCTGTATTGCAGCCCAGTATATCTGTTACTTACAGTAGTAGTCCATTATTGCTGGC
CTAGGGGCTTTTGCTCCTACACGAACACCACTCTGTAAAATTTGAGGTCGTCTTAGAGTCAAACCATTTCATGG
AGCGCTCTGTGCATCTACCAACTATCGCTAAGCATTCACTTGGTTGGTTTAAAGTGGAGGCAACTCCATTATCTT
CTAGCATACCCTTCCCAGGCTACATGTAGAAAGAGATCTGTTGGGCCCCACTATTTTTTCAACCAGGGAAGCCT
ACTTTAGTTATAGCTTGCCAGAGATTTTCTGTGTCATGTAGAAGTCATCCACTTTTAACACCAGGAGGTGGATG
TGGGGCCAGGAAATATGTCAATAACGATACGGGACTTCTAACAGTGACTCGCGGCCGCGATATCCTGCAGATGC
ATCCAGTACA

CTL - 850bp

AGTATGGCCCGGGGATCCTTAAGTCGTGTCCTTCTCCTACGATCTTGTGAACGATGGATATTTTCTTTCTAAA
CTTTAAACAAACAGTGGAGAGATGTTGTTGTGTGTGGAACGACGCTTAGCCTACCGAGGAAGATCCAGACTACA
ATAGAATATGTGGCCAAAACCTCTCCGCAACTTCAGCAGCAAAAAGGATATTATTGACATAACCTCCTCACAAAA
AGTACACAAATGGCTAAATAACAGAGCCCCTCTTTTTACTAGGGAAATGGTGGATGTGGACTTTAGAATTTAAG
ATAATAAAGCTCTTGATCCCAATGTTATTTCCATGTGAGGGACATTAAATTGAGTAACCTTTGCCACATACCCT
CTCCCAGAGTCCATTCTCTAAAACCTTGAAGCTCCGCCCCCTTTTTACGCACATTAGGCTTCCAATTACGGTCAAT
GGTCTTGAAGATTGGGAGCTTTTGAAGAGTAATAAGAACCATCACAAAAGGAACCCAGAAGCCGGGAGTGTCT
ACCAAAAAAATTCAAGGGTTAAAAAAAAGTGACATTTTCTCCTGTTTTTTTACACATGATTTTGAATGCTGATGG
GTCCACGTCCAGCTCTAAAGGTAGGTTTCATGGTTCTCCAAAGTTGCTTTCTTGTGTCAGAATTGAGCCACATCAGG
TAGGTGGGGAAGTAGATCAGTGAGGATGCTTCACATGTGTGGGCACTGGGAACAGAATGCTTCAATAACACGAG
CTGACGAGGGCCCGCTATGAAAAAAAAGATTCTCTGTGCCCCCTGGCGCCTCCGCACTTAAAGAATTGATGACC
GTGCGGCCGCGATATCCTGCAGATGCATCCAGTACA