igNext™ Dual Index Oligos

- In NGS sample prep workflow, adaptors and indexes are an essential addition (by way of PCR) to DNA fragments to achieve successful sequencing. igNext™ Dual Index Oligos allow for proper and efficient tagging of your DNA fragments to properly process samples for sequencing.
- The dual index primer strategy utilizes two 8 base indices within each primer; i7 primers contain indices that are adjacent to the P7 sequence; i5 primers contain indices that are adjacent to the P5 sequence. Especially, Unique Dual indexing provides non-redundant indexes for both of i7 and i5, significantly reducing index-hopped and misassigned reads, and will make sure that libraries sequence and demultiplex with the highest accuracy.
- igNext™ Dual Index Oligos include 48 unique i7 index primers and 48 unique i5 index primers. Indexing options include 1) combinatorial dual indices and 2) unique dual indices. Currently, our primers enable multiplexing of up to 2304 dual indexes and 48 unique dual indexes.
- igNext™ Dual Index Oligos are offered in a pre-mixed format, which allows for easy-to-use PCR reaction setups.
- igNext™ Dual Index Oligos are supplied separately from igNext™ DNA Library Prep Kits to provide maximal workflow flexibility.
- igNext™ Dual Index Oligos have been thoroughly tested with outstanding results (up to 2,304 dual indexes). More details on our testing may be found in the link below:
  https://www.intactgenomics.com/wp-content/uploads/2021/08/IG-NGS-Library-Kit-Introduction-and-Benefits-1.pdf

1. igNext™ Index Oligos selection:

igNext™ Dual Index Oligos provide flexible choices to satisfy the need of customers in need of various scales of multiplexing. Based on the number of samples to pooling, we offer the following suggestions to select igNext™ Index products.

- **1 to 12 samples**: **igNext™ 12 Unique Dual Index Strip**.
- **13 to 48 samples**: **igNext™ 48 Unique Dual Index Plate Set A or Set B**
- **49 to 96 samples**: **igNext™ 48 Unique Dual Index Plate Set A and Set B**
- **> 96 samples (and up to 2304 samples)**: Contact us for preparation of different sets of the 24 **igNext™ 96 Combinatorial Dual Index Plates**.

2. PCR Reaction Setup

1.1. Count the number of samples that will be amplified and pooled for subsequent sequencing.

1.2. Thaw the pre-mixed index primer tubes/plate for 10-15 minutes at room temperature.

1.3. Briefly mix the tubes/plate by vortexing. Briefly centrifuge the plate or tube strip to ensure the primers are at the bottom of well.

1.4. Check the orientation of the index tubes/plate.

a. For tubes, carefully open the cover lid, transfer the necessary volume of primer mix required for your PCR reaction to a PCR tube by pipette. (Note: It is important to change tip before transferring from a new tube.)

b. For plates, using a pipette tip, pierce the desired wells and transfer the necessary volume of primer mix required for your PCR reaction to a PCR tube or plate. *(Note: It is important to change tips before piercing a new well to avoid cross contamination of indexed primers.)*

1.5 Proceed with the PCR reaction in accordance with the library prep kit manual.

3. Index Pooling Guide:

Illumina uses a red laser/LED for sequencing adenine (A)/cytosine (C) and a green laser/LED to sequence guanine (G)/thymine (T). For each cycle, both the red and green channels need to be run in order to ensure proper image registration (i.e. A or C must be in each cycle, and G or T must be in each cycle). If this color balance is not maintained, index sequencing could potentially fail.

- For Pooling 2 to 12 samples: follow the valid combinations table 2 in Appendix B.
- For Pooling more than 12 samples: Any combination

Example of index combination follow the color balance

Index_id	i7 Index	i7 Index Read in Color								i5 Index	i5 Index Read in Color							
2	TAGTGACC	T	A	G	T	G	A	C	C	CAACTCCA	C	A	A	C	T	C	C	A
3	CGAGACTA	C	G	A	G	A	C	T	A	TGTTCCGT	T	G	T	T	C	C	G	T
4	GACATGGT	G	A	C	A	T	G	G	T	ACCGCTAT	A	C	C	G	C	T	A	T
		✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓

Example of index combination don't follow the color balance

Index_id	i7 Index	i7 Index Read in Color								i5 Index	i5 Index Read in Color							
9	GGTGTCTT	G	G	T	G	T	C	T	T	CCTAGAGA	C	C	T	A	G	A	G	A
10	AAGAAGGC	A	A	G	A	A	G	G	C	TTCCAGGT	T	T	C	C	A	G	G	T
11	AGGTTCGA	A	G	G	T	T	C	G	A	TCAGCCTT	T	C	A	G	C	C	T	T
		✓	✓	x	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	x	✓

Appendix A. Index Sequence

i7_Index_ID	i7_Index_Read	i5_Index_ID	i5_Index_Read
i7_01	ACGTTACC	i5_01	ACCGACAA
i7_02	CTGTGTTG	i5_02	AGTGGCAA
i7_03	TGAGGTGT	i5_03	CACAGACT
i7_04	GATCCATG	i5_04	CGACACTT
i7_05	GCCTATCA	i5_05	GACTTGTG
i7_06	AACAACCG	i5_06	GTGAGACT
i7_07	ACTCGTTG	i5_07	GTTCCATG
i7_08	CCTATGGT	i5_08	TAGCTGAG
i7_09	TGTACACC	i5_09	CTTCGCAA
i7_10	GTATGCTG	i5_10	GTGGTATG
i7_11	TGATGTCC	i5_11	CACTGTAG
i7_12	GTCCTTCT	i5_12	AGACGCTA
i7_13	ATAAGGCG	i5_13	CAACTCCA
i7_14	CTTACCTG	i5_14	AACACGCT
i7_15	CGTTGCAA	i5_15	TGGATGGT
i7_16	GATTCAGC	i5_16	TTCGAAGC
i7_17	TCACGTTC	i5_17	AACACCAC
i7_18	TGTGCGTT	i5_18	TGAGCTGT
i7_19	TAGTTGCG	i5_19	CACAGGAA
i7_20	AAGAGCCA	i5_20	TGACAACC
i7_21	ACAGCTCA	i5_21	TGTTCCGT
i7_22	GTTAAGGC	i5_22	CCTAGAGA
i7_23	AAGCCACA	i5_23	GCATAACG
i7_24	ACACGGTT	i5_24	CAGTGCTT
i7_25	CAGCGATT	i5_25	CGTATCTC
i7_26	TAGTGACC	i5_26	CGTCAAGA
i7_27	CGAGACTA	i5_27	CCATGAAC
i7_28	GACATGGT	i5_28	GGTACTTC
i7_29	GCATGTCT	i5_29	ACCGCTAT
i7_30	ACTCCATC	i5_30	TTCCAGGT
i7_31	TGTGACTG	i5_31	TCGAACCT
i7_32	CGAAGAAC	i5_32	TAGTGCCA
i7_33	GGTGTCTT	i5_33	GGTACGAA
i7_34	AAGAAGGC	i5_34	AAGCATCG
i7_35	AGGTTCGA	i5_35	GCCAATAC
i7_36	CATGTTCC	i5_36	CTGTATGC
i7_37	GTGCCATA	i5_37	CTTAGGAC
i7_38	CCTTGTAG	i5_38	TCAGCCTT
i7_39	GCTGGATT	i5_39	ACATGCCA
i7_40	TAACGAGG	i5_40	GATGGAGT
i7_41	ATGGTTGC	i5_41	CGATCGAT
i7_42	CCTATACC	i5_42	TACTCCAG
i7_43	TTAGGTCG	i5_43	AGCTACCA
i7_44	GCAAGATC	i5_44	TCGACAAG
i7_45	AGAGCCTT	i5_45	TATGACCG
i7_46	GCAATGGA	i5_46	AGCCAACT
i7_47	CTGGAGTA	i5_47	GATCTTGC
i7_48	GAACATCG	i5_48	CCTCGTTA

Appendix B. igNext™ 12 Unique Dual Index Strip

Table 1. Sequence of the 12 dual index and color coded to correspond to the red/green channel.

Index_id	i7 Index	i7 Index Read in Color								i5 Index	i5 Index Read in Color								i5 Index RC Read*
1	CAGCGATT	C	A	G	C	G	A	T	T	GACTTGTG	G	A	C	T	T	G	T	G	CACAAGTC
2	TAGTGACC	T	A	G	T	G	A	C	C	CAACTCCA	C	A	A	C	T	C	C	A	TGGAGTTG
3	CGAGACTA	C	G	A	G	A	C	T	A	TGTTCCGT	T	G	T	T	C	C	G	T	ACGGAACA
4	GACATGGT	G	A	C	A	T	G	G	T	ACCGCTAT	A	C	C	G	C	T	A	T	ATAGCGGT
5	GCATGTCT	G	C	A	T	G	T	C	T	CTTAGGAC	C	T	T	A	G	G	A	C	GTCCTAAG
6	ACTCCATC	A	C	T	C	C	A	T	C	TATGACCG	T	A	T	G	A	C	C	G	CGGTCATA
7	TGTGACTG	T	G	T	G	A	C	T	G	GTGAGACT	G	T	G	A	G	A	C	T	AGTCTCAC
8	CGAAGAAC	C	G	A	A	G	A	A	C	AACACGCT	A	A	C	A	C	G	C	T	AGCGTGTT
9	GGTGTCTT	G	G	T	G	T	C	T	T	CCTAGAGA	C	C	T	A	G	A	G	A	TCTCTAGG
10	AAGAAGGC	A	A	G	A	A	G	G	C	TTCCAGGT	T	T	C	C	A	G	G	T	ACCTGGAA
11	AGGTTCGA	A	G	G	T	T	C	G	A	TCAGCCTT	T	C	A	G	C	C	T	T	AAGGCTGA
12	CATGTTCC	C	A	T	G	T	T	C	C	AGCCAACT	A	G	C	C	A	A	C	T	AGTTGGCT

*: i5 Index RC Read: i5 Index Reverse Complement Read, using for the reverse complement workflow that is performed on the MiniSeq, NextSeq, HiSeq X and others.

Table 2. List of Valid Index Combination

Number of Samples to Pool	Index Combination
2	Not recommended
3	Index 2, 3, & 4
3	Index 5, 6, & 11
4	Index 1,2,3, & 4
4	3-plex option with any other index
5	Index 1,2,3, 4, & 5
5	Index 6,7,8, 9, & 10
5	3-plex option with any other index
>5	Any continuous index well

Appendix C. igNext™ 48 Unique Dual Index Plate Set A

Well_ID	i7 Index	i7 Index Read in Color								i5 Index	i5 Index Read in Color								i5 Index RC Read*
A1	ACGTTACC	A	C	G	T	T	A	C	C	ACCGACAA	A	C	C	G	A	C	A	A	TTGTCGGT
A2	CTGTGTTG	C	T	G	T	G	T	T	G	CTTCGCAA	C	T	T	C	G	C	A	A	TTGCGAAG
A3	TGAGGTGT	T	G	A	G	G	T	G	T	AACACCAC	A	A	C	A	C	C	A	C	GTGGTGTT
A4	GATCCATG	G	A	T	C	C	A	T	G	CGTATCTC	C	G	T	A	T	C	T	C	GAGATACG
A5	GCCTATCA	G	C	C	T	A	T	C	A	GGTACGAA	G	G	T	A	C	G	A	A	TTCGTACC
A6	AACAACCG	A	A	C	A	A	C	C	G	CGATCGAT	C	G	A	T	C	G	A	T	ATCGATCG
A7	ACTCGTTG	A	C	T	C	G	T	T	G	AGTGGCAA	A	G	T	G	G	C	A	A	TTGCCACT
A8	CCTATGGT	C	C	T	A	T	G	G	T	GTGGTATG	G	T	G	G	T	A	T	G	CATACCAC
A9	TGTACACC	T	G	T	A	C	A	C	C	TGAGCTGT	T	G	A	G	C	T	G	T	ACAGCTCA
A10	GTATGCTG	G	T	A	T	G	C	T	G	CGTCAAGA	C	G	T	C	A	A	G	A	TCTTGACG
A11	TGATGTCC	T	G	A	T	G	T	C	C	AAGCATCG	A	A	G	C	A	T	C	G	CGATGCTT
A12	GTCCTTCT	G	T	C	C	T	T	C	T	TACTCCAG	T	A	C	T	C	C	A	G	CTGGAGTA
Well_ID	**i7 Index**	**i7 Index Read**								**i5 Index**	**i5 Index Read**								**i5 Index RC Read***
B1	ATAAGGCG	A	T	A	A	G	G	C	G	CACAGACT	C	A	C	A	G	A	C	T	AGTCTGTG
B2	CTTACCTG	C	T	T	A	C	C	T	G	CACTGTAG	C	A	C	T	G	T	A	G	CTACAGTG
B3	CGTTGCAA	C	G	T	T	G	C	A	A	CACAGGAA	C	A	C	A	G	G	A	A	TTCCTGTG
B4	GATTCAGC	G	A	T	T	C	A	G	C	CCATGAAC	C	C	A	T	G	A	A	C	GTTCATGG
B5	TCACGTTC	T	C	A	C	G	T	T	C	GCCAATAC	G	C	C	A	A	T	A	C	GTATTGGC
B6	TGTGCGTT	T	G	T	G	C	G	T	T	AGCTACCA	A	G	C	T	A	C	C	A	TGGTAGCT
B7	TAGTTGCG	T	A	G	T	T	G	C	G	CGACACTT	C	G	A	C	A	C	T	T	AAGTGTCG
B8	AAGAGCCA	A	A	G	A	G	C	C	A	AGACGCTA	A	G	A	C	G	C	T	A	TAGCGTCT
B9	ACAGCTCA	A	C	A	G	C	T	C	A	TGACAACC	T	G	A	C	A	A	C	C	GGTTGTCA
B10	GTTAAGGC	G	T	T	A	A	G	G	C	GGTACTTC	G	G	T	A	C	T	T	C	GAAGTACC
B11	AAGCCACA	A	A	G	C	C	A	C	A	CTGTATGC	C	T	G	T	A	T	G	C	GCATACAG
B12	ACACGGTT	A	C	A	C	G	G	T	T	TCGACAAG	T	C	G	A	C	A	A	G	CTTGTCGA

Appendix C. igNext™ 48 Unique Dual Index Plate Set A (Continued)

Well_ID	i7 Index	i7 Index Read								i5 Index	i5 Index Read								i5 Index RC Read*
C1	CAGCGATT	C	A	G	C	G	A	T	T	GACTTGTG	G	A	C	T	T	G	T	G	CACAAGTC
C2	TAGTGACC	T	A	G	T	G	A	C	C	CAACTCCA	C	A	A	C	T	C	C	A	TGGAGTTG
C3	CGAGACTA	C	G	A	G	A	C	T	A	TGTTCCGT	T	G	T	T	C	C	G	T	ACGGAACA
C4	GACATGGT	G	A	C	A	T	G	G	T	ACCGCTAT	A	C	C	G	C	T	A	T	ATAGCGGT
C5	GCATGTCT	G	C	A	T	G	T	C	T	CTTAGGAC	C	T	T	A	G	G	A	C	GTCCTAAG
C6	ACTCCATC	A	C	T	C	C	A	T	C	TATGACCG	T	A	T	G	A	C	C	G	CGGTCATA
C7	TGTGACTG	T	G	T	G	A	C	T	G	GTGAGACT	G	T	G	A	G	A	C	T	AGTCTCAC
C8	CGAAGAAC	C	G	A	A	G	A	A	C	AACACGCT	A	A	C	A	C	G	C	T	AGCGTGTT
C9	GGTGTCTT	G	G	T	G	T	C	T	T	CCTAGAGA	C	C	T	A	G	A	G	A	TCTCTAGG
C10	AAGAAGGC	A	A	G	A	A	G	G	C	TTCCAGGT	T	T	C	C	A	G	G	T	ACCTGGAA
C11	AGGTTCGA	A	G	G	T	T	C	G	A	TCAGCCTT	T	C	A	G	C	C	T	T	AAGGCTGA
C12	CATGTTCC	C	A	T	G	T	T	C	C	AGCCAACT	A	G	C	C	A	A	C	T	AGTTGGCT
Well_ID	**i7 Index**	**i7 Index Read**								**i5 Index**	**i5 Index Read**								**i5 Index RC Read***
D1	GTGCCATA	G	T	G	C	C	A	T	A	GTTCCATG	G	T	T	C	C	A	T	G	CATGGAAC
D2	CCTTGTAG	C	C	T	T	G	T	A	G	TGGATGGT	T	G	G	A	T	G	G	T	ACCATCCA
D3	GCTGGATT	G	C	T	G	G	A	T	T	GCATAACG	G	C	A	T	A	A	C	G	CGTTATGC
D4	TAACGAGG	T	A	A	C	G	A	G	G	TCGAACCT	T	C	G	A	A	C	C	T	AGGTTCGA
D5	ATGGTTGC	A	T	G	G	T	T	G	C	ACATGCCA	A	C	A	T	G	C	C	A	TGGCATGT
D6	CCTATACC	C	C	T	A	T	A	C	C	GATCTTGC	G	A	T	C	T	T	G	C	GCAAGATC
D7	TTAGGTCG	T	T	A	G	G	T	C	G	TAGCTGAG	T	A	G	C	T	G	A	G	CTCAGCTA
D8	GCAAGATC	G	C	A	A	G	A	T	C	TTCGAAGC	T	T	C	G	A	A	G	C	GCTTCGAA
D9	AGAGCCTT	A	G	A	G	C	C	T	T	CAGTGCTT	C	A	G	T	G	C	T	T	AAGCACTG
D10	GCAATGGA	G	C	A	A	T	G	G	A	TAGTGCCA	T	A	G	T	G	C	C	A	TGGCACTA
D11	CTGGAGTA	C	T	G	G	A	G	T	A	GATGGAGT	G	A	T	G	G	A	G	T	ACTCCATC
D12	GAACATCG	G	A	A	C	A	T	C	G	CCTCGTTA	C	C	T	C	G	T	T	A	TAACGAGG

Appendix D. igNext™ 48 Unique Dual Index Plate Set B

Well_ID	i7 Index	i7 Index Read								i5 Index	i5 Index Read								i5 Index RC Read*
E1	GTGCCATA	G	T	G	C	C	A	T	A	ACCGACAA	A	C	C	G	A	C	A	A	TTGTCGGT
E2	CCTTGTAG	C	C	T	T	G	T	A	G	CTTCGCAA	C	T	T	C	G	C	A	A	TTGCGAAG
E3	GCTGGATT	G	C	T	G	G	A	T	T	AACACCAC	A	A	C	A	C	C	A	C	GTGGTGTT
E4	TAACGAGG	T	A	A	C	G	A	G	G	CGTATCTC	C	G	T	A	T	C	T	C	GAGATACG
E5	ATGGTTGC	A	T	G	G	T	T	G	C	GGTACGAA	G	G	T	A	C	G	A	A	TTCGTACC
E6	CCTATACC	C	C	T	A	T	A	C	C	CGATCGAT	C	G	A	T	C	G	A	T	ATCGATCG
E7	TTAGGTCG	T	T	A	G	G	T	C	G	AGTGGCAA	A	G	T	G	G	C	A	A	TTGCCACT
E8	GCAAGATC	G	C	A	A	G	A	T	C	GTGGTATG	G	T	G	G	T	A	T	G	CATACCAC
E9	AGAGCCTT	A	G	A	G	C	C	T	T	TGAGCTGT	T	G	A	G	C	T	G	T	ACAGCTCA
E10	GCAATGGA	G	C	A	A	T	G	G	A	CGTCAAGA	C	G	T	C	A	A	G	A	TCTTGACG
E11	CTGGAGTA	C	T	G	G	A	G	T	A	AAGCATCG	A	A	G	C	A	T	C	G	CGATGCTT
E12	GAACATCG	G	A	A	C	A	T	C	G	TACTCCAG	T	A	C	T	C	C	A	G	CTGGAGTA
Well_ID	i7 Index	i7 Index Read								i5 Index	i5 Index Read								i5 Index RC Read*
F1	CAGCGATT	C	A	G	C	G	A	T	T	CACAGACT	C	A	C	A	G	A	C	T	AGTCTGTG
F2	TAGTGACC	T	A	G	T	G	A	C	C	CACTGTAG	C	A	C	T	G	T	A	G	CTACAGTG
F3	CGAGACTA	C	G	A	G	A	C	T	A	CACAGGAA	C	A	C	A	G	G	A	A	TTCCTGTG
F4	GACATGGT	G	A	C	A	T	G	G	T	CCATGAAC	C	C	A	T	G	A	A	C	GTTCATGG
F5	GCATGTCT	G	C	A	T	G	T	C	T	GCCAATAC	G	C	C	A	A	T	A	C	GTATTGGC
F6	ACTCCATC	A	C	T	C	C	A	T	C	AGCTACCA	A	G	C	T	A	C	C	A	TGGTAGCT
F7	TGTGACTG	T	G	T	G	A	C	T	G	CGACACTT	C	G	A	C	A	C	T	T	AAGTGTCG
F8	CGAAGAAC	C	G	A	A	G	A	A	C	AGACGCTA	A	G	A	C	G	C	T	A	TAGCGTCT
F9	GGTGTCTT	G	G	T	G	T	C	T	T	TGACAACC	T	G	A	C	A	A	C	C	GGTTGTCA
F10	AAGAAGGC	A	A	G	A	A	G	G	C	GGTACTTC	G	G	T	A	C	T	T	C	GAAGTACC
F11	AGGTTCGA	A	G	G	T	T	C	G	A	CTGTATGC	C	T	G	T	A	T	G	C	GCATACAG
F12	CATGTTCC	C	A	T	G	T	T	C	C	TCGACAAG	T	C	G	A	C	A	A	G	CTTGTCGA

Appendix D. igNext™ 48 Unique Dual Index Plate Set B (Continued)

Well_ID	i7 Index	i7 Index Read								i5 Index	i5 Index Read								i5 Index RC Read*
G1	ATAAGGCG	A	T	A	A	G	G	C	G	GACTTGTG	G	A	C	T	T	G	T	G	CACAAGTC
G2	CTTACCTG	C	T	T	A	C	C	T	G	CAACTCCA	C	A	A	C	T	C	C	A	TGGAGTTG
G3	CGTTGCAA	C	G	T	T	G	C	A	A	TGTTCCGT	T	G	T	T	C	C	G	T	ACGGAACA
G4	GATTCAGC	G	A	T	T	C	A	G	C	ACCGCTAT	A	C	C	G	C	T	A	T	ATAGCGGT
G5	TCACGTTC	T	C	A	C	G	T	T	C	CTTAGGAC	C	T	T	A	G	G	A	C	GTCCTAAG
G6	TGTGCGTT	T	G	T	G	C	G	T	T	TATGACCG	T	A	T	G	A	C	C	G	CGGTCATA
G7	TAGTTGCG	T	A	G	T	T	G	C	G	GTGAGACT	G	T	G	A	G	A	C	T	AGTCTCAC
G8	AAGAGCCA	A	A	G	A	G	C	C	A	AACACGCT	A	A	C	A	C	G	C	T	AGCGTGTT
G9	ACAGCTCA	A	C	A	G	C	T	C	A	CCTAGAGA	C	C	T	A	G	A	G	A	TCTCTAGG
G10	GTTAAGGC	G	T	T	A	A	G	G	C	TTCCAGGT	T	T	C	C	A	G	G	T	ACCTGGAA
G11	AAGCCACA	A	A	G	C	C	A	C	A	TCAGCCTT	T	C	A	G	C	C	T	T	AAGGCTGA
G12	ACACGGTT	A	C	A	C	G	G	T	T	AGCCAACT	A	G	C	C	A	A	C	T	AGTTGGCT
Well_ID	**i7 Index**	**i7 Index Read**								**i5 Index**	**i5 Index Read**								**i5 Index RC Read***
H1	ACGTTACC	A	C	G	T	T	A	C	C	GTTCCATG	G	T	T	C	C	A	T	G	CATGGAAC
H2	CTGTGTTG	C	T	G	T	G	T	T	G	TGGATGGT	T	G	G	A	T	G	G	T	ACCATCCA
H3	TGAGGTGT	T	G	A	G	G	T	G	T	GCATAACG	G	C	A	T	A	A	C	G	CGTTATGC
H4	GATCCATG	G	A	T	C	C	A	T	G	TCGAACCT	T	C	G	A	A	C	C	T	AGGTTCGA
H5	GCCTATCA	G	C	C	T	A	T	C	A	ACATGCCA	A	C	A	T	G	C	C	A	TGGCATGT
H6	AACAACCG	A	A	C	A	A	C	C	G	GATCTTGC	G	A	T	C	T	T	G	C	GCAAGATC
H7	ACTCGTTG	A	C	T	C	G	T	T	G	TAGCTGAG	T	A	G	C	T	G	A	G	CTCAGCTA
H8	CCTATGGT	C	C	T	A	T	G	G	T	TTCGAAGC	T	T	C	G	A	A	G	C	GCTTCGAA
H9	TGTACACC	T	G	T	A	C	A	C	C	CAGTGCTT	C	A	G	T	G	C	T	T	AAGCACTG
H10	GTATGCTG	G	T	A	T	G	C	T	G	TAGTGCCA	T	A	G	T	G	C	C	A	TGGCACTA
H11	TGATGTCC	T	G	A	T	G	T	C	C	GATGGAGT	G	A	T	G	G	A	G	T	ACTCCATC
H12	GTCCTTCT	G	T	C	C	T	T	C	T	CCTCGTTA	C	C	T	C	G	T	T	A	TAACGAGG