



Illumina, Inc.  
5200 Illumina Way  
San Diego, CA 92122 USA  
tel 858.202.4500  
fax 858.202.4545  
www.illumina.com

September 7, 2012

Dear Customer,

We are providing this letter in response to your request for nucleotide sequence information about oligonucleotides used in Illumina's 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.

Most of Illumina's oligonucleotides are specially modified and purified in a proprietary manner to enable and optimize their performance with Illumina instruments. The oligonucleotides described in this letter are available directly from Illumina, which is the only authorized supplier of the oligos. Illumina has no control over the quality, composition, or compatibility of reagents from non-authorized suppliers. We cannot troubleshoot or provide other support for experiments performed with non-authorized reagents, and we cannot guarantee the performance of Illumina products when used with such reagents.

The oligonucleotides described in this letter are proprietary to Illumina, and their manufacture, use, and sequence information are protected by intellectual property, including issued or pending patents, copyright, and trade secrets. Illumina reserves all rights in the oligonucleotides and their sequence information, except for the strictly limited permissions as follows.

***Limited permission to copy or distribute sequence information***

You are permitted to copy and distribute this letter within your institution, but only for use with Illumina's instruments (including the Genome Analyzer™, HiSeq®, HiScan®, and MiSeq® instruments) and their associated equipment, reagents, kits, and software ("Illumina products"). You may not copy or distribute this letter or its information outside your institution, or where it will be accessible outside your institution, except as provided below.

For individual sequences contained in this letter, Illumina grants you the limited permission to distribute the sequence information outside your institution or to publish the sequence information in presentations, manuscripts, or publications authored by you, as long as it is accompanied by the following copyright notice:

Oligonucleotide sequences © 2007-2012 Illumina, Inc. All rights reserved.

If you modify or adapt any sequence information contained in this letter and distribute or publish the modified sequences, it must be accompanied by the following copyright notice:

Oligonucleotide sequences © 2007-2012 Illumina, Inc. All rights reserved.  
Derivative works created by Illumina customers are authorized for use with Illumina instruments and products only. All other uses are strictly prohibited.

For all other uses of the sequence information in this letter, or for questions on custom oligonucleotides, please contact Illumina to discuss the permissions or licenses that may be required.

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

Sincerely yours,

Customer Solutions  
858-202-4566

## **Nextera® DNA Sample Preparation Kit (Illumina) <sup>1,2</sup>**

### **Nextera® transposase sequences (FC-121-1031, FC-121-1030)**

5' TCGTCGGCAGCGTCAGATGTGTATAAGAGACAG  
(a) Read 1 -->

5' GTCTCGTGGGCTCGGAGATGTGTATAAGAGACAG  
(d) Read 2 -->

### **Nextera® Index Kit - PCR primers (FC-121-1012, FC-121-1011)**

5' AATGATACGGCGACCACCGAGATCTACAC [i5] TCGTCGGCAGCGTC  
(c) i5 Index read -->

5' CAAGCAGAAGACGGCATACGAGAT [i7] GTCTCGTGGGCTCGG  
<-- i7 Index read (b)

### **Nextera® codes for entry on sample sheet:**

<b>i5 bases in adapter</b>	<b>Nextera DNA i5 index name</b>	<b>Nextera XT i5 index name</b>	<b>Nextera Enrichment i5 index name</b>	<b>i5 bases for entry on sample sheet</b>
<u>TAGATCGC</u>	N501	S501	E501	<b>TAGATCGC</b>
<u>CTCTCTAT</u>	N502	S502	E502	<b>CTCTCTAT</b>
<u>TATCCTCT</u>	N503	S503	E503	<b>TATCCTCT</b>
<u>AGAGTAGA</u>	N504	S504	E504	<b>AGAGTAGA</b>
<u>GTAAGGAG</u>	N505	S505	E505	<b>GTAAGGAG</b>
<u>ACTGCATA</u>	N506	S506	E506	<b>ACTGCATA</b>
<u>AAGGAGTA</u>	N507	S507	E507	<b>AAGGAGTA</b>
<u>CTAAGCCT</u>	N508	S508	E508	<b>CTAAGCCT</b>

<b>i7 bases in adapter</b>	<b>Nextera DNA i7 index name</b>	<b>Nextera XT i7 index name</b>	<b>Nextera Enrichment i7 index name</b>	<b>i7 bases for entry on sample sheet</b>
<u>TCGCCTTA</u>	N701	N701	N701	<b>TAAGGCGA</b>
<u>CTAGTACG</u>	N702	N702	N702	<b>CGTACTAG</b>
<u>TTCTGCCT</u>	N703	N703	N703	<b>AGGCAGAA</b>
<u>GCTCAGGA</u>	N704	N704	N704	<b>TCCTGAGC</b>
<u>AGGAGTCC</u>	N705	N705	N705	<b>GGACTCCT</b>
<u>CATGCCTA</u>	N706	N706	N706	<b>TAGGCATG</b>
<u>GTAGAGAG</u>	N707	N707	N707	<b>CTCTCTAC</b>
<u>CCTCTCTG</u>	N708	N708	N708	<b>CAGAGAGG</b>

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

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

<u>AGCGTAGC</u>	N709	N709	N709	<b>GCTACGCT</b>
<u>CAGCCTCG</u>	N710	N710	N710	<b>CGAGGCTG</b>
<u>TGCCTCTT</u>	N711	N711	N711	<b>AAGAGGCA</b>
<u>TCCTCTAC</u>	N712	N712	N712	<b>GTAGAGGA</b>

**TruSeq® Custom Amplicon or TruSeq® Amplicon – Cancer Panel**  
 (codes for entry on sample sheet)<sup>2,3</sup>

**i5 index**

A501	TGAACCTT
A502	TGCTAAGT
A503	TGTTCTCT
A504	TAAGACAC
A505	CTAATCGA
A506	CTAGAACA
A507	TAAGTTCC
A508	TAGACCTA

**i5 code**

**i7 index**

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

**i7 code**

---

<sup>3</sup> Patent pending.

## **TruSeq® DNA HT and RNA HT Sample Prep Kits**<sup>2,4,5</sup>

### **D501–D508 adapters**

AATGATACGGCGACCACCGAGATCTACAC [**i5**] ACACTCTTTCCCTACACGACGCTCTTCCGATCT

### **D701–D712 adapters**

GATCGGAAGAGCACACGTCTGAACTCCAGTCAC [**i7**] ATCTCGTATGCCGTCTTCTGCTTG

<b>i5 index name</b>	<b>i5 bases in D5xx adapter and for entry on sample sheet</b>
D501	TATAGCCT
D502	ATAGAGGC
D503	CCTATCCT
D504	GGCTCTGA
D505	AGGCGAAG
D506	TAATCTTA
D507	CAGGACGT
D508	GTACTGAC

<b>i7 index</b>	<b>i7 bases in D7xx adapter and for entry on sample sheet</b>
D701	ATTACTCG
D702	TCCGGAGA
D703	CGCTCATT
D704	GAGATTCC
D705	ATTCAGAA
D706	GAATTCGT
D707	CTGAAGCT
D708	TAATGCGC
D709	CGGCTATG
D710	TCCGCGAA
D711	TCTCGCGC
D712	AGCGATAG

---

<sup>4</sup> For TruSeq process control sequences, see Appendix.

<sup>5</sup> Used in the methods of U.S. Patent 7,741,953.

## **TruSeq® DNA v1/v2/LT and RNA v1/v2/LT and ChIP Sample Prep Kits**<sup>2,5</sup>

### **TruSeq Universal Adapter**

5' AATGATACGGCGACCACCGAGATCTACACTCTTTCCCTACACGACGCTCTTCCGATCT

### **TruSeq Adapter, Index 1**<sup>6</sup>

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACATCACGATCTCGTATGCCGTCTTCTGCTTG

### **TruSeq Adapter, Index 2**

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACCGATGTATCTCGTATGCCGTCTTCTGCTTG

### **TruSeq Adapter, Index 3**

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACTAGGCATCTCGTATGCCGTCTTCTGCTTG

### **TruSeq Adapter, Index 4**

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACTGACCAATCTCGTATGCCGTCTTCTGCTTG

### **TruSeq Adapter, Index 5**

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACCACAGTGATCTCGTATGCCGTCTTCTGCTTG

### **TruSeq Adapter, Index 6**

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACGCCAATATCTCGTATGCCGTCTTCTGCTTG

### **TruSeq Adapter, Index 7**

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACCAGATCATCTCGTATGCCGTCTTCTGCTTG

### **TruSeq Adapter, Index 8**

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACACTTGAATCTCGTATGCCGTCTTCTGCTTG

### **TruSeq Adapter, Index 9**

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACGATCAGATCTCGTATGCCGTCTTCTGCTTG

### **TruSeq Adapter, Index 10**

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACTAGCTTATCTCGTATGCCGTCTTCTGCTTG

### **TruSeq Adapter, Index 11**

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACGGCTACATCTCGTATGCCGTCTTCTGCTTG

### **TruSeq Adapter, Index 12**

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACCTTGTAATCTCGTATGCCGTCTTCTGCTTG

### **TruSeq Adapter, Index 13**

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACAGTCAACAATCTCGTATGCCGTCTTCTGCTTG

### **TruSeq Adapter, Index 14**

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACAGTTCCGTATCTCGTATGCCGTCTTCTGCTTG

### **TruSeq Adapter, Index 15**

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACATGTCAGAATCTCGTATGCCGTCTTCTGCTTG

### **TruSeq Adapter, Index 16**

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACCCGTCCCCGATCTCGTATGCCGTCTTCTGCTTG

### **TruSeq Adapter, Index 18**<sup>7</sup>

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACGTCCGCACATCTCGTATGCCGTCTTCTGCTTG

### **TruSeq Adapter, Index 19**

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACGTGAAACGATCTCGTATGCCGTCTTCTGCTTG

### **TruSeq Adapter, Index 20**

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACGTGGCCTTATCTCGTATGCCGTCTTCTGCTTG

### **TruSeq Adapter, Index 21**

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACTTTTCGGAATCTCGTATGCCGTCTTCTGCTTG

### **TruSeq Adapter, Index 22**

<sup>6</sup> Index sequences are 6 bases as underlined. Please enter only these 6 bases on the sample sheet.

<sup>7</sup> Index numbers 17, 24, and 26 are reserved.

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACCGTACGTAATCTCGTATGCCGTCTTCTGCTTG

**TruSeq Adapter, Index 23**

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACGAGTGGATATCTCGTATGCCGTCTTCTGCTTG

**TruSeq Adapter, Index 25**

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACACTGATATATCTCGTATGCCGTCTTCTGCTTG

**TruSeq Adapter, Index 27**

5' GATCGGAAGAGCACACGTCTGAACTCCAGTCACATTCCTTTATCTCGTATGCCGTCTTCTGCTTG

**Oligonucleotide sequences for TruSeq® Small RNA Sample Prep Kits**

**RNA 5' Adapter (RA5), part # 15013205**

5' GUUCAGAGUUCUACAGUCCGACGAUC

**RNA 3' Adapter (RA3), part # 15013207**

5' TGGAAATTCTCGGGTGCCAAGG

**Stop Oligo (STP)<sup>8</sup>**

5' GAAUCCACCACGUUCCCGUGG

**RNA RT Primer (RTP), part # 15013981**

5' GCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer (RP1), part # 15013198**

5' AATGATACGGCGACCACCGAGATCTACACGTTTCAGAGTTCTACAGTCCGA

**RNA PCR Primer, Index 1 (RPI1)<sup>2,9</sup>**

5' CAAGCAGAAGACGGCATAACGAGATCGTGATGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 2 (RPI2)**

5' CAAGCAGAAGACGGCATAACGAGATACATCGGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 3 (RPI3)**

5' CAAGCAGAAGACGGCATAACGAGATGCCTAAGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 4 (RPI4)**

5' CAAGCAGAAGACGGCATAACGAGATTGGTCAGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 5 (RPI5)**

5' CAAGCAGAAGACGGCATAACGAGATCACTGTGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 6 (RPI6)**

5' CAAGCAGAAGACGGCATAACGAGATATTGGCGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 7 (RPI7)**

5' CAAGCAGAAGACGGCATAACGAGATGATCTGGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 8 (RPI8)**

5' CAAGCAGAAGACGGCATAACGAGATTCAAGTGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

---

<sup>8</sup> Patent pending.

<sup>9</sup> 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 9 (RPI9)**

5' CAAGCAGAAGACGGCATAACGAGATCTGATCGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 10 (RPI10)**

5' CAAGCAGAAGACGGCATAACGAGATAAGCTAGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 11 (RPI11)**

5' CAAGCAGAAGACGGCATAACGAGATGTAGCCGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 12 (RPI12)**

5' CAAGCAGAAGACGGCATAACGAGATTACAAGGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 13 (RPI13)**

5' CAAGCAGAAGACGGCATAACGAGATTTGACTGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 14 (RPI14)**

5' CAAGCAGAAGACGGCATAACGAGATGGAAGTGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**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' CAAGCAGAAGACGGCATAACGAGATGCCGACGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 19 (RPI19)**

5' CAAGCAGAAGACGGCATAACGAGATTTTCACGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**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' CAAGCAGAAGACGGCATAACGAGATGCTCATGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 27 (RPI27)**

5' CAAGCAGAAGACGGCATAACGAGATAGGAATGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 28 (RPI28)**

5' CAAGCAGAAGACGGCATAACGAGATCTTTTGGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 29 (RPI29)**

5' CAAGCAGAAGACGGCATAACGAGATTAGTTGGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 30 (RPI30)**

5' CAAGCAGAAGACGGCATAACGAGATCCGGTGGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 31 (RPI31)**

5' CAAGCAGAAGACGGCATAACGAGATATCGTGGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 32 (RPI32)**

5' CAAGCAGAAGACGGCATAACGAGATTGAGTGGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA



**RNA PCR Primer, Index 33 (RPI33)**

5' CAAGCAGAAGACGGCATAACGAGATCGCCTGGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 34 (RPI34)**

5' CAAGCAGAAGACGGCATAACGAGATGCCATGGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 35 (RPI35)**

5' CAAGCAGAAGACGGCATAACGAGATAAAATGGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 36 (RPI36)**

5' CAAGCAGAAGACGGCATAACGAGATTGTTGGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 37 (RPI37)**

5' CAAGCAGAAGACGGCATAACGAGATATTCGGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 38 (RPI38)**

5' CAAGCAGAAGACGGCATAACGAGATAGCTAGGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 39 (RPI39)**

5' CAAGCAGAAGACGGCATAACGAGATGTATAGGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 40 (RPI40)**

5' CAAGCAGAAGACGGCATAACGAGATTCTGAGGTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**RNA PCR Primer, Index 41 (RPI41)**

5' CAAGCAGAAGACGGCATAACGAGATGTCGTGCTGACTGGAGTTCCTTGGCACCCGAGAATTCCA

**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) <sup>1,2,10</sup>

### **Transposon Sequences**

5' -GCCTCCCTCGCGCCATCAGAGATGTGTATAAGAGACAG

5' -GCCTTGCCAGCCCGCTCAGAGATGTGTATAAGAGACAG

### **Adaptors** (showing optional bar code)

5' -AATGATACGGCGACCACCGAGATCTACACGCCTCCCTCGCGCCATCAG

5' -CAAGCAGAAGACGGCATAACGAGAT [**barcode**] CGGTCTGCCTTGCCAGCCCGCTCAG-3'

### **PCR Primers**

5' -AATGATACGGCGACCACCGA

5' -CAAGCAGAAGACGGCATAACGA

## **Oligonucleotide sequences for Genomic DNA**

### **Adaptors**

5' P-GATCGGAAGAGCTCGTATGCCGTCTTCTGCTTG

5' ACACTCTTTCCCTACACGACGCTCTTCCGATCT

### **PCR Primers**

5' AATGATACGGCGACCACCGAGATCTACACTCTTTCCCTACACGACGCTCTTCCGATCT

5' CAAGCAGAAGACGGCATAACGAGCTCTTCCGATCT

### **Genomic DNA Sequencing Primer**

5' ACACTCTTTCCCTACACGACGCTCTTCCGATCT

## **Paired End DNA oligonucleotide sequences**

### **PE Adaptors**

5' P-GATCGGAAGAGCGGTTCAGCAGGAATGCCGAG

5' ACACTCTTTCCCTACACGACGCTCTTCCGATCT

### **PE PCR Primer 1.0**

5' AATGATACGGCGACCACCGAGATCTACACTCTTTCCCTACACGACGCTCTTCCGATCT

### **PE PCR Primer 2.0**

5' CAAGCAGAAGACGGCATAACGAGATCGGTCTCGGCATTCTGCTGAACCGCTCTTCCGATCT

### **PE Read 1 Sequencing Primer**

5' ACACTCTTTCCCTACACGACGCTCTTCCGATCT

---

<sup>10</sup> These kits are no longer available for purchase. As a replacement, we recommend FC-121-1031

### **PE Read 2 Sequencing Primer**

5' CGGTCTCGGCATTCCTGCTGAACCGCTCTTCCGATCT

## **Oligonucleotide sequences for the Multiplexing Sample Prep Oligo Only Kit<sup>2</sup>**

### **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' CAAGCAGAAGACGGCATAACGAGATCGTGATGTGACTGGAGTTC

### **PCR Primer, Index 2**

5' CAAGCAGAAGACGGCATAACGAGATACATCGGTGACTGGAGTTC

### **PCR Primer, Index 3**

5' CAAGCAGAAGACGGCATAACGAGATGCCTAAGTGACTGGAGTTC

### **PCR Primer, Index 4**

5' CAAGCAGAAGACGGCATAACGAGATTGGTCAGTGACTGGAGTTC

### **PCR Primer, Index 5**

5' CAAGCAGAAGACGGCATAACGAGATCACTGTGTGACTGGAGTTC

### **PCR Primer, Index 6**

5' CAAGCAGAAGACGGCATAACGAGATATTGGCGTGACTGGAGTTC

### **PCR Primer, Index 7**

5' CAAGCAGAAGACGGCATAACGAGATGATCTGGTGACTGGAGTTC

### **PCR Primer, Index 8**

5' CAAGCAGAAGACGGCATAACGAGATTCAAGTGTGACTGGAGTTC

### **PCR Primer, Index 9**

5' CAAGCAGAAGACGGCATAACGAGATCTGATCGTGACTGGAGTTC

### **PCR Primer, Index 10**

5' CAAGCAGAAGACGGCATAACGAGATAAGCTAGTGACTGGAGTTC

### **PCR Primer, Index 11**

5' CAAGCAGAAGACGGCATAACGAGATGTAGCCGTGACTGGAGTTC

**PCR Primer, Index 12**

5' CAAGCAGAAGACGGCATAACGAGATTACAAGGTGACTGGAGTTC

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

**RT Primer**

5' CAAGCAGAAGACGGCATAACGA

**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' CAAGCAGAAGACGGCATAACGA

**Small RNA PCR Primer 2**

5' AATGATACGGCGACCACCGACAGGTTCCAGAGTTCTACAGTCCGA

**Small RNA Sequencing Primer**

5' CGACAGGTTCCAGAGTTCTACAGTCCGACGATC

**Appendix: Process Controls for TruSeq® Sample Preparation Kits  
(Included in TruSeq DNA and RNA (v1/v2/LT/HT) and TruSeq Exome Kits <sup>11</sup>**

**CTE2 - 150bp**

ATCCTGCAGATGCATCCAGTACTAGTATGGCCCGGGGATCCTACGTTCCAAATGCAGCGAGCTCGTATAACCCTTT  
AAGAGTTGCTCTTTTTGTTTGGTAAGTTGCAAATCGAAGTTTTAGATTGAGTTCTACGTCGAGCGGCCGCGAT

**CTE2 - 250bp**

ATCCTGCAGATGCATCCAGTACTAGTATGGCCCGGGGATCCTTATCTGTCAAACCGCTAATGTCCGTTCTAAGAC  
CGTCTGGAGAACACTTGCCCATCAGTGCTTTTTGAACCTTTTTTTTACAGGTCCCTTCCGATTACACTGAGAAGCTGA  
CCACACCTGCTAGAAGATGGAGGTATGCAGCCCGTTAGTAGGAGTAATACTACCCAGCTTATAACCCCTCAAACGTAG  
GGCAGATGGCGGCCGCGAT

**CTE2 - 350bp**

ATCCTGCAGATGCATCCAGTACTAGTATGGCCCGGGGATCCTAGAGACCATTTCGCGATTCCATGAGACTCCAAGGG  
TTCTGCACAACCTTATGCACCTCTATTAGATCATTGTGTTCTACGAAGCCTGGACTGCATTACATATTCACAACCAAC  
ATGAGAAGAGCGGAATAGATGGCCGGATGTTTGGTGGCTTTGATATATTGTGAGGAGCATTGCGAACCCCTAGAGCTG  
TCCGGTCAAATAACCCCTCACAATAAGTGTAATGTCATGGGATAATCAAAGACTAAGGGAGGGCTTTTTATAGAAG  
GCGTGAGGTCATGCTATCCCCCTCTGAAGACGCGGCCGCGAT

**CTE2 - 450bp**

ATCCTGCAGATGCATCCAGTACTAGTATGGCCCGGGGATCCGTATACGTTTTCTAATTTGTAGTTAACGGTTGGATA  
CCACTTTGAGGCATGTAATATGGTACTGAGCTTCGGCACAGGGCTCAAATTCATCATTAAATGTCTCCGATGTGGC  
TATATGTCATGGATAAAGGCAGCCCCCTATATCTTTTTTTGTGGCAGCATGGGTCCATCAAAGCAATTATTCAGGGT  
CTTAATGACCTCCACAGCTCTAAACGTAATTCATCTGGCTTTGCCTGTACTTACTTCCCTCCATGAAAAAAGTGTG  
ATAATGCTCATAATGCTGCCAGCAATTTCCCTCCCTTCTCAAGACTATTCTGGCTTCCCTGGGTACTTAAAAACAGGG  
CTTAGAGTATGGCTGCTGACAAAATTGCACTCTAAACGCTAGCTTAGGTCTTCTGCGGCCGCGAT

**CTE2 - 550bp**

ATCCTGCAGATGCATCCAGTACTAGTATGGCCCGGGGATCCGTTAGCTATCGTTTCGCGAGAAAGTTAGTAGACACA  
CAGGACCCAGGCGTGCAAGTCAATTTAGCTGACTACACCGATTCTGGTTAAAAGAGCCTATGGCCACCCTTATTTT  
AGAGAAAAAAACCACACCTCTAATGTGTTGGGCACTAGAAAAAGCTAACTACCTAGTCCGTTTCTGGACGACTTCA  
TTGGGAATAACATACCCCCACTGTGATTAAGACTGGCACTGTCCTAATGCTTTCTTCAATAGGTTTGGCTCATGTG  
TGATCCCTCTGGCAAACCTATAGAGGACAAGCAGAATAAACCAATTCAAGGTCGTTGTAGCTGAAGGCCTGGCCTG  
CCTGACAGTTAATTATGAGCATGTCTTGCCCTTCATGGTGGATATTACAGCTGAAAGTGGTATTGGCATTTTTTTTC  
TGAGGACACAACGAGGAAATCTGATAAATACGGCCACCTGAAGTCTAGCTCGGAGTTAAACAATTTACCACGTTTAGA  
GCGGCCGCGAT

**CTE2 - 650bp**

ATCCTGCAGATGCATCCAGTACTAGTATGGCCCGGGGATCCGCTCGCACTTAGCCTGTTAAGGGGTTTCGCGCTCGT  
CTAGTCTGTGCTGTTGCTGGATAGTAAATTATCATGGTACAAACTTTTAAAGAGCCAGTTAAATGGAGATGGATTTA  
AAAAGAGTTATTGTAAAGTCTCCCCAGGTGTGTCATTAAATATCCCAACAGATTGCCCTGGCCTGACCCCTAAATG  
CAATTTTGGGATTCCCTTTTAGTTGCTTTCATTAAAATGTACCAGCGCAGTAAAAAAGCACAAAGTATATTGTTTA  
TGTAACCTACTATCTCATTGCACTGGTTACATGGCAGCTTCAGACTGACTAAAACCTACACTTTTCCCACCATGGTT  
CAAAGATCAACAGAAGTGGGCCAACAAAAGCAATTTTTTTCATGTGGTCTAACTACCAACTTATTATGAGTTAAGTTA  
CTTTTAGGTTTAAAATCACAGCAGTTTTTCCCTCCACACCTCCCAGAGATACTTTCAGGGTGGCTAAACTTGGCTAA  
AGGCTTCCGGACCAACCCTTGTTTCTTTATGGTGTCTGTGTCCTGACAACCGGTAAGGCATGGAAATTCAGCTATT  
TATCCGATCGTTTATATGGGCGTGCGGCCGCGAT

**CTE2 - 750bp**

ATCCTGCAGATGCATCCAGTACTAGTATGGCCCGGGGATCCTTGGACCGTTAATTCATATATCGAAGTAGCAGGTT  
GTTGCCCGCCTGATGTTGCCACTACTTGCTCATGACAGTTTTTTTTAGGCAATGCAAACCTACTATTTGATATTTTTT  
TCCAAGTACAGTTGTAGGGTACTCCTTATACTGATTCTTCTGAGCCTGTACGGGGAGCATTAGGTACTGATGTAGTA  
GGAGTTGAGCTTCAAAATTCACCAGGTAAGCCCAAATTTATTTTTCTGCTTGGACAGGTCCACCTCACATGGGCTGTG  
TCTAATATATTTAAAGAGGGGATTTTTCTTTGCTGTATTGCAGCCCAGTATATCTGTTACTTACAGTAGTAGTCCATTA  
TTGCTGGCCTAGGGGCTTTTTGCTCCTACACGAACACCCTCTGTAAAATTTGAGGTCGTCCTTAGAGTCAAACCATT

---

<sup>11</sup> Patent pending

CATGGAGCGCTCTGTGCATCTACCAACTATCGCTAAGCATTCACTTGGTTGGTTTAAAGTGGAGGCAACTCCATTATC  
TTCTAGCATAACCCTTCCCAGGCTACATGTAGAAAGAGATCTGTTGGGCCCCACTATTTTTTACCCAGGGAAGCCTA  
CTTTAGTTATAGCTTGCCAGAGATTTTCTGTGTATGTAGAAAGTCACTTTTAAACACCAGGAGGTGGATGTGGG  
GCCAGGAAATATGTCAATAACGATACGGGACTTCTAACAGTGACTCGCGGCCGCGAT

**CTE2 - 850bp**

ATCCTGCAGATGCATCCAGTACTAGTATGGCCCCGGGGGATCCTTAAGTCGTGTCTTCTCCTACGATCTTGTGAACG  
ATGGATATTTTCTTTCTAAACTTTAAACAAACAGTGGAGAGATGTTGTTGTGTGTGGAACGACGCTTAGCCTACCGA  
GGAAGATCCAGACTACAATAGAATATGTGGCCAAAACCTCTCCGCAACTTCAGCAGCAAAAAGGATATTATTGACATA  
ACCTCCTCACAAAAGTACACAAATGGCTAAATAACAGAGCCCCTCTTTTTACTAGGGAAATGGTGGATGTGGACTT  
TAGAATTTAAGATAATAAAGCTCTTGATCCCAATGTTATTTCCATGTGAGGGACATTAAATTGAGTAACCTTTGCCA  
CATACCCTCTCCCAGAGTCCATTCTCTAAAACCTTGAAGCTCCGCCCTTTTTACGCACATTAGGCTTCCAATTACGG  
TCAATGGTCTTGAAGATTGGGAGCTTTTGAAGAGTAATAAGAACCATCACAAAAGGAACCCAGAAGCCGGGAGTGT  
CTACCAAAAAAATCAAGGGTTAAAAAAGTGCATTTTCTCCTGTTTTTACACATGATTTTGAATGCTGATGGG  
TCCACGTCCAGCTCTAAAGGTAGGTTTCATGGTTCTCAAAGTTGCTTTCTTGTGAGAATTGAGCCACATCAGGTAGG  
TGGGGAAGTAGATCAGTGAGGATGCTTACATGTGTGGGCACTGGGAACAGAATGCTTCAATAACACGAGCTGACGA  
GGCCCCGCTATGAAAAAAGATTCTCTGTGCCCTGGCGCCTCCGCACTTAAAGAATTGATGACCGTGCAGCCGCG  
GAT

**CTE1 - 123bp**

GATCCTACGTTCCAAATGCAGCGAGCTCGTATAACCCTTTAAGAGTTGCTCTTTTTGTTTGGTAAGTTGCAAATCGA  
AGTTTTAGATTGAGTTCTACGTCGAGCGGCCGCGATATCCTGCAGATGCA

**CTE1 - 223bp**

GATCCTTATCTGTCAAAACCGCTAATGTCCGTTCTAAGACCGTCTGGAGAACACTTGCCCATCAGTGCTTTTGAACC  
TTTTTTTACAGGTCCCTTCCGATTACACTGAGAAGCTGACCACACCTGCTAGAAGATGGAGGTATGCAGCCCGTTA  
GTAGGAGTAATACTACCCAGCTTATAACCCTCAAACGTAGGGCAGATGGCGGCCGCGATATCCTGCAGATGCA

**CTE1 - 323bp**

GATCCTAGAGACCATTTCGCGATTCCATGAGACTCCAAGGGTCTGCACAACCTTATGCACCTCTATTAGATCATTGTG  
TTCTACGAAGCCTGGACTGCATTACATATTCACAACCAACATGAGAAGAGCGGAATAGATGGCCGGATGTTTGGTGG  
CTTTGATATATTGTGAGGAGCATTGCGAACCCTAGAGCTGTCCGGTCAAATAACCCCTCACAAATAGTGAATGTC  
ATGGGATAAATCAAAGACTAAGGGAGGGCTTTTATAGAAGCGTGAGGTATGCTATCCCCCTCTGAAGACGCGGCC  
CGGATATCCTGCAGATGCA

**CTE1 - 423bp**

GATCCGTATACGTTTCTAATTTGTAGTTAACGGTTGGATACCCTTTGAGGCATGTAATATGGTACTGAGCTTCGGC  
ACAGGGCTCAAATTCATCATTAAATGTCTCCGATGTGGCTATATGTCATGGATAAAGGCAGCCCCCTATATCTTTT  
TTTGTGGCAGCATGGGTCCATCAAAGCAATTATTAGGGTCTTAATGACCTCCACAGCTCTAAACGTAATTCATCTG  
GCTTTGCCTGTACTTACTTCCCTCCATGAAAAAAGTGTGATAATGCTCATAATGCTGCCAGCAATTTCTCCCTT  
CTCAAGACTATTCTGGCTTCCCTGGGTAATTTAAACAGGGCTTAGAGTATGGCTGCTGACAAAATTGCACTCTAAAC  
GCTAGCTTAGGTCTTCTGCGGCCGCGATATCCTGCAGATGCA

**CTE1 - 523bp**

GATCCGTTAGCTATCGTTCGCGAGAAAGTTAGTAGACACACAGGACCCAGGCGTGCAAGTCAATTTAGCTGACTAC  
ACCGATTCTGGTTAAAAGAGCCTATGGCCACCCTTATTTTATAGAGAAAAAACCACACCTCTAATGTGTTGGGCACT  
AGAAAAAGCTAACTACCTAGTCCGTTTCTGGACGACTTCATTGGGAATAACATACCCCCCACTGTGATTAAGACTGG  
CACTGTCCTAATGCTTTCTTCAATAGGTTTGGCTCATGTGTGATTCCCTCTGGCAAACCTTATAGAGGACAAGCAGAA  
TAAACCAATTCAAGGTCGTTGTAGCTGAAGGCCTGGCCTGCCTGACAGTTAATTATGAGCATGCTTTGCCCTTCATG  
GTGGATATTCACAGCTGAAAGTGGTATTGGCATTTTTTTCTGAGGACACAACGAGGAAATCTGATAAATACGGCCAC  
CTGAAGTCTAGCTCGGAGTTAAACAATTTACCACGTTTAGAGCGGCCGCGATATCCTGCAGATGCA

**CTE1 - 623bp**

GATCCGCTCGCACTTAGCCTGTTAAGGGTTTCGCGCTCGTCTAGTCTGTGCTGTTGCCTGGATAGTAAATTATCATG  
GTACAAACTTTTAAAGAGCCAGTTAAATGGAGATGGATTTAAAAGAGTTATTGTAAAGTCTCCCCAGGTGTGTCATT  
AAATATCCCAACAGATTGCCCTGGCCTGACCCCTAAATGCAATTTTGGGATTCCCTTTTATGTTGCTTTTCAATAAA  
TGTACCAGCGCAGTAAAAAAGCACAAAGTATATTGTTTATGTAACCTACTATCTATTTGCACTGGTTACATGGCA  
GCTTCAGACTGACTAAAACCTACTTTTCCACCATGGTTCAAAGATCAACAGAAGTGGGCCAACAAAAGCAATTTT  
TTCATGTGGTCTAACTACCAACTTATTATGAGTTAAGTTACTTTTAGGTTTAAAATCACAGCAGTTTTTCCCTCCAC  
ACCTCCCAGAGATACTTTTAGGGTGGCTAAACTTGGCTAAAGGCTTCCGGACCAACCCTTGTTTCTTTATGGTGTCTT

GTGTCCTGACAACCGCGTAAGGCATGGAAATTCAGCTATTTATCCGATCGTTTATATGGGCGTGCGGCCGCGATATC  
CTGCAGATGCA

**CTE1 - 723bp**

GATCCTTGGACCGTTAATTCATATATCGAAGTAGCAGGTTGTTGCCCGCCTGATGTTGCCACTACTTGCTCATGAC  
AGTTTTTTTTAGGCAATGCAAACACTATTTGATATTTTTTCCAAGTACAGTTGTAGGGTACTCCTTATACTGATTC  
TTCTGAGCCTGTACGGGGAGCATTAGGTACTGATGTAGTAGGAGTTGAGCTTCACAAATTCACCAGGTAAGCCCAAA  
TTTTTTTTCTGCTTGGACAGGTCCACCTCACATGGGTCTGTCTAATATATTTAAAAGAGGGATTTTCTTTGCTGTATT  
GCAGCCAGTATATCTGTTACTTACAGTAGTAGTCCATTATTGCTGGCCTAGGGGCTTTTGTCTACACGAACACC  
ACTCTGTAAAATTTGAGGTGCTCCTTAGAGTCAAACCATTCATGGAGCGCTCTGTGCATCTACCAACTATCGCTAAG  
CATTCACTTGGTTGGTTTAAAGTGGAGGCAACTCCATTATCTTCTAGCATAACCCTTCCCAGGCTACATGTAGAAAGAG  
ATCTGTTGGGCCCCACTATTTTTTCAACCAGGGAAGCCTACTTTAGTTATAGCTTGCCAGAGATTTTCTGTGTATG  
TAGAAGTCATCCACTTTTAAACCAGGAGGTGGATGTGGGGCCAGGAAATATGTCAATAACGATACGGGACTTCTAA  
CAGTGACTCGCGGCCGCGATATCCTGCAGATGCA

**CTE1 - 823bp**

GATCCTTAAAGTCGTGTCCTTCTCCTACGATCTTGTGAACGATGGATATTTTCTTTCTAAACTTTAAACAAACAGTGG  
AGAGATGTTGTTGTGTGTGGAACGACGCTTAGCCTACCGAGGAAGATCCAGACTACAATAGAATATGTGGCCAAAAC  
TCTCCGCAACTTCAGCAGCAAAAAGGATATTATTGACATAACCTCCTCACAAAAAGTACACAAATGGCTAAATAACA  
GAGCCCTCTTTTTACTAGGGAAATGGTGGATGTGGACTTTAGAATTTAAGATAATAAAGCTCTTGATCCCAATGTT  
ATTTCCATGTGAGGGACATTAATTTGAGTAACCTTTGCCACATACCCTCTCCAGAGTCCATTCTCTAAAACCTTGAA  
GCTCCGCCCCTTTTACGCACATTAGGCTTCCAATTTACGGTCAATGGTCTTGAAGATTGGGAGCTTTTGAAGAGTAA  
TAAGAACCATCACAAAAAGGAACCCAGAAGCCGGGAGTGTCTACCAAAAAAATTCAAGGGTTAAAAAAAAGTGACAT  
TTTTCTCCTGTTTTTTACACATGATTTTTGAATGCTGATGGGTCCACGTCCAGCTCTAAAGGTAGGTTTATGTTCTCC  
AAAGTTGCTTTCTTGTGAGAATTGAGCCACATCAGGTAGGTGGGGAAGTAGATCAGTGAGGATGCTTACATGTGTG  
GGCACTGGGAACAGAATGCTTCAATAACACGAGCTGACGAGGGCCCGCTATGAAAAAAAAGATTCTCTGTGCCCTT  
GGCGCCTCCGCACTTAAAGAATTGATGACCGTGCGGCCGCGATATCCTGCAGATGCA

**CTA - 150bp**

GGGGGATCCTACGTTCCAAATGCAGCGAGCTCGTATAACCCTTTAAGAGTTGCTCTTTTTGTTGGTAAAGTTGCAAA  
TCGAAGTTTTAGATTGAGTTCTACGTCGAGCGGCCGCGATATCCTGCAGATGCATCCAGTACTAGTATGGCCC

**CTA - 250bp**

GGGGGATCCTTATCTGTCAAACCGCTAATGTCCGTTCTAAGACCGTCTGGAGAACAACCTTGCCCATCAGTGCTTTTTG  
AACCTTTTTTTCACAGGTCCCTTCCGATTACACTGAGAAGCTGACCACACCTGCTAGAAGATGGAGGTATGCAGCCC  
GTTAGTAGGAGTAATACTACCCAGCTTATAACCCTCAAACGTAGGGCAGATGGCGGCCGCGATATCCTGCAGATGCA  
TCCAGTACTAGTATGGCCC

**CTA - 350bp**

GGGGGATCCTAGAGACCATTTCGCGATTCCATGAGACTCCAAGGGTTCTGCACAACCTTATGCACCTCTATTAGATCAT  
TGTGTTCTACGAAGCCTGGACTGCATTACATATTCACAACCAACATGAGAAGAGCGGAATAGATGGCCGGATGTTTG  
GTGGCTTTGATATATTGTGAGGAGCATTGCGAACCCCTAGAGCTGTCCGGTCAAATAACCCCTCACAAATAGTGTA  
TGTCATGGGATAATCAAAGACTAAGGGAGGGCTTTTATAGAAGGCGTGAGGTATGCTATCCCCCTCTGAAGACGC  
GGCCGCGATATCCTGCAGATGCATCCAGTACTAGTATGGCCC

**CTA - 450bp**

GGGGGATCCGTATACGTTTCTAATTTGTAGTTAACGGTTGGATACCCTTTGAGGCATGTAATATGGTACTGAGCTT  
CGGCACAGGGCTCAAATTCATCATTAAATGTCTCCGATGTGGCTATATGTCATGGATAAAGGCAGCCCCCTATATC  
TTTTTTTTGTGGCAGCATGGGTCCATCAAAGCAATTATTCAGGGTCTTAATGACCTCCACAGCTCTAAACGTAATTCA  
TCTGGCTTTGCCTGTACTTACTTCCCTCCATGAAAAAAGTGTGATAATGCTCATAATGCTGCCAGCAATTTCCCTC  
CCTTCTCAAGACTATTCTGGCTTCCCTGGGTACTTAAAAACAGGGCTTAGAGTATGGCTGCTGACAAAATTGCACTCT  
AAACGCTAGCTTAGGTCTTCTGCGGCCGCGATATCCTGCAGATGCATCCAGTACTAGTATGGCCC

**CTA - 550bp**

GGGGGATCCGTTAGCTATCGTTTCGCGAGAAAGTTAGTAGACACACAGGACCCAGGCGTGCAAGTCAATTTGAGCTGA  
CTACACCGATTCTGGTTAAAAGAGCCTATGGCCACCCTTATTTTAGAGAAAAAAAACCACACCTCTAATGTGTTGGG  
CACTAGAAAAAGCTAACTACCTAGTCCGTTTCTGGACGACTTCATTGGGAATAACATACCCCCACTGTGATTAAGA  
CTGGCACTGTCCTAATGCTTTCTTCAATAGGTTTTGGCTCATGTGTGATTCCCTCTGGCAAACCTTATAGAGGACAAGC  
AGAATAAACCAATTCAAGGTCGTTGTAGCTGAAGGCCTGGCCTGCCTGACAGTTAATTATGAGCATGTCTTGCCCTT  
CATGGTGGATATTCACAGCTGAAAGTGGTATTGGCATTTTTTTCTGAGGACACAACGAGGAAATCTGATAAATACGG

CCACCTGAAGTCTAGCTCGGAGTTAAACAATTTACCACGTTTAGAGCGGCCGCGATATCCTGCAGATGCATCCAGTAC  
TAGTATGGCCC

**CTA - 650bp**

GGGGGATCCGCTCGCACTTAGCCTGTAAAGGGGTTTCGCGCTCGTCTAGTCTGTGCTGTTGCCTGGATAGTAAATTAT  
CATGGTACAAACTTTTTAAGAGCCAGTTAAATGGAGATGGATTTAAAAAGAGTTATTGTAAAGTCTCCCCAGGTGTGT  
CATTAAATATCCCAACAGATTGCCCTGGCCTGACCCCTAAATGCAATTTTGGGATTCCCTTTTAGTTGCTTTTCATT  
AAAATGTACCAGCGCAGTAAAAAAGCACAAAGTATATTGTTTATGTAACCTACTATCTCATTGCACTGGTTACAT  
GGCAGCTTCAGACTGACTAAAACTACTTTTTCCACCATGGTTCAAAGATCAACAGAAGTGGGCCAACAAAAGCAA  
TTTTTTTCATGTGGTCTAACTACCAACTTATTATGAGTTAAGTTACTTTTTAGGTTTAAAATCACAGCAGTTTTTCCCT  
CCACACCTCCCAGAGATACTTTTCAGGGTGGCTAAACTTGGCTAAAGGCTTCCGGACCAACCCTTGTTTTCTTTATGGT  
GCTTGTGTCTGACAACCGCGTAAGGCATGGAAATTCAGCTATTTATCCGATCGTTTATATGGGCGTGCAGGCCGCGA  
TATCCTGCAGATGCATCCAGTACTAGTATGGCCC

**CTA - 750bp**

GGGGGATCCTTGGACCGTTAATTCATATATCGAAGTAGCAGGTTGTTGCCCGCCTGATGTTGCCACTACTTGCTCA  
TGACAGTTTTTTTTAGGCAATGCAAACCTACTATTTGATATTTTTTCCAAGTACAGTTGTAGGGTACTCCTTATACTG  
ATTCTTCTGAGCCTGTACGGGGAGCATTAGGTACTGATGTAGTAGGAGTTGAGCTTCACAAATTCACCAGGTAAGCC  
CAAATTTATTTTCTGCTTGGACAGGTCCACCTCACATGGGTCTGTCTAATATATTTAAAAGAGGGGATTTTCTTTGCTG  
TATTGCAGCCCAGTATATCTGTTACTTACAGTAGTAGTCCATTATTGCTGGCCTAGGGGCTTTTGTCTTACACGAA  
CACCACCTGTAAAAATTTGAGGTCTCCTTAGAGTCAAACCATTCATGGAGCGCTCTGTGCATCTACCAACTATCGC  
TAAGCATTCACTTGGTTGGTTTTAAGTGGAGGCAACTCCATTATCTTCTAGCATACCCCTTCCAGGCTACATGTAGAA  
AGAGATCTGTTGGGCCCACTATTTTTTACCCAGGGAAGCCTACTTTAGTTATAGCTTGCCAGAGATTTTCTGTGT  
CATGTAGAAGTCATCCACTTTTTAACACCAGGAGGTGGATGTGGGGCCAGGAAATATGTCAATAACGATACGGGACTT  
CTAACAGTGACTCGCGGCCGCGATATCCTGCAGATGCATCCAGTACTAGTATGGCCC

**CTA - 850bp**

GGGGGATCCTTAAAGTCGTGTCTTCTCCTACGATCTTGTGAACGATGGATATTTTCTTTCTAAACTTTAAACAAACA  
GTGGAGAGATGTTGTTGTGTGTGGAACGACGCTTAGCCTACCGAGGAAGATCCAGACTACAATAGAATATGTGGCCA  
AAACTCTCCGCAACTTCAGCAGCAAAAAGGATATTATTGACATAACCTCCTCACAAAAAGTACACAAATGGCTAAAT  
AACAGAGCCCCTCTTTTTACTAGGGAAATGGTGGATGTGGACTTTAGAATTTAAGATAATAAAGCTCTTGATCCCAA  
TGTTATTTCCATGTGAGGGACATTAATTTGAGTAACCTTTGCCACATACCCTCTCCAGAGTCCATTCTCTAAAAC  
TGAAGCTCCGCCCCTTTTTACGCACATTAGGCTTCCAATTACGGTCAATGGTCTTGAAGATTGGGAGCTTTTGAAGA  
GTAATAAGAACCATCACAAAAAGGAACCCAGAAGCCGGGAGTGTCTACCAAAAAAATTCAAGGGTTAAAAAAAAGTG  
ACATTTTCTCCTGTTTTTTACACATGATTTTGAATGCTGATGGGTCCACGTCCAGCTCTAAAGGTAGGTTTATGGTT  
CTCCAAAGTTGCTTTTCTTGTGAGAATTGAGCCACATCAGGTAGGTGGGGAAGTAGATCAGTGAGGATGCTTACATG  
TGTGGGCACTGGGAACAGAATGCTTCAATAACACGAGCTGACGAGGGCCCGCTATGAAAAAAAAGATTCTCTGTGCC  
CCCTGGCGCCTCCGCACTTAAAGAATTGATGACCGTGCAGGCGCGATATCCTGCAGATGCATCCAGTACTAGTATGG  
CCC

**CTL - 150bp**

AGTATGGCCCCGGGGATCCTACGTTCCAAATGCAGCGAGCTCGTATAACCCTTTAAGAGTTGCTCTTTTT  
GTTTGGTAAGTTGCAAATCGAAGTTTTAGATTGAGTTCTACGTCGAGCGGCCGCGATATCCTGCAGATGC  
ATCCAGTACA

**CTL - 250bp**

AGTATGGCCCCGGGGATCCTTATCTGTCAAAACCGCTAATGTCCGTTCTAAGACCGTCTGGAGAACACTTGCCCATC  
AGTGCTTTTGAACCTTTTTTTTACAGGTCCCTTCCGATTACACTGAGAAGCTGACCACACCTGCTAGAAGATGGAGG  
TATGCAGCCCCTTAGTAGGAGTAATACTACCCAGCTTATAACCCTCAAACGTAGGGCAGATGGCGGCCGCGATATCC  
TGCAGATGCATCCAGTACA

**CTL - 350bp**

AGTATGGCCCCGGGGATCCTAGAGACCATTTCGCGATTCCATGAGACTCCAAGGGTTCTGCACAACCTTATGCACCTCT  
ATTAGATCATTGTGTTCTACGAAGCCTGGACTGCATTACATATTCACAACCAACATGAGAAGAGCGGAATAGATGGC  
CGGATGTTTGGTGGCTTTGATATATTGTGAGGAGCATTGCGAACCCTAGAGCTGTCCGGTCAAATAACCCCTCACA  
ATAAGTGTAAATGTCATGGGATAATCAAAGACTAAGGGAGGGCTTTTATAGAAGGCGTGAGGTGATGCTATCCCCCT  
CTGAAGACGCGGCCGCGATATCCTGCAGATGCATCCAGTACA

**CTL - 450bp**

AGTATGGCCCCGGGGATCCGTATACGTTTCTAATTTGTAGTTAACGGTTGGATAACCACTTTGAGGCATGTAATATGG  
TACTGAGCTTCGGCACAGGGCTCAAATTCATCATTAAATGTCTCCGATGTGGCTATATGTCATGGATAAAGGCAGC



CCCCTATATCTTTTTTTGTGGCAGCATGGGTCCATCAAAGCAATTATTCAGGGTCTTAATGACCTCCACAGCTCTAA  
ACGTAATTCATCTGGCTTTGCCTGTACTTACTTCCCTCCATGAAAAAAGTGTGATAATGCTCATAATGCTGCCAG  
CAATTTCTCCCTTCTCAAGACTATTCTGGCTTCCCTGGGTACTTAAAAACAGGGCTTAGAGTATGGCTGCTGACAAA  
ATTGCACTCTAAACGCTAGCTTAGGTCTTCTGCGGCCGCGATATCCTGCAGATGCATCCAGTACA

**CTL - 550bp**

AGTATGGCCCCGGGGGATCCGTTAGCTATCGTTCGCGAGAAAGTTAGTAGACACACAGGACCCAGGCGTGCAAGTCAA  
TTTCAGCTGACTACACCGATTCTGGTTAAAAGAGCCTATGGCCACCCTTATTTTAGAGAAAAAAACCACACCTCTA  
ATGTGTTGGGCACTAGAAAAAGCTAACTACCTAGTCCGTTTCTGGACGACTTCATTGGGAATAACATACCCCCCACT  
GTGATTAAGACTGGCACTGTCCTAATGCTTTCTTCAATAGGTTTGGCTCATGTGTGATTCCCTCTGGCAAACCTTATA  
GAGGACAAGCAGAATAAACCAATTCAAGGTCGTTGTAGCTGAAGGCCTGGCCTGCCTGACAGTTAATTATGAGCATG  
TCTTGCCCTTCATGGTGGATATTCACAGCTGAAAGTGGTATTGGCATTTTTTTCTGAGGACACAACGAGGAAATCTG  
ATAAATACGGCCACCTGAAGTCTAGCTCGGAGTTAAACAATTTACCACGTTTAGAGCGGCCGCGATATCCTGCAGATG  
CATCCAGTACA

**CTL - 650bp**

AGTATGGCCCCGGGGGATCCGCTCGCACTTAGCCTGTTAAGGGGTTTCGCGCTCGTCTAGTCTGTGCTGTTGCCTGGAT  
AGTAAATTATCATGGTACAACTTTTAAAGAGCCAGTTAAATGGAGATGGATTTAAAAAGAGTTATTGTAAAGTCTCC  
CCAGGTGTGTCAATAAATATCCCAACAGATTGCCCTGGCCTGACCCCTAAATGCAATTTTGGGATTCCCTTTTAGT  
TGCTTTCATTAATAATGTACCAGCGCAGTAAAAAAGCACAAAGTATATTGTTTATGTAACCTACTATCTCATTTGCA  
CTGGTTACATGGCAGCTTCAGACTGACTAAAACTACACTTTTCCACCATGGTTCAAAGATCAACAGAACTGGGCCA  
ACAAAAGCAATTTTTTTCATGTGGTCTAACTACCAACTTATTATGAGTTAAGTTACTTTTAGGTTTAAAATCACAGCA  
GTTTTTCCCTCCACACCTCCAGAGATACTTTTCAAGGTGGCTAAACTTGGCTAAAGGCTTCCGGACCAACCTTGT  
TCTTTATGGTGTCTGTGTCCTGACAACCGCGTAAGGCATGGAAATTCAGCTATTTATCCGATCGTTTATATGGGCGT  
GCGGCCGCGATATCCTGCAGATGCATCCAGTACA

**CTL - 750bp**

AGTATGGCCCCGGGGGATCCTTGGACCGTTAATTCATATATCGAAGTAGCAGGTTGTTGCCCCGCTGATGTTGCCAC  
TACTTGCTCATGACAGTTTTTTTTTAGGCAATGCAAACCTACTATTTGATATTTTTTTTCCAAGTACAGTTGTAGGGTACT  
CCTTATACTGATTCTTCTGAGCCTGTACGGGGAGCATTAGGTACTGATGTAGTAGGAGTTGAGCTTCACAAATTCAC  
CAGGTAAGCCCAAATTTATTTTCTGCTTGGACAGGTCCACCTCACATGGGTCTGTCTAATATATTAAGAGGGGATT  
TTCTTTGCTGTATTGCAGCCAGTATATCTGTTACTTACAGTAGTAGTCCATTATTGCTGGCCTAGGGGCTTTTGTCT  
CCTACACGAACACCCTCTGTAAAATTTGAGGTCGTCCTTAGAGTCAAACCATTTCATGGAGCGCTCTGTGCATCTAC  
CAACTATCGCTAAGCATTCACTTGGTTGGTTTAAAGTGGAGGCAACTCCATTATCTTCTAGCATAACCCTTCCCAGGCT  
ACATGTAGAAAGAGATCTGTTGGGCCCCACTATTTTTTTCACCCAGGGAAGCCTACTTTAGTTATAGCTTGCCAGAGA  
TTTTCTGTGTGCATGTAGAAGTCATCCACTTTTAAACACCAGGAGGTGGATGTGGGGCCAGGAAATATGTCAATAACGA  
TACGGGACTTCTAACAGTGACTCGCGGCCGCGATATCCTGCAGATGCATCCAGTACA

**CTL - 850bp**

AGTATGGCCCCGGGGGATCCTTAAAGTCGTGTCTTCTCCTACGATCTTGTGAACGATGGATATTTTCTTTCTAAACTT  
TAAACAAACAGTGGAGAGATGTTGTTGTGTGTGGAACGACGCTTAGCCTACCGAGGAAGATCCAGACTACAATAGAA  
TATGTGGCCAAAACCTCTCCGCAACTTCAGCAGCAAAAAGGATATTATTGACATAACCTCCTCACAAAAAGTACACAA  
ATGGCTAAATAACAGAGCCCCTCTTTTTACTAGGGAAATGGTGGATGTGGACTTTAGAATTTAAGATAATAAAGCTC  
TTGATCCCAATGTTATTTCCATGTGAGGGACATTAATTTGAGTAACCTTTGCCACATAACCCTCTCCCAGAGTCCATT  
CTCTAAAACCTTGAAGCTCCGCCCTTTTTACGCACATTAGGCTTCCAATTACGGTCAATGGTCTTGAAGATTGGGAG  
CTTTTGAAGAGTAATAAGAACCATCACAAAAAGGAACCCAGAAGCCGGGAGTGTCTACCAAAAAAATTCAGGGTTA  
AAAAAAGTGACATTTTCTCCTGTTTTTTTACACATGATTTTGAATGCTGATGGGTCCACGTCCAGCTCTAAAGGTAG  
GTTTCATGGTTCTCCAAAGTTGCTTTCTTGTGAGAATTGAGCCACATCAGGTAGGTGGGGAAGTAGATCAGTGAGGAT  
GCTTTCACATGTGTGGGCACTGGGAACAGAATGCTTCAATAACACAGCTGACGAGGGCCGCTATGAAAAAAGAT  
TCTCTGTGCCCCCTGGCGCCTCCGCACCTAAAGAATTGATGACCGTGCAGGCGCGATATCCTGCAGATGCATCCAGT  
ACA