Electronic Supplementary Information

Folding Super-sized DNA Origami with Scaffold Strands from Long-Range PCR

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Experimental Materials and Methods

Materials: Lambda DNA and LA Taq mix were purchased from TaKaRa (Dalian, China). PCR primers were synthesized and purified by Invitrogen (Shanghai, China). Lambda Exonuclease was purchased from Fermentas (USA). All staple strands were synthesized and purified by Sangon (Shanghai, China).

PCR reaction. Long DNA substrates were amplified from lambda DNA. A master mix was prepared on ice containing 1.25 ng of template DNA, 0.4 μM each of the forward and reverse PCR primesrs, 0.25 μL LA Taq (5 units/μL), 2.5μL of 10×LA PCR Buffer II (Mg^{2+} plus), 4 μL of dNTP mixture (2.5 mM) in 25 μL reaction volume according to the manufacturer's instructions. One of the PCR primes was modified with 5' Cy3 label and the other was modified with 5' phosphorylation. The mix was annealed in a PCR thermocycler and was subjected to a 2 minutes hot start at 95 ℃ followed by 30 cycles of amplification (98 ℃ for 10 seconds, then 68 ℃ for 15 minutes). The protocol ends with a final extension step at 72 ℃ for 10minutes.

Generation of long single-stranded DNA. To generate the single-stranded DNA, the PCR product was digested. 2 μL of lambda exonuclease, 3 μL of 10×lambda exonuclease reaction buffer, and purified dsDNA were mixed to 30 μL and incubated in a thermocycler for 6 hours at 37 ℃. The generated ssDNA was purified by ethanol precipitation and stored at -20 ℃ to be used as scaffold strand.

Thermal annealing. The scaffold ssDNA and staple strands with a molar ratio of 1:100 were mixed to a volume of 20 μL in 1×TAE/Mg^{2+} buffer consisting of 40 nM Tris (pH 7.6), 20nM acetic acid, 2 mM EDTA and 12.5 nM magnesium acetate. The sample was cooled from 90 ℃ to 4℃ in a PCR at a rate of 1 ℃/minute.

AFM Imaging. 3 μL of sample was spotted on freshly cleaved mica, and left to adsorb to the surface for 3 minutes. 35 μL of 1×TAE/Mg^{2+} buffer was added to the liquid cell and the sample was scanned in tapping mode on a MultiMode 8 AFM with NanoScope V Controller (Bruker, Inc.).

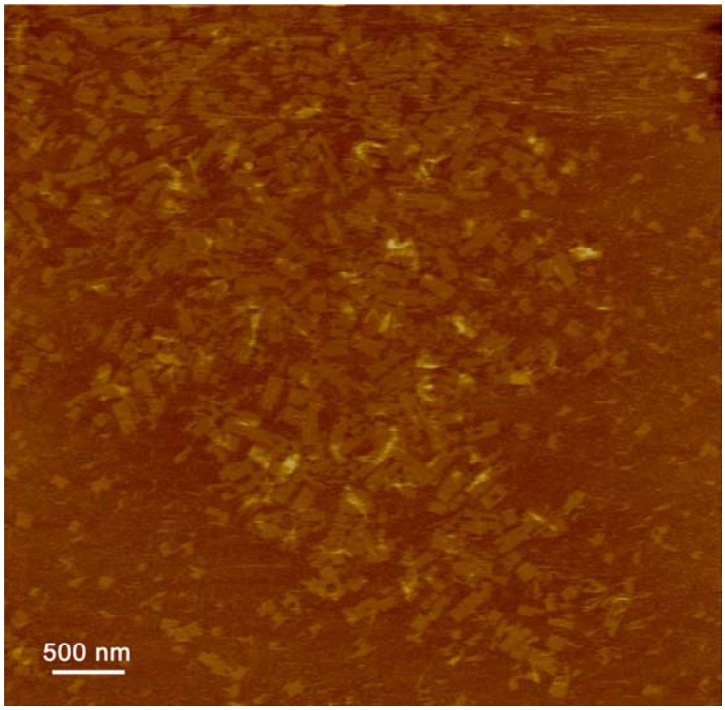

Fig. S1 AFM image of super-sized DNA origami with a scale of 500nm.

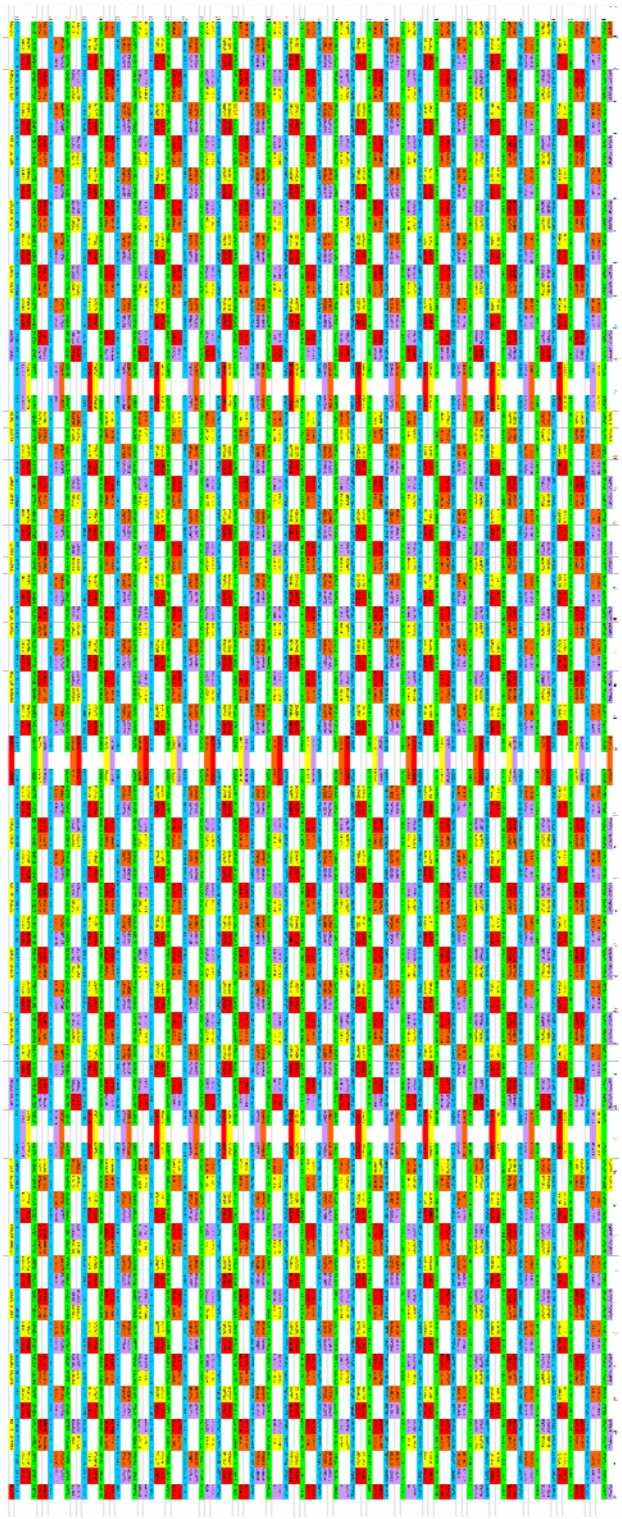

Fig. S2 Design of the super-sized origami in sequence

Table S1 Sequences of staple strands.

Referring to Figure S1, there are totally 792 staple strands; the sequence is named as c and r.

C refers to the column, which is counted from left to right.

R refers to the row, which is counted from top to bottom.

No.	Location	5'-----3'
1	c1r1	TCTGAAAG TTTT GTCCCACATTGGTGACTCTGCCATCGACGGAC TTTT
2	c1r3	AAACGCGC TTTT TTCAGCGCCGGTGAGAGCTCTTCG
3	c1r5	GGCAGCAT TTTT TTTTATGGCCATACATCGGCCTGC
4	c1r7	TCCGGCAG TTTT TCTTTCGTCCCCGTCAACGGAGCG
5	c1r9	GAAGGGAT TTTT GGATCGAAGGCTTCACCATATCCA
6	c1r11	CCGTGAGC TTTT TGGAGGTGTCCAGCATGCAACCAG
7	c1r13	CACCATCC TTTT GCCGACACCTTCTGCGGGACAGGC
8	c1r15	TTTGAAGG TTTT ATTAAAGGCCATGCTGCAAGCATC
9	c1r17	AATCTGCA TTTT CAGCCGGTCAGCCTTTGGCAATTT
10	c1r2	CCCGTGTA TTTT CGGATTCGCGTAAGGGAGTCAACG
11	c1r4	TCAAGACC TTTT CGGGAATACGACGGTTTGCTGAAT
12	c1r6	CCAGTTCT TTTT CGAACAGGTTATCGAACGGGCAAT
13	c1r8	CCTCAACC TTTT GAAGTTCTTTTTGACGTCGTGTTG
14	c1r10	CTTACGGC TTTT AGCTCTCACGGAAAAATCCGTGGT
15	c1r12	CGGTATAT TTTT CTCCTCACAGTTGAGGCTTCGCGT
16	c1r14	AGCGGCTC TTTT CGCCGGGCGTGTCCATGCCCCCGC
17	c1r16	CACCAATC TTTT TAACGTCACCACGCGGAGCGCGCT
18	c1r18	TTTT CACCGGCACGGCAGTTCTGTCATT
19	c2r1	GCCGCTGTTACCGTGCTGCGATCTTTTCACCG
20	c2r3	CCCCTTATCAGGTATCGCTGTCCATAAACGGC
21	c2r5	CAAGCACGCGGCTGAGGTTTTCAACCCCCTTT
22	c2r7	CAGCGCCTCTTTCAGCTCTGCCACGGCTGACA
23	c2r9	CACGTACTTCTCCTCACTGCGGCCCGGTCATG
24	c2r11	GAAACAGCGGTGGTGCCATCCCACCAGCGGGG
25	c2r13	AATGCGGCCCAGCACAACCTGCACCAAACATC
26	c2r15	GAATGCCGCGCGCATAGGCGGGTTGCAATATG
27	c2r17	GGCCTCTTCTGCGGCGTAATACGCCCCGCTGC
28	c2r2	TGCGGGTGTTTGCCAGACGCGACCTCACCGCT
29	c2r4	AACTGCCGCCGGCCATTTTTCAGTACCCACCA
30	c2r6	CAGCGGCGTATCGTTTCATCGGCGATCAGCCA
31	c2r8	TCACGGTTGTGTTCCCCAGCACCACCGTTTTC
32	c2r10	GTGTATTTTGAGAGATAGACTTTCGAGACGCA
33	c2r12	TCATTGCAAGCACGCGTGCCTGTTATCCCCAT
34	c2r14	TGGCGGGTGTCAGCGCAGTCAAATATCGAGCA
35	c2r16	CGGGAGATGCTTCCTGAAAACTGACGAACGAT
36	c2r18	TCCTGACTTCCCAGCGCCGCACCGCCGGCTGT
37	c3r1	CTTTAACTATCACTTCCTTCGCCGTGCCGGTT
38	c3r3	ACATGCCAGAAAATCCGCCTCATCATGCAGCT
39	c3r5	TACCCGCGACGGTTAACGGCAGGCCGCCGTTT
40	c3r7	GTGCCTGACAGTTGTTCACCCAGCGTGTCATC
41	c3r9	GGAATTTGGCCCTTAAGCACGGCAGACTGCGT
42	c3r11	TTTCTGCCGGCGCTTTCGCACTCACAACGGCA
43	c3r13	GCGATGATTGCGTCCATCCGGGACACTGCAGC
44	c3r15	CACTGCGGTACGCAGCTCTGCTGTCGCACAAA
45	c3r17	ACGTAATAGTTCGCGCCCAGAATACCCAGCCG
46	c3r2	CCGCCTGCAAACCCACAGGGTGGTCGTCAGGT
47	c3r4	TGCTGATACTGCCGCCACCTTTCAGCTGCATG
48	c3r6	AAGCTCCTCCCGTTATTGCATTCTTTCCCATG
49	c3r8	GATGTTATGTCCGGAATACACGACCAGACCGC
50	c3r10	GCACCGTCGGATCAAACTTAAATTCCAGTCCC
51	c3r12	CTCGGTATTGTTTTCTGCCGCAACACCGGGGG
52	c3r14	AGAAAACCTCCACCATCGGATCGCGCACACGG
53	c3r16	GACCGGCGCCAGCCAGCACAGAAACCCCCAGG
54	c3r18	CGCCGGTATTGTTCGGGTTGCTGACCTCGCTG
55	c4r1	AGGTGCTGGCAGGCGTCACGGTCATCACCGCC
56	c4r3	CTTTCACCGCAGGAAAACTTCGATAAAAACAG
57	c4r5	CGCTGCCCCGGCGGCACCAGGCACGGTACGCC
58	c4r7	CGCGCTCTACCGGCAGTTTCATCCGAGCGGAG
59	c4r9	CATCGCCACCACTCCGTGCCGCCGGAAACTGC
60	c4r11	TTTGCCGCGCAACCGCAAGAATGCATCCGCCG
61	c4r13	TGATCTGCCTCCTGACCGCTGTACTGCAGTGT
62	c4r15	TGTTGCAGCAAGCTGGCCTGCAAGCACTCTTC

63	c4r17	TCGCCTGACGGTACTTTTGCGCCTAAATCCAT
64	c4r2	TTACCGATCGGTCAGTTCGCCGGGCCCGGCAC
65	c4r4	CGGGGCGATTTTTCCCAGCCACACGGGATGAA
66	c4r6	CCGTCCAAGTAATGGTGGCTGACGGGCCAGGC
67	c4r8	ACGGGCAATGCAGCCATAGGTGCGGATGGCCA
68	c4r10	CTGCATCTTACAGCGCCATGTTTATCTGCTCA
69	c4r12	GGCGCGGTCCGTTTTCACGGTCATCGCTGCGG
70	c4r14	CTCCCGGAACCGGTTTTATGTCACTGGCAGCC
71	c4r16	TCCTCCTCCTATCCAGTCGCAGTTCATCTGGC
72	c4r18	CGCTGACTCAGCCAGGATACCCGTTGCGCTTC
73	c5r1	GGACTCAGACTGCTGACCCAGCCACACCACCG
74	c5r3	GGTAACGGCCATCAAAAAACGTCGTCCGGCAC
75	c5r5	CACCGGATGCCAGAGATGACAACTCGGTTAAT
76	c5r7	ATCCTGAATCAGTTCATCTTTCGTTGAGAGGG
77	c5r9	GCGAAACGCTTCGACCTGAGCAATACTTGTCA
78	c5r11	GCGGCGGGTGCGGTATGAGCCGGGGCTGGTCT
79	c5r13	GCGCCCATCGTCATCCGGAAGATGGTCCGGCA
80	c5r15	ACCGGAGCTGTTGATTGTCGCAGCGTCAGGCT
81	c5r17	GCGGCATCGCGTATCCAGCTCACTCACCCGGC
82	c5r2	CTGAGCAGGGCATTGTAGGATTTGTCGTCATA
83	c5r4	GGCCATTGCTTTTTACGACGCCTGATCAATGG
84	c5r6	GTGTCCTGGTCATTTCGGCTGCCATGACTGCT
85	c5r8	CGCTTGCTTACATCCCCTTATAGGGCGTCCGC
86	c5r10	GGTCAGCACAGCAGTTGGGCGGTTAACAATCG
87	c5r12	TCAATGGCGCGTTCACGTCCGGCTGCCAGAAT
88	c5r14	GCTGATCCACGGGCGATAATGCCGGTTGGCAA
89	c5r16	ATCAGGTGCGGGATGCGACGAATTGCCATACG
90	c5r18	GGGCTGACCATCCGGAACTGTGTCCCATTTCT
91	c6r1	GGTCAGCGTGGTGCTCTGCCCTTTCGGAACAC
92	c6r3	ATAGCGTCCGCATCCAGCTCTGAACCCCGGTG
93	c6r5	AAGGACAACGCGGATGAAGCAACGTCCGCCAT
94	c6r7	GAGACACGAGCACATTTTCCCGGCCATGGACT
95	c6r9	TTGCCCAGGTCGGGTCATACGTGGGGCCAGCT
96	c6r11	CGACATAAAGAACGTCAGCGTGGTTCACTGTT
97	c6r13	CTGGCGTTACAAGTTCATCAGCCAGCTGTAGG
98	c6r15	GGTCATCCGCCGGACACCGCATCCCCGGATTC
99	c6r17	CCCATAAATGCAGGTTCAGTGAGTCTCAATGG
100	c6r2	ATCGACCGATCATCGAGATAGCTGGTACAGGC
101	c6r4	TCATGCTTTCGGGATTTTCACCACCGGCGCGA
102	c6r6	CATCCGGCCACGTATCACCGCACCCACCGGCA
103	c6r8	CCTCCACAAATGCCTTCGCGCTGTACACCGCT
104	c6r10	CTTCGTCAGGATAACCTCACCGGAGTGTACAT
105	c6r12	GCCCTGCGACTCTGTGGTGCTGCGGCGCCGCG
106	c6r14	GGTTGCCACACTGCAGTTCATGTCTTGTAACC
107	c6r16	AAATGCTGTTTCAGACCATCGATGTTCGCCGC
108	c6r18	TGGCGGCACACGGGGTATCCATGTCGGAAAAG
109	c7r1	GCATCTTCTGCCGTTCGGGAAGCGAAGGCCAC
110	c7r3	CACCGCCACTCCAGTGCATCCAGTTCCGGGAC
111	c7r5	AAAAACACGAAACCCGATCTACCCACGCCGAC
112	c7r7	GAGGCGTTGAGAAACAATGGCCCCATTTTCAT
113	c7r9	ACGGGAACCGCATGTTCTGCATGAGGCTTCGA
114	c7r11	GCCTGTGCGCTGGTAATGGGTAAAAACGTGCC
115	c7r13	CTGACCTGTCCACCTTATGGCTGCCGCATCGG
116	c7r15	TGAACTTCCAGCCGCCCAGGCGGGGGGCAGTC
117	c7r17	GGGTAACTTACATCGCCTTCACAACGTATCCT
118	c7r2	TCCATCCACTCACATTTCATAGGTTCCAGTCT
119	c7r4	TGCGATATCCCGCGCATTACCCAGGTCAGCGG
120	c7r6	GTCCGGTCAAACGCCGTTCCCGGCGGGTCATC
121	c7r8	TATCGTCGGTCTTTCACCGCTGTCAACGGGCA
122	c7r10	GGACTTGTAAAAATCCCGTAAAAAGAGCCGCC
123	c7r12	TGCTGTTACTCGCCCTCCGTCGCTCACTGCGC
124	c7r14	AGGCTGTCCCGAGTACGGCTGCAGGCAAGCAA
125	c7r16	GAGCCGTCGTACGCCCACGACTCGCCGCTTCC
126	c7r18	CCGCGACGAACTGGTATCCCAGGTCGCCCGCC
127	c8r1	TTGTCGGTTACGCCCTCCGGCTGGGATTTTAT
128	c8r3	AAGTCAGACTCATCACCGGATAAAACGGCTGC
129	c8r5	CGGGCAAATCACGGGCAACCTGTGAGAAATTT
130	c8r7	TGCCACAGGCGCTGATCCCACCTCGAAGGGCC
131	c8r9	GGAATTAGTGGCGTTCAGCGCGTATGATGCGA
132	c8r11	CAGGCGGCCACATCCTCATAACGGGGTTTCTT
133	c8r13	GTCAGTAACACGCATGACGGTGATCGCTGTAA
134	c8r15	TCCGGCTGGTCGCGAGTGCCTCCTCGGTTTAA

135	c8r17	GGCCCGTGCGGAGTAGCCGTTATCTGGCGCTC
136	c8r2	AGGCACGGCCCTGCCCGGTCGCAGAATGACAT
137	c8r4	ACGGAGTTTTGTTTAAACGCCGTGCTTGATTA
138	c8r6	TCCTCACCATAGCTGATATTTTCAAGCACAAA
139	c8r8	ATGATTACACCCAGTTTTTCGGGTTCCAGCTC
140	c8r10	CGGCGGCGCGTAAATTCAGAGGTGAAGCCGCA
141	c8r12	TGCTCGTCCGATCCAGCGCAGTGTGGCACCAC
142	c8r14	ATCAGCGTCCGGGAGGCGGCACTGCGCCCGCG
143	c8r16	GACCGGCTGCTTCTATCAGCATCATTCGCACT
144	c8r18	TGCAGCTGGTGAATGAACGAGGCGGGCCTGAA
145	c9r1	ATTTCTGCGTATCGCCTTCATTAAGAAAGCTC
146	c9r3	TCAATATTCAGTATGTTTCATCGCCAGTGCCG
147	c9r5	TGTCCGGCGATGGTCAGCGTGTCTCCGGCGTA
148	c9r7	CGGTGGTCGCCAGTTGTACGGACAATCACGGT
149	c9r9	TATCCCGGGTAAGCCGGGTCCGCCATATTCAC
150	c9r11	GCATCAGAATAAACATCCCTTACACAGCCTCC
151	c9r13	ACCAGACGGATTTCCACACCCTGTCGTGCATC
152	c9r15	TCAGTCCGGCACGGCGCTCCATCGACCGGATA
153	c9r17	TCAAAAACCGTGTTCTGCAGCGTGAGTGACTG
154	c9r2	GGATATCGTCGGCTGAACTCCACATCCGGCAG
155	c9r4	CCTTTGTCTCCCCCCGGTTAACTTGTATCCGC
156	c9r6	ATCCGGCTGTTCATCCCGCGTGGCGCACGCCC
157	c9r8	CACACCGCAGCCACGACGGGTATCCGGATCGC
158	c9r10	GGCCAGAGCTTTAGTGATGAAGGGGCTTGACA
159	c9r12	CAGTGCATCGTCAGCCTGCGAAGCTGCCCCCT
160	c9r14	ATGCCAGCACCAGCGTGCCGGACATCTGCGTG
161	c9r16	CTCAAACACCGTGGAGTAGCTCATGTAGGTAC
162	c9r18	CGAACAGTTCACCGTTAAAGGCGTCCACGGGT
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164	c10r3	TCATCGTCTGGTGATCAAATCTGATTTATTAC
165	c10r5	GCCTGCGGTTTCCTTTACCAGTTTCCACGCCG
166	c10r7	CATCAGTATTCAGACGTATCCAGACGAACTCA
167	c10r9	CCTTGACGCGGATCGAACACGATGAGATTCTG
168	c10r11	AACGATGCTTCGTCTCGTCGCTGGCTGGTGTG
169	c10r13	AAACAGTTTGAGAGACGGGATTTATTCTCCAG
170	c10r15	ACGGCGATGTGGTCCGTCATCATCTTTCACGG
171	c10r17	AATTCCGGAGCGATATACCGCAGCTCGAGCAT
172	c10r2	AGCAGCGCGCGTGAAGCTGGTATCAGCCCGCA
173	c10r4	CATCCTCAGGAAGACGTTCACGCCTGATTCTG
174	c10r6	CAGCTGCCCTGGAGCCTTCAACGCGTGAAGTG
175	c10r8	TCAGGGTCTGGTGAACTCACGCGCCAGCTTCT
176	c10r10	CGGATCTTTTCACTTCATGCTTCGTAAAGTTA
177	c10r12	TTCAGCAACAGCCAGCGGTGCCGGAGTGGCTG
178	c10r14	CGCAGCACGAGCCTGTCCGGGCGGCCGGCAGC
179	c10r16	ACCTGCTGTTGCGCACTCTTTCTCCTGGGCGT
180	c10r18	CTTCATCTCGAGTCTGCCCGTCCTGCATGGCC
181	c11r1	CCACGCCACTGCTGCCCCTGCTCTTCTTCTGC
182	c11r3	GCTCTTTCGTTGATGCTGCAGCGCATGACGCC
183	c11r5	GGGACGGGGCACCTCATCAGTCCGTCGCCGGA
184	c11r7	CTGAATCAAGCCAGCAGCATCAGCGCTGCTGG
185	c11r9	TCTGCGGACATCCGGCAGGCGACGAAAATGGA
186	c11r11	GTTACCTGATCGTTAACGGCATCAGCCGGATA
187	c11r13	CGCCGATGCGTAATTACTGTGAGCATTCTGTC
188	c11r15	ACCGCGTTGGCAAAAATTTCCTGACCAAATCG
189	c11r17	TTGCACCGGCTCCATCACGCTGTAGGTTGTCC
190	c11r18	ACACCTTCCCGAATCATCATGGTAAACGTGCG
191	c11r2	CACCATACGCGCCGGTAGTCATAGAAAGTGCA
192	c11r4	CCTGGCCCATTTTTGACCGTGGCCACAGGGTT
193	c11r6	GTGACCAGTGCAGCTTCACCAGTGGTCCTGTT
194	c11r8	CAGCCTTTGCTTTGAAGGAACGGATTCTGCTC
195	c11r10	TCCGTTTTTGATTGCCGTTCCGGCCTCCGGAG
196	c11r12	CGCCCTCCGTTGATTGAGTCTCTTCTGTTTCC
197	c11r14	GGCCTGTCGCCGTTCATGACCTGATGTGTAAC
198	c11r16	AGCCCGGCGAAAGCTGCTCATACGGGCACCGA
199	c12r1	GATGGTCATACCACTGACCGACACGGTGGCTT
200	c12r2	GGATGGTTATGGACGGCATCTGCGCCGGGCAT
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205	c12r12	TCCTGCATTCATTCAGTGTTTCCTGATGCCGG
206	c12r14	TGTGTCATTGCGCCAGAATCGCTGCATCATGA

207	c12r16	TTGTAAATAAGGTCGATGCGGCGATAGTCGTC
208	c12r18	TTCGCTTCAACTGCGTGGACTTCAAAACACAT
209	c12r3	TATCCAGCTGTACGTCAGCCCGGACCGCTGGC
210	c12r5	GAGTTGCCGTTTTGTTGAAATCGGCTTTTCAG
211	c12r7	GAGTCTGCGCTGCTGCGCATTTTTCCACGACC
212	c12r9	TGACATGAAGCCGCCCAGGTCTTTACAGCGCC
213	c12r11	AACAGGCCGGTCTTCATCGTCCACAAACGCGG
214	c12r13	GTTGACGACTCCGGATCGGCGTAATGGTCATT
215	c12r15	AGTCCGTCAAGCATCCCGGAACAGTAACTGCG
216	c12r17	GAGAAAACCACCGAGCACCATACTAGACACCC
217	c13r1	CTTCATTCATGCCACAGGGACATCTTCACGGT
218	c13r3	CGCATCACGCCATCTGCTCGTCAAAACAGGCT
219	c13r5	GCCGCCTGACTGAGCAACATACGCGCCGGAAA
220	c13r7	TCTCCGCCCTCATTTGCTCCGGCAGCTTCGGT
221	c13r9	GGTTCCCGGCAGCGGCCTGAATGGCGCGAAGC
222	c13r11	GGGTGCATCAGTTCACCACCTGTTTCACTTTC
223	c13r13	GCCGGGCGGGGATTTACTGCGAAAGGCTGATC
224	c13r15	TTCACACGCCCCGTAAAGGCAGATATCCCCGC
225	c13r17	CACTCAGCGCGCGGGGTATGCCCCAGCATCTG
226	c13r2	TTTTCGCTAGAACATCATGAAAATTTTAACGG
227	c13r4	GAGCACGGCTGATACCAGGCATACGTTTTTTT
228	c13r6	GGACCAGCTGCTCAGCCTTCTTTCCCTCGTTC
229	c13r8	ATCGCTCTCGTTATTCAGCGCCAGGAACTGAC
230	c13r10	TGGTCTTCACCATCACGCATCTGTTTGCCGCC
231	c13r12	CAGCGGAAAGTTCACCGCATCCAGCTCCGCAC
232	c13r14	ACCTCCTGACACCGTGCTCAAAGCCGCACATC
233	c13r16	CAGATGATAGGATGCCGGTCATACCCCCCGTT
234	c13r18	CGCCACACCAACGTCAATGCAGCAATCGATCA
235	c14r1	TTGACCTTGCCTGCAGCAACGCCGGCCACCAG
236	c14r3	CTGTAAAAATCCGGATCGCTGAAAATCTGGCC
237	c14r5	ACCGGTCGTCAGTCCCGCCTGATTAATCTGCT
238	c14r7	TCAAGCGCATATTTCAGCCGTGACTGCTTCTC
239	c14r9	CGCCATACCCTGCCATCCAGTTCCCTGTACCG
240	c14r11	TTCATCACACATCCATACCGGGTTCAAACTCT
241	c14r13	CGTAAACCTGCTCAATGCGCCAGCGTTTGTTA
242	c14r15	GTGAGATGAAAGTCCGGCATCTCAGCGCGCCA
243	c14r17	CCAATGGCTCTGGCTTTCGGTGCCTTACTGCT
244	c14r2	AAACGCGCCTTCCTGCTCAATCTGAATGGGTA
245	c14r4	GCATCCAGTTCAACGACTGCCGCTGCCAGCGC
246	c14r6	CCGCCGACAACCCTTTCGTTGCGGGGGCGGCT
247	c14r8	CAGCGTCCCCTCCTCCAGTACCGCCGGATTAT
248	c14r10	CCTGACGCCCCCGCTGGCTCATATGTCTGAAT
249	c14r12	GCGCTGAACCACGCTGGCCGACTGAAAACGGG
250	c14r14	ATGGAAAGCGCACGACTCCGCTGGGCCGCCCG
251	c14r16	TGCCCGGTGCCCGGATGGCTTCAGCACCGGCC
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255	c15r5	GGTCATCAACGTTATGGAACTGGCAGCATACG
256	c15r7	TTGCGCCGGGAGTTCTGCCTGAAGTCTGCGCC
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259	c15r13	CACGAAGCGAAGCCGCCAAAGTTGGCTCAGTT
260	c15r15	TGGCCAGTGACGCCAGAGGGAGTGAGTCATCC
261	c15r17	TTCAATCGCCATTCCTCACGCTCCTCTGTATA
262	c15r2	GGATGCATGCGGTGCCAGTCGGCAGGCCAGGT
263	c15r4	ATCTGCCGCCACCGCCAGCGAGGTGTCGGCTC
264	c15r6	TCTTCGGTAAGACGGGCCTTTTCAGCGGGTCT
265	c15r8	ACTTCAGGTGTTCCTTCAGGCGCTTGGCGACG
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267	c15r12	CGCTGCACTTACGCCGGACCACCGTCGATTTC
268	c15r14	TCACGATGCGGCACACAGCGGAACGTGCTTAC
269	c15r16	CGGGGAGTTGCCCCCCATGCTGCAGAGCTGTG
270	c15r18	CCTCGGCAAACTCTTTCCATGCCGACCGGACC
271	c16r1	CAAACTCACCATTACCGGATACAATTCCACAG
272	c16r3	GGATGACACGGTTCAGCAGACTGAAGATCGCC
273	c16r5	CCATCGGCGGCTCTGGACAGGACCGAGCCATC
274	c16r7	CCAGTAACAGCCGTTCGTAAGCCTCGTCAGCA
275	c16r9	GCTTCCCGTCTCTTCCCACTCACTACAGCCCC
276	c16r11	ACACCGCCAGCGCACCTTTCTTACCTGACCCG
277	c16r13	ACCAGACTAGGAGGCACTCACCGCCCGACGTT
278	c16r15	CGTCCCCCTGGCCGTTACGCCACCTGTGCGTC

279	c16r17	TCCGGCGGTTACCGTTATCCGTTGATAAATGA
280	c16r2	TAAACTTCAGAAATTGCCTCCGTGTACTCCGT
281	c16r4	TACCGGTTTGTGCAGCCAGCGCCTGGCCCCCA
282	c16r6	GCCGTCAGTGTTCTCTTTCAGGCGCGATCATC
283	c16r8	GGGCAGCACTCCTGTGCAGACAGCGTTCCGTG
284	c16r10	GCCAATGGTTCGTGAAGACAAACTCATGTCAT
285	c16r12	CGACGACCACCGACCTCTGTCAGGTTCCGCCG
286	c16r14	ATTGCGGATCTTTCCCCCTCCGGCTTATGAAT
287	c16r16	GCTGCCATTCTGACGAAACGCCGGAGGGTGGC
288	c16r18	CAAAACCGGCTTTTTAAGCCATCCCTTCAACC
289	c17r1	TCAGCATGCGGTTGCTGTCTGACTAACCGCAG
290	c17r3	CCGCTTTCCAGCCATACCGGACTCTTCGTCAG
291	c17r5	CGTGCCCACCCCGACGTCGGGTCTGCCCTGCC
292	c17r7	AGGGATTTTGAGCACTGTCTTCCTCTCCAGCG
293	c17r9	TTGCCTCCCGCTGCCGATACTCCCATACTGTC
294	c17r11	CGTTCTCCATTTTGCGCAGGTCACGAATAGCC
295	c17r13	GGGAAATAACTTACAACCGCTCAGGGCGTGGA
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299	c17r4	GCCTGCCCAGGGTGATCGCACCGGGGAAATCC
300	c17r6	GCGTCTGCGCGCCCGCGCTTCATCGTCTCCAG
301	c17r8	CGTGGCGCTTCTGCCTGCCGGTCAGCGCCAGC
302	c17r10	ATCACCAATTCAGAGCAGCCGGACCCGGCTGG
303	c17r12	CAGTACAACTGCATATCTTCCGCCAAAAATAA
304	c17r14	AGAGATTCGGCAGACCAGCCACCATCACGCAG
305	c17r16	TGTTCTGCTAAAGAATGATCCGGCCAGCCGTC
306	c17r18	TCGCGGGAAAAGGCACGGGCTTCTTACTGTTC
307	c18r1	ACTGGCGGTGACGGTAATTTCTGCCCGCCTGT
308	c18r3	CGGGTCGCCATCATCTTCAGGCTCCTCCTGCG
309	c18r5	CTGAACATGTCTGGTTAAACGTCAGTGGTCAG
310	c18r7	AATAATCAGACGGGCGGTATATTTGACGATCG
311	c18r9	CCGGCTTTACTTTTTACCTGCGACGACAATCC
312	c18r11	CCGTTCGTGGCAGGCGCTCGCTGACTTTATCT
313	c18r13	GACCATACGCCATCCGTTTCCGTCGCATTTGC
314	c18r15	CACTCTGCCCGTCGCCTCCAGATTCTCGTTTG
315	c18r17	CAGCCCCCTGTTATCCAGTGAGGACATAAAAC
316	c18r2	TCTGCCTGCCAGACAGCCGGTACAACGCCAGT
317	c18r4	ATCCCTTCCTTTATACTGCCCGACCAAGCCCC
318	c18r6	CTTCCCGAAGTCCTGTCTGCCCAGGTTAACAA
319	c18r8	CCCGCAGAAGCGTCTCATCTTTATGTCAGCCC
320	c18r10	CCACCATTGATTCCCCACGCCAATCTATCTGC
321	c18r12	GCCGCCACTTCTGCTCATTACAGAATCCCGGT
322	c18r14	TGCATTTAGGCTCACCGGAGATATCGGCAAAT
323	c18r16	CTCAGTTGAATCCGTACCTGATACAATGGCGG
324	c18r18	ATTTTGCAGTGTCCAGCACCGGCGTCCTCCCC
325	c19r1	CATACATACCGTTTCATCAGGGCGCCGGATTA
326	c19r3	CATGGCGGTGATACTGTCATCAGCGCTTTCTG
327	c19r5	GCCCGCGCAGGCTTCAGCGACCTTGCTGAGTG
328	c19r7	TGTACTCCCACCTTCACGCTGGACTTGTTCAG
329	c19r9	CCGGTAAAGCCTGCTTAAGCAGAAAGGTCTGC
330	c19r11	CTTTTTCGTCATAAGGCGGCGTCCGGTTGGCA
331	c19r13	TAGCCTCCTCCTTCGTGATATCGGGTCCCGGA
332	c19r15	CGCCCGGCTTCAGGAATATGGTGCGGCACCTG
333	c19r17	TCCCCTCATCAGCGACCAATCACCTTGCCCTG
334	c19r2	CATCAGCACCCATCTCACGCGCCACACAAACT
335	c19r4	ACTCGCTGGGGGATCATCCCGCCGAGCATACG
336	c19r6	TTCTTCCTTCCTTGCGCAGATTCCATTTGAAT
337	c19r8	GTGGCTGCTCGCATCAATGGCGGCCTGGCGTT
338	c19r10	TTCAGCCCGCCGTCGTTGTTAATCCGCATCAG
339	c19r12	AAAACAGCCGTACAGGTTAGAAACCGGCTCAC
340	c19r14	ATACAGCCACCTGCAGCCGCCGGTTACGGAAA
341	c19r16	GGCAACCAAGGACAATCTGGAATATGACGTCC
342	c19r18	GATGCCCAGATAGCGCCAGCTTGGGTTGGTAT
343	c20r1	GTTTTCAGGAACATCGCTGACTCTAGATGCTC
344	c20r3	GCAAAACTTCCGGCAAGCCCTGCCATTACGTC
345	c20r5	CTTCACCTCCGCCTTAACCAGTGCGTCCACCT
346	c20r7	TCTGCTTTCCCGTCTTTCAGTGCCTGTTTCGG
347	c20r9	CCCGTTGCTGTGCAATACCATCAATTTCTGTC
348	c20r11	GTTATTCTACGCTGTACGTTTTCAACAGAAAG
349	c20r13	TGGGGCGCTTGGCCAGCATGATACACGTTGGC
350	c20r15	CTCAGCCACTGTGCCGCTGACAACAGCAGCTC

351	c20r17	GACTTGGCCAGAACAGGCAGAACAACAACCTG
352	c20r2	AATGCGCTCAGGGGCATTATTCACGTTTCAGG
353	c20r4	ATCCTCCGGGTGAACTGTGCAGGCAAGGAGTC
354	c20r6	CCACGCCGACCGCATCCCACATGGAGATGTCG
355	c20r8	CTTTTTCACGCCAAGTGCAGCCAGCCGTTTTG
356	c20r10	ATCATGGAGCCGGTGGCATAGCCGACCACATG
357	c20r12	GATTTCCAGCCCCTGCCAGGTGACCGTCAGCG
358	c20r14	TGGTCATACAGTCTTCCGGCGACACGGCCTCA
359	c20r16	GCCGTCGCGTTAACCCGGACGTGCCGCCACCT
360	c20r18	ACCACCGTCCGTGACACCGGATATGCGATGAC
361	c21r1	TGTCTGTTGCAGGGCTGACAGTTCATGATTCG
362	c21r3	GCCACGTCTCATGTCCGCCACATCGGCCAAAG
363	c21r5	TATCCAGCGATGCAGAGGAGAAACGCCTCACC
364	c21r7	AACCTTGTGCGTCGCTTCATAATCCCGCCTGC
365	c21r9	ACATAACCCAGCACGGAACGGGTGCATCGCCG
366	c21r11	ATACTGTCGCCCCCGTGCTCTTCCGGGGACAG
367	c21r13	CCTGCAGCTTCATCCGCGACAGCCGGTCCAGG
368	c21r15	ACTGCGCCCGCAGTAAATTGCGGCGCAGCACA
369	c21r17	GAACACCACCCCTTCGTCTGCCGTCGCGCATT
370	c21r2	CGGACACCCAGCTCACCGTCGAACGCGTCCTC
371	c21r4	GCTTACCCGCCCCCCCTGTTGCAGGCTGCGTG
372	c21r6	AGGATTTTCTTATACGCAGCCTCTACGACCAA
373	c21r8	CCATATTCTGCTGTGCGAATTTATTGATACGT
374	c21r10	AAAGCGTCGCTCAAACGTCCCGGAGTGTACCG
375	c21r12	TGCAGGTGGTACTGGTGCCTTTGCTACGGCTG
376	c21r14	TCGCCCGGGGGCAGACCACCGGGGCATTTCTG
377	c21r16	TCCCCGTACCCGGCGACTCTGGGACTCATGTA
378	c21r18	TGAGCCGGAAAAAAGACCCGACGACCAGCCCG
379	c22r1	ATGTTCAAAGAAAGCGTGACGGTCTGCTGGTT
380	c22r3	CCCGTCCGCGGGGAAGCGGGGATAGGATCATT
381	c22r5	CAATCTGAGCGCCACACTCTGGCTGTGGCGGC
382	c22r7	GTTGTAATCTTTTTCGCCGCCGCCCACTGTGT
383	c22r9	CCGGTCAGAAGCTGCGCCAGTTCTGACCACGC
384	c22r11	TCCTCACGAGAAACGACTCCAGTACAACCAGA
385	c22r13	CCGCGATAGGACCGCTATAACCGCCCGTCGTC
386	c22r15	ACAGCACAGTGATTCGGCACTGATACGACCGT
387	c22r17	TGACCCCAGCTGATCTCCTGAGAAGCAGCTGG
388	c22r2	CGGGCCCGACTTTCCCGCAGAAACAAGCACAC
389	c22r4	GCCTGCAACAGGATCAGCCACGGATGCACGTA
390	c22r6	GTATCAGGGCCTTAATCAGCATCTGCACCTCC
391	c22r8	GGCGCTCCCCGCCTGCTGCGCCAGATAGTGAA
392	c22r10	GCTGCCCGCGCCTGCGACCGGCTGCAGTCCAC
393	c22r12	GAATGGGACATTCAGTTCAAAACCTTTGATAT
394	c22r14	TCACCCTGTGGCTGTGGACCAGCGCTTTTACC
395	c22r16	GGCAGAGTACAATATGAATTACAGGACTGGTC
396	c22r18	CCTGCTCATATGATCCTGATGCAGTAACAACA
397	c23r1	CCTTTAACTAAGCAATACCCTGTGACACCGTT
398	c23r3	CCCGAGCGGGTGGTAGCAAAATCTACTTCATT
399	c23r5	TGATTGTTCGCGGTGGAGGCAGACGATGGACG
400	c23r7	TACCTGGCCGGCGGGCTGTCATAAATCAGCGT
401	c23r9	TGATGCCCCTCTGTAACACACTCAGCTCACTG
402	c23r11	AACTGGCTGCGATACGATTGGCGGCCGTGGCC
403	c23r13	CGCTGTTAGACCAGCCGCTCACTGACTCGTCA
404	c23r15	AACGGGCACCATCTTCGTAACATTGAACCAAA
405	c23r17	TCTGTGGTCAGAGCGTTTTGTTCTACCACGCG
406	c23r2	CCGATGGAAGCCTCGCATATCAGGAGGCTCTG
407	c23r4	TTGCCGCCGTTTTGCCGAATTTTTCTTTGCCC
408	c23r6	GGCCGGGCAGTTCAAGACGACGCACCTGCGCG
409	c23r8	ACGTATCCGTCCACGCAGGCTCTCCGCGTTCA
410	c23r10	ACTGCTTTACGGGTACCTGACGGCTCTGCCAT
411	c23r12	TGATACTGAATAATCATGGCCCGGGCTCCCCT
412	c23r14	TTCACGCCTCAGGAACACGGCTCACCACAATC
413	c23r16	GCAGTACTAAAGCCGTCCGGCACTCGCCATCA
414	c23r18	AACCATGTCAAATCCCTCCGGCGGAGTCTGCT
415	c24r1	CCCTGACTGTCCGTTTTCGATAAATGTGGATA
416	c24r3	AGCAAGTTCAAGCGCGTTAGTCATCTGCGGCC
417	c24r5	CGCACTTTCTGACGCTTTCGTGGCGTGACGCT
418	c24r7	CCGTCATGAAAAGCCCACCGGTTCTAATCAGA
419	c24r9	CATCACTGCCGTTCCCGGACGAACAGCGCCTG
420	c24r11	CGCGGAAATGCCGGGTCAATAAATCAGTTTGC
421	c24r13	CCAGTACATCGTCCGGGCCGTGCTCGGTCAGA
422	c24r15	CGGACTGAGTACAGCCAAAGGCATATGGCCTG

423	c24r17	ACATACAGTTCAGTGTATGACGACGCTGTCCG
424	c24r2	AACTTCCTTTCCCCTTGATTGTCCTACGCGAC
425	c24r4	AGTTCATTGCTATATCTTCTGCACGCTTCTGC
426	c24r6	GCAGCATTCACCTCTTCCACCATCATCATCCT
427	c24r8	ATTTATAAATCACGCTCACATAACTCCCCGGT
428	c24r10	TTTCTTAACGGTCACGGTGACAGTCACGCTGG
429	c24r12	CTTCCTCCCTGCGGATATAAAAGTGCGGCTAT
430	c24r14	CGGAGCAGGTATTCAGCAACACCGGTCGGTGA
431	c24r16	CGTATCTTGCGGCTCCGTGCCGCCGGCCGATG
432	c24r18	GCGTCATCTCGGAGCCGGAGGATTCGCTGCCA
433	c25r1	TGGCGGGTGTAATGGTTGCTGTTCTGTGGCTG
434	c25r3	CAGCTGAACAGCGTATTCAGTGCGTTCGGTTG
435	c25r5	TTACGCGCCGTTTCTGACGTTTTCGCTGAAGT
436	c25r7	GTCCGGCCCCGACCCCAACGATGACATATTCA
437	c25r9	ATGGTCATTCACCATAACCTGCACTTTTATAA
438	c25r11	TGTTCACAGTGTCCTCCATGCTGAGCGTTTCA
439	c25r13	CATACGCTGAAACTCACGCCCTTCCGGTATGT
440	c25r15	GGTGATGCCAACAAGCTCTGTCGCTGCCTGCC
441	c25r17	GCACCGTCCTGCGCATCCGGATATGTTTCACA
442	c25r2	TTTACCCGTTGGGTAGGCTGATTTACGACCGC
443	c25r4	GGCGGCCTTGCTCTGCGATGCTGAAAGCGCGA
444	c25r6	CCCCACAAGCACAGAGAAAATCATCGGACGCG
445	c25r8	TAAAACGCTGCTGCTCTTTTTCGATAAAACCG
446	c25r10	TTCCCGTTAGCCGCGCTCGCCGCCTCAAAAGG
447	c25r12	GGTTTCCGGCGCCGTACCAAGATAGCCAACGG
448	c25r14	CCCGGCTGACCTCCACGCTGACCGTCAGCTCC
449	c25r16	TCGATGATCGCCCATTTATCCACAGCATTACA
450	c25r18	CTCGCGCAGCAAAATCAGAGGTAACGTACCCA
451	c26r1	CGGCTGTACCGGACAATGAGTGACCATACTGA
452	c26r3	CCTGCCCCCGTCAGTGTCGCATTCTCAGGTGA
453	c26r5	TTCCCGCAGGCCACCGCATCTCGTGCCGCACC
454	c26r7	CCCGGTTGCTGAAATCTTTACTGCATCCGTCA
455	c26r9	ACCCCAGGCGTTCACCTCTCACTGATCGCTGG
456	c26r11	GTCCCCGATGCGCCACAAACATCGGGCCAATA
457	c26r13	TGGTTTCACGCCAGTTGCGTGAAGACCACCTT
458	c26r15	CTTCCGTCACAGCCCGGCGCGGTGCGTCTCCC
459	c26r17	ACCAAGACGTGTTCGGGTAGCACTTAAACGGG
460	c26r2	CTCCAGCCCCTGAGACAATACAGCGTCAAACG
461	c26r4	CGCGTCGATTGTGTCCGCATCCTCTACCGCAC
462	c26r6	GGCACTGGGTACTCTGTGCCACCATCAGCGTC
463	c26r8	GTACGCCACCTGCTTACTGATTTGCGCGGCGA
464	c26r10	CAAACGTACACCACTATCTGGCGATTTACAAT
465	c26r12	CCCGCGACCCACGAATGCCGATTTACGCGTGC
466	c26r14	CGGTGTGTCGCAGCGTCGGCAGCTGATTGCCA
467	c26r16	AGCCGTTGCTGTGTGGTCAGGTACTCCGCCGC
468	c26r18	CGCGGCGGTGTCATATTTCACTTCGGAGATCA
469	c27r1	ATCCTGTTAGAACTGTTCATCCTTGGCACTCA
470	c27r3	CTTTCTCGTAACATCTGCAATCGCAAAGCCCT
471	c27r5	CGTCTGCCTGGCCGCCGCGTTTTTTTGCTGCC
472	c27r7	CGCACTGAGTCGCCACTGCCGGAGCCGTCTTT
473	c27r9	AGCGGAAGTACGGCGGAATATCTGTACACACA
474	c27r11	GACGGCCTATAATGTTTGCCGTCTGAATATCT
475	c27r13	GTCGCTGGCCCATCGCGCCAGCACGCCTGTAG
476	c27r15	GCCTTACGTTCGGGTCAATCCAGTTCTGTTTT
477	c27r17	GATCGGCGCAGGTTACCCATCACCCACGCCGA
478	c27r2	GCCAGCGCTGCATCAGGACGTAGCTTAATTCC
479	c27r4	TCTTTTGAGCCTCTGTCGCCTTCGACTATCCC
480	c27r6	CAGGACTCTGAATCTTCATACACGTTTCTTCG
481	c27r8	TTACGCATGAAGCCATCACCCCCAATGGCGTA
482	c27r10	GGTTGCCCCGATTTTTTCCGCCCTGAAACGTC
483	c27r12	TTCCCCAGACCTGTCTGATATCCGGCCCGACC
484	c27r14	AATCAGCCAACCAGGCTTATCAGCGCGGAACA
485	c27r16	CCAGTGCCGTTTCCCCATGCCGTACATCCCAC
486	c27r18	AGACTTACGGCTGACGAATACCTGGTGCGGGT
487	c28r1	ACCAACTGTATGCGCATGTGCACCAAACCACT
488	c28r3	ACGATATCTTATTTTTCGCCGTGGGGCCAGTA
489	c28r5	GTTGACGCTTCGTTTCTGATGATTTGAGGACT
490	c28r7	CCCGGCGTTACCGGTTTTCCTGTGCCTTCATA
491	c28r9	GTCAGCTCAAGACAGCAACGGCAACCGAATGC
492	c28r11	CGTTTATCGGAACACGTCGTTCATTTGGTCTG
493	c28r13	TTTTCCGAACCGCCCGGACTGTCACTGATATT
494	c28r15	GGAGGATGCTGCGTTTCCAGCAGTTCACCTCA

495	c28r17	GGGTCAGCGCTCCGAGTCCACCTGACCGAGGC
496	c28r2	TGTGTGGGACTGTGGGTGTGCGACCAGACGGA
497	c28r4	CAAAAGCGTGCACTGCTGAGCTGCTGGATGCC
498	c28r6	CTGCGGCTTGGCATCGCCGGCTGAGTGATGGT
499	c28r8	AGCAATATGTGAGCCACTCCGGCCCACTGTCC
500	c28r10	CGTGTGGAGTACGCTTACTTCCGCCAGCGTAC
501	c28r12	CTCAATTTTTCCGCATCATCGCTCCAATCTGC
502	c28r14	CCCCGCTGCACGGATACTCACGCAGCGGTACC
503	c28r16	ACGGCATTCAGAAATCGCTGAGCAGCGCGGAT
504	c28r18	CAGATACTGTTTGCAGACGTAATGAAAATTTA
505	c29r1	GCACTGGCCATGAGCACCCGCGGCGCACCAAT
506	c29r3	CTGTTGGTGTGTTCGCAATCTGGGCGCAAAAT
507	c29r5	TGATGCACGCGGCACTTTTTTCCGGGCACTTG
508	c29r7	CACCGACTCAACAACGACGGACGCGAATGGTG
509	c29r9	CGCTGACACGTAAGCGTGAACGTCCACCGCAA
510	c29r11	AGGTAACCTGACAGCCCACATGGCGCCGTCAG
511	c29r13	GTCGTTCTTCTGCAGTGACTTCTGCTGCCCCC
512	c29r15	TCGCCGAGATGGCGGTCCTTCAGGCGCTGAAA
513	c29r17	CGGTCGATGCGAGGTGGTTTTGCCTGCTGGCT
514	c29r2	ACGGTAATTGATGGCCACGGGATCTACCGGAT
515	c29r4	ATGATGCGACTCCCCGCCGCCGCTCAGACGTG
516	c29r6	CAGTTCTGGCGATGGTGGAAAACCTGAGCAGC
517	c29r8	GTGCGGCAATAACGGTACTTCACGTGCCGGAC
518	c29r10	GCGCTTCAGTACAGTTTTCAGCTATGTCCTGC
519	c29r12	ACGCATTTGAACCAGAACTCAAACAAAAATCC
520	c29r14	TCCACGGTGCAGCGTGATTTCACGGTGCCGTC
521	c29r16	GCCGAACTATATCCCACAGACACCACAGCGCA
522	c29r18	TCAAGCAGCAGAATCATCACCATGAGCGCAGA
523	c30r1	CCGATAACAACCGGATGCTGGTGCCCCTGTTG
524	c30r3	TGCCGGAATGGCGGCATCATTTTCTATTGTTT
525	c30r5	GTCTGCCGAGGAAGCTGCACGACCCTTCAGTG
526	c30r7	GCAGGATGCGTCTGGCTTTCAGCTTGCCGGAT
527	c30r9	TTTCAGATGGGCCGGAGTGACTGTAGGATCAC
528	c30r11	TTACTGAGGCTGGTAATGGTGGGGATTCCACT
529	c30r13	CGGGTCATACGCCGGATCGCCCTGCGGTCAGG
530	c30r15	TCAGCGTCAGCCCTTCTGCGCCGAGCGCTGAA
531	c30r17	TTGTTGCTATAATTACGGCTCACCCTTAATGG
532	c30r2	AACCGCTCTTCGTCCCCAAATCCGGGCGCACC
533	c30r4	GTTCCCCTGTTGCAGCAAGCGTTTGTTTTTGC
534	c30r6	GCCTTTGCCACAAGGGCCGCGACCGTCAACCT
535	c30r8	TAATCTGTCGGTAATCCATTGTACTTAATCCC
536	c30r10	GTTTCCCCAACACATCGAATACGTTCGTCACA
537	c30r12	TATCACTGGTTATCTTGCCTTTGATGTACCGT
538	c30r14	TGCTGCACGGCGGTGATGGCATACGTCGAGCG
539	c30r16	GCTGTAGCCGTTCCATACCGGCATAGGCCATG
540	c30r18	TGATGTCTTGTACACCGAAGGTAATTGGCTCA
541	c31r1	ATGTGGTTAGACTGTGAGCATGAGCATGAGCA
542	c31r3	CCTTTGGCGAGCGCGGTTGGTGCTGTCAGTTC
543	c31r5	GCATCAGTTGATGCCGCTTCTGCGTCTGCCGC
544	c31r7	CCGTCTTAATACCTGCACTCCACGCACCGTGG
545	c31r9	TTTCAGATGACCCGCTGGCATGTCTGTCCACC
546	c31r11	GGGATTCGGCATCCTTCCACTCTTCCGGAGGA
547	c31r13	TGCTGCACCGCTGGCGGCGTGACAATCCGGAA
548	c31r15	CGTCTGCCGGAACGGCGCGCCATCGCCCGGTA
549	c31r17	CCAGTGCCTTTTCCGTCACCCAGCTACGCCCG
550	c31r2	AGTCAGGCAGGCCGAATTCTCACCAAACGACG
551	c31r4	CGTTGCCGCGGCAGAGGCGCTCCGCTTAACCG
552	c31r6	TGCTGTTAACACTGTACTGACCGTAGTCAGTT
553	c31r8	TTCCGCACGACTCACACCGGTATCAGTGATTT
554	c31r10	TTGCCGCCCGTCCCGGAGTTCGCAATCAGTAC
555	c31r12	CGATACCGAAACGGCAAGATGCGGGCCGAGAT
556	c31r14	CATGGCGACGGGTCTGGCTGTTCACCGGCACA
557	c31r16	CGCAGATGGTATGCCGGTTTAAACAACGTCAG
558	c31r18	GACTTGCAATGGAACTGGCTGTTGGGTTTCCA
559	c32r1	GTGAACCAATACTGAAAGAATGGGCCCCCGTG
560	c32r3	GGTATTCAATCCCTGCCAACCTGAGTTGGCGT
561	c32r5	CTGTTTCACGCCCTGGCAGAATTTCCGGAGGA
562	c32r7	TCCATGCTCCACCGTGTTCACCACCCACTGAG
563	c32r9	ACAACGACCACCGTAAACGTACCAAACAATAC
564	c32r11	GCCACTGAGGTGTCAGGGAAAAGGTCGAAAAC
565	c32r13	TTATCTGATGCTGCCGGTGCGGCACCATTCAC
566	c32r15	ACACGACCAGATTTCAATAACATCATCCGGCA

567	c32r17	CCAGATACGACGGCACCTGCAGAACACCGTTA
568	c32r2	TTATTCGTTTTTCGTCCCGTAATCGGCCCCAA
569	c32r4	TCCGGTCATTTCATCCATTACCACTTCCGCTG
570	c32r6	CGCTTCCTCTGGCGGCGCGTGCTGACTCCACA
571	c32r8	GTATGCCGCTTTCATATACCCGGGCCCGCCCG
572	c32r10	GGGAGAACAATCACCGCACCGTTCTTCACACT
573	c32r12	TCCTCCAGTTTCCAGCAGCTCCTTCGTGGCGG
574	c32r14	CGTGCCACACGATGGCCTCTTTTTCCGCCAGC
575	c32r16	TCACCACACGGTCGGTCCTGCACGGTTCCGTC
576	c32r18	CGTTGTATTGTCACCCTTTGAGGTTTACCGGG
577	c33r1	GCCTGTTGCGATTTGGTGCCGTAACCGAGTTC
578	c33r3	TCTGTTCGGTGCCGGACTGTCCAGCAGAGCTA
579	c33r5	CGGACGTGGAGCTGACGATGCAGCAGGCGATT
580	c33r7	GGTCGTCTCATTGCACTTTCGTCCTTGTAATG
581	c33r9	CCATCATAACCTGTACCGCCTCGTATAGGACA
582	c33r11	CTCGACTTTCTGCTGGCGTTATCCGCTTTTTT
583	c33r13	CGTTATCCTCTGTTCGCCGTCAAACCGGATTC
584	c33r15	TTATCCGATTACTGCGGTTATAGGCATGCAAC
585	c33r17	CGGATTCCCTGAACCAGCAGGCGGACACCATG
586	c33r18	CAACGAGTTGGTGATTTATGCGAAATGAAGTG
587	c33r2	GCCAGAATAGAACATCTGCAACGGTTATTTCA
588	c33r4	GTTTTTGCGATGACCTGGCATTCGAGAATAAC
589	c33r6	CTCTGAGCGTAACGCCCGGCTTCATATTACAT
590	c33r8	AAATAGCCGGCAATGTACCCGGTTGTGAAGTG
591	c33r10	TTCCGTCCTATCCGCATTTTTAGCAAGGTAAA
592	c33r12	CTCGACGGAAATAGCCCGGCGTCACCGCTTAG
593	c33r14	ATCATCGCACCGGTGCTGATACCGGGAAATGT
594	c33r16	TATAGTTCCGCTGTATTGCCGCGTTCGCACTC
595	c34r1	ACCCGCAGCGTTAACGGTGATGGTGTGTCCGT
596	c34r2	AGAAATAAATTTTCCGGTAACGGATCGAAACT
597	c34r4	TGGCTCAGGGCTTCATTTGGATATTGGGCTTT
598	c34r6	TAGAAATGATACGATAGAAAAACACTGTCCGG
599	c34r8	TCCGCTCCGCACCGAGAAGGACGTCTGGCAGT
600	c34r10	GACAAAAATCCATTTTGTGGTGATTCGCCGCG
601	c34r12	ACGAACATTCCACCTTTGCTCTCTTCCGTCAG
602	c34r14	AGTGATTTAATAGAAAAAGTGCTCGTGCGCCC
603	c34r16	ATGAATAAGGTATAAACAGTGCACTCCACGTC
604	c34r18	GCATCACACTCGGGCATAAGTCGGACTTCCGA
605	c34r3	TACAACGTAACTAACCGCAGAACGAATTTTTT
606	c34r5	TTATTTAAATTTGATGAAGCCAGGTCTCGGAC
607	c34r7	TGACAGTTAAGATCAAACAACTTGTCCGGATT
608	c34r9	ATTACTCAGCAGGGAAGCACTTGATCACTTGA
609	c34r11	GTACAATGATAATGAACAGAGATGGGTCAGCT
610	c34r13	AATTCATTAATCACTAGGCGATCTGCTCAATC
611	c34r15	TAAAATTGTGAAAAATGCGATATCGCATAGTC
612	c34r17	CAGAGAAGTTTGTCATCAAACCTGCTGCGGGT
613	c35r1	CAGGTAAAATAACGCGTCGCCGGATCCGCGTT
614	c35r3	ATGCCTATAAAAGCAAGCATCTACAGCTTTAC
615	c35r5	TTCTCGCATATAGCGAGGCAAAGGCATCATTC
616	c35r7	AGTGGCATGGCACATAGCAGTCCTGATAAGAA
617	c35r9	GAAAAATGATATAGATCATTTTCTCAGGTATC
618	c35r11	CATCTGCATAAGCGACTTACTCGACGTTTTAA
619	c35r13	TTTCATTTAACTATACCTTTTGAGGCCAGCAA
620	c35r15	ATATCGTTCAGTGGGTTATCCAAATCTTTGAT
621	c35r17	AACATCTTGTATCGTGATGACAGACTTCTTGC
622	c35r2	AATATACTTTCTGCGGCATATCACGCGATAAC
623	c35r4	GACTCTTTAATTAAAAGATTACTCAATAACAA
624	c35r6	TCATTGCAAAGCAGTTAATTTTATGCTAAAAA
625	c35r8	GTTTGGAGAAGAAACTCTTTCGTATTGGCAAC
626	c35r10	AAGCGATGAAAAAACTACCTCTTCCATCAGGT
627	c35r12	TAGTTTAATCAGCATTTATTGGTTCAGAGGTT
628	c35r14	GAGCATGGGTTTTGTAGGTCAAAATTTCCACT
629	c35r16	GCTAATTTCACAAAGCCTCGCAATAATAGACT
630	c35r18	GTCTGATATCGTAGATGGATATCTGTTTGCTC
631	c36r1	AATGCAATGTTTTTGACGGTGTTTAGCCACGT
632	c36r3	TACTCCATAAATAAACCAATACTCTCCAATAA
633	c36r5	AATTGTCAGATGTGATTTCGCCAACTACTCTT
634	c36r7	AAATATATTTACTATATGGTTTCTAGGGACAG
635	c36r9	AAGGAAATTATTAAATATTGCTAATCCTATTG
636	c36r11	ACTTATAGGATTAGAAGGTCGAACTGCACGCA
637	c36r13	GTAGATAGTGGACTCAAGAATGCTGTGACGGT
638	c36r15	TAAGCACTATGTTTTATCTTACTGAGGAAGCA

639	c36r17	AAGCTTTGGCAAGGTGATTTTTGTGGCAGGGA
640	c36r2	CATAGACGTGATATTCCCCTCCCGAAAACGAT
641	c36r4	ACCAATACCAGCTGACAGAGCCAACATAAGCA
642	c36r6	ATTTCATCTCCATTAATGGCTTGGCACCTCTA
643	c36r8	TGGCGTACATTCCTAGGCAGGTCAAAAGTTAT
644	c36r10	CACATTATGATGACATGCTTGTTTCAGCGAGA
645	c36r12	ATGGTGTAGTTTTATTCGATGAACGTATGAGA
646	c36r14	TAATTCTATGCCAGAATTGTCAGAAGAAGAAG
647	c36r16	GAAAGCTAATACTATATATGCATTCCAGTGCA
648	c36r18	GTGGGACAAGCAGATAAGCGATAATTATGTCG
649	c37r1	TCCACTTCGTTTTACCCCGATGGTTATAGTTA
650	c37r3	GCGTTATGATACAATGCCAATTATGAAGATAA
651	c37r5	AAAAATGATTACATTGAAGAAAATCAATCCAA
652	c37r7	GCTAACCAAGTCATAGATGGTCGGTTCCTGTG
653	c37r9	CATATTACCCTGAATTTTCGGTGACTTCATCA
654	c37r11	AGTCATTAGCAATAATTGCAACTCTATAATGG
655	c37r13	AAATGGTTTGCCCAGCACGAACATCACAATAC
656	c37r15	GTTCGGCGAATATGGAAAACTACACTATTCCT
657	c37r17	CTATGAGAAAATTGAAATCAAATAGTAACAGA
658	c37r2	TAATCGCCAACAGGGACAGCAGGCTGTGCCGT
659	c37r4	TGGGTGACTTTAGCATGATACAATATTTTTTG
660	c37r6	TAACTAATCAGCATCTAGCATGCAAAAAATGG
661	c37r8	TTTCAAGCATAGTTCAACCGCAACAGTAACTT
662	c37r10	TCAGATAGCGAAATGCTTAATAAACGCTAGAA
663	c37r12	TTTTATATAAAAAGACAACTCTGGTGGCGAAA
664	c37r14	TTGTTACATATTCATTAATAGATACGTGTGTT
665	c37r16	GCATTAGCTGTGCCACCCACTACGAGCTAATC
666	c37r18	AGCAAAGCAAAACAGGCGTAAAAAGCAAGACT
667	c38r1	AATGCCATTATGCAAGCCTCACAACTTCAACG
668	c38r3	ATCAGGTGCTTCCATTATTCTCCTAGATGAAA
669	c38r5	AAAATAATTTGGCATACAAATAAAGACATTGA
670	c38r7	AAATGGAGTAATAATATTAAAAATTGGGAGGT
671	c38r9	AGCTACAGAGACAAACACAGAGCTTGCCTATT
672	c38r11	AGGTATGAAACCATTCTAAAAAATATTCCCCA
673	c38r13	TATCAAAAGACCCAGCAAAAGGTATCATGCTT
674	c38r15	AGTCAACTCAGATGGTTGGAATGAATACGATG
675	c38r17	AACCAGTAATGGTATTAGTGACCTATGATTTT
676	c38r2	AGATGCCATATCCTTCACCCAGGCCACTCAAT
677	c38r4	GACTTCAGTCAAGCAGATAAATATATGACAAT
678	c38r6	GTTTATTAAACAATAATGTTATTGACCTATCA
679	c38r8	GGTACAAATTTTACAAAATCCGGTGTTTCAGC
680	c38r10	AATTTAGTGAGATAAAAACAAACCTGCTCGGA
681	c38r12	GTAGTACTGATTAGTAGATGTCGTCTTGAAGC
682	c38r14	TTATCGGGTCATGGACAGTTCGCAAAAAATTC
683	c38r16	CCCCGTTACTTCAGAAGCCTGAAGACCTGCAT
684	c38r18	ATTTTGACGTTGCGCAGTTTGTCTTTGCCATC
685	c39r1	TGCTTCCGCGATGCCTCATCACTGTCATTCTG
686	c39r3	TTTGAAGAGTAATTGGAATTGATTCAATTGAG
687	c39r5	TTTGGTATCAAATGAAAGTATGTTAACTGCTG
688	c39r7	AGGGCTGTTTCTCTCATGCAAAAAACATAATG
689	c39r9	TAATCTCCTCCATCGTGCCGCGACCGAACTGG
690	c39r11	TATCACAAGCAAGAGGTTCCAAAACAGAGCTT
691	c39r13	TCAGAAATCGGAATGGGTGTGGTATCCTAAAG
692	c39r15	AAACGCTTAGTTCAATACTACTAAAAGGCATT
693	c39r17	TTTCACGATGATAGTGACCTGTTCTGAATCAA
694	c39r2	TCATAGAACAGTTGATGTATCAACAGTTTTTC
695	c39r4	TAACTCTCTCCTGAAGATATTAAAATACAACA
696	c39r6	AATGATAAAGTTTTATGACTAAAAATATGACA
697	c39r8	AGGCAGGATCAGAATTTATTGAAGATATGAGG
698	c39r10	TCTTATGATGCAGATAAATGTTAGTATGAAAA
699	c39r12	AACAACCTAACTAAGTAGTGATGATTATTTAC
700	c39r14	CCTACGAGCCCTGAAATGTTTTTTTAACTCTT
701	c39r16	CTACTTAGAGAAGATAGCAGTGATAGTACTTG
702	c39r18	CCAACAGCATTGCATATTGATGCTCGCCTACC
703	c40r1	TTTTTATGGTCCGTGGTTGTTCACTTGAAAAC
704	c40r3	GCAACACCATGTAAACACTATGAACAAATAAT
705	c40r5	AAAACTGGCTATGGCAGAATGTATAAACATTG
706	c40r7	GAAAGAAGCAACTCTAATTTTAATATATGTAA
707	c40r9	AAACCTATTATGTTGAATGCCCGGTGCAATAT
708	c40r11	TCATTACTTCGCAGTCCGTTGATTTCCTGCAT
709	c40r13	CAAATATGTTGATCCTTTTACTCCAAACAACA
710	c40r15	TGAAAGCATGCAGTAGAAAAAAATTTTTTAGA

711	c40r17	ACGCAGCTACATATGCAGTCACTAGTTGCAAC
712	c40r2	AGCCACAACTCCCGGATCCGGAACACGGTTCA
713	c40r4	AATCAAAACCAATTGATTTAATCAGAGCGTCT
714	c40r6	GTATAAAAAAAACCAGATTATAGGAACCATGG
715	c40r8	AATCGGTATGAACGAATACTTTTTCAAATCTG
716	c40r10	GGGAGAGATAAATTAGAAAAGCTTAAATAATT
717	c40r12	GTGGAAAGTGGACATGCAATTGTTAAACTTTT
718	c40r14	ATTTTGAATCATTACTTAGAGGGGTCCTTAGG
719	c40r16	TGGAAAACTATCTATCGGCTTATTGTCAAACG
720	c40r18	AAATTGATTCCTTCGAAGGGGATCCTCGGAAT
721	c41r1	TCTTCCGCAGCCAGCCGGAATATCATTATAAA
722	c41r3	AATTCCATATGTATTTCATGGAAAAAAGCAAT
723	c41r5	AAAAAACAAAGTTAGTCAGACTTGATGCCTTA
724	c41r7	ATCGGAAGGCAACTGGAAATCATTTAGCAGAG
725	c41r9	ACAAAGGTAAGGTCAAGTTTTCGCGGGTGCTA
726	c41r11	ATGAGCTCTCCTACGGTCAAGAGAATACCACC
727	c41r13	TTAACACCTGGAATGATTGGTGCAGTTTCGTT
728	c41r15	TCCGTGGCGTATGTAATAGAGAGTGAGGCGGG
729	c41r17	CAGGTCTTAAGCAATGCTTTTTTAAATACTGT
730	c41r2	TGGCGGTGCGATACTTCTTCCAGGTTTTTGTT
731	c41r4	GCTATAATTAGATAAGCCTAAAAATGATAAAC
732	c41r6	CCAAGCCAACTTAAAGATTTATCGATTATTCA
733	c41r8	TCAGTTTTTATAGATTTGAATGACCGACGCTT
734	c41r10	ACTTATTACACTTCCCCACTTTTTGTAACCTG
735	c41r12	TAGTGCATGAACTCATCAGCCTCATGCTTCGA
736	c41r14	TATATTCCTTGACTACTATGTTAAAAGCGTCC
737	c41r16	AAAACACAGACTTCTTTTCTTTCACTACGAAG
738	c41r18	ATCAATGAAGGAAACACTTGATAAAAAAGCAT
739	c42r1	AAATTCATTAGTTCCGGCCAGCAGTGGCGGTG
740	c42r3	AACGAGGTCATGCGTTCAGTCTTAATAGTTAG
741	c42r5	CGACAGAAGATTACGAATTATTACCACAAAAG
742	c42r7	CAAATGCTCCTATGAGCAACGTGTCAACACCC
743	c42r9	TTATTGGATCGTTTCCGGAACTCCAGTAGATG
744	c42r11	GAACAACAAAGTGACAAATTCTGGAGCAATAA
745	c42r13	TATGAAGATCGATCGCTTGTTTCAATCACCAA
746	c42r15	AATTAAGCTTTAGTGTTATTGAAAAACTTAAA
747	c42r17	CCACACCCAAAAAACAGACTACATTAATGCCA
748	c42r2	CAATATCGACCTGCATCAGGCTTTCTTCCAGC
749	c42r4	AGAAAACGAAACATTAATTTTTTATATCACTT
750	c42r6	AAATTACCAAGAACAGTAACATTTCACTTGCT
751	c42r8	GCACTATCGAAAGATAGAAAATTATTCCCCAA
752	c42r10	AGGTACACACAACCTTAGTAGTTGTGCAGAAA
753	c42r12	ATATTATCAATATCCAGAAATATCTTTCTAAA
754	c42r14	CCCAGAAACCGACATTGAAAATGATCTCAGCA
755	c42r16	AGAGAGATCACTTATGAAAAATGGCGACTTCC
756	c42r18	ACTTAGTAATTTTATGCGCGCACGATGCAAAG
757	c43r1	CACTGGCTGTACTGTTTGCAGGCATCACCAAT
758	c43r3	TCACATTCAAGAAAAAAAACCGACACGAAAAA
759	c43r5	CAAACCGCTTCATATTTAACTGAACGCTAATA
760	c43r7	AATATGATGGAAGTTCACCAGCCACGGCTCTA
761	c43r9	TTGAGCCTCAAGCGATTCATCCCTTGGGTATA
762	c43r11	TTTATGACCGTCCGGATATTGAGAGAGGTGTT
763	c43r13	TCGATTAGACAATGAATATTTTTTTCCCAAAG
764	c43r15	GAAGTTAACCTGTGTTGCCGCCAATTACTATA
765	c43r17	ATCAAGGTTAAAAAAGCTGAACGAAAATTAGA
766	c43r2	CCATATTTTTCTTCCTTCGTTGCAAATATGCT
767	c43r4	CGCTAAAAGAGTTAGTTGACTATAGACGGTTA
768	c43r6	CCATATCTGCATTGATACATATTTAATTCCTC
769	c43r8	TGCAAATTAAAGAGTTATGTATCAGGATCTAG
770	c43r10	TTTACTTGATATAGAATATTAAGCACACCCTC
771	c43r12	GGATATTTGTTAAGACGTAATGAATAAATTGT
772	c43r14	TGTTGGAGGATGGTTTTAAACATATGGCCAAA
773	c43r16	TTTTGCATAGCATGCATACCTTTCGAGGAGCG
774	c43r18	AGATTCTTGGCGGAGAAACCATAAGGCACAGT
775	c44r1	TTTT AATATATGCGTCACCTGACCGGTA
776	c44r3	ATCTGCAG TTTT GCAGACTCAAAACATGTTTAGAAA
777	c44r5	CTTGCAGA TTTT CAGAAAGACGATGGGTTCATCTAT
778	c44r7	AATTATTT TTTT GCATACGACGTGTCTGGCCGCAGC
779	c44r9	CAAACTCG TTTT TTTTTTTCGTGAGCAAATATCGAC
780	c44r11	TCAGTTAT TTTT AGGTGTTTTAACTCGTCATTCGGT
781	c44r13	TCAAGTGG TTTT CTTATCGAGTCAAGAACTCTGAAA
782	c44r15	AAAGCTAT TTTT TTAATAAAATTAAGGGATAAATTG

783	c44r17	CTGTAGTG TTTT TAAATATCAATATATTGAAACGTA
784	c44r2	TGAGGCGG TTTT CATCCTGAAGCGGCGCATTTCCAG
785	c44r4	TATCAACA TTTT AACGACTTTTTTAAAGCAGCCAAG
786	c44r6	TATTAAAT TTTT CGCTTGAATTTGAATCTGACCCTG
787	c44r8	ACGTTCCT TTTT GAAGATTTTTTCAGAGGTGCCTAG
788	c44r10	AAGGACAT TTTT TTACCTACGACAGGACTCGACAGG
789	c44r12	GAGAACTT TTTT ACGATGATAAATTCACCCACAGAT
790	c44r14	ATAATAGA TTTT TCAGGATTTAGTAGTAACCTTCTT
791	c44r16	CGGTTATT TTTT AATGTCTGTTATGAGCCGCCATAA
792	c44r18	AAATGATA TTTT CGAACCGCTTTCATCCTTGCATCTACTCGTCG TTTT

Sequence of Primers in PCR

Labeled primers	Location	Oligo sequences(5'-----3')
5' Cy3 labeled primer	2710	ACAGAAAGACGGACGAAGGGTGGAGT
5' Phosphorylated primer	28893	GGATCAGAAATGGGAAGAAGGCGAAG