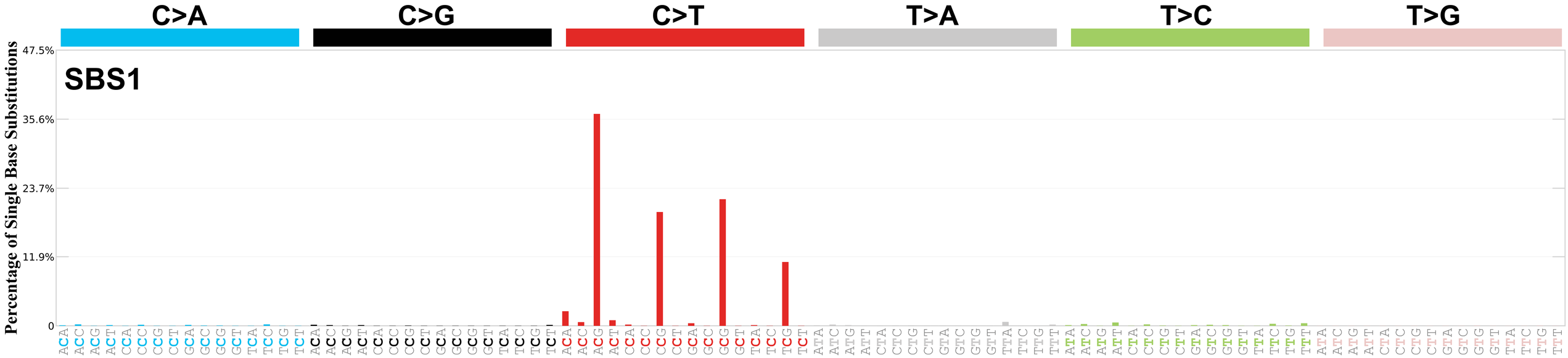
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C>G
C>T
T>A
T>C
T>G
SBS1
Percentage of Single Base Substitutions
47.5%
35.6%
23.7%
11.9%
0
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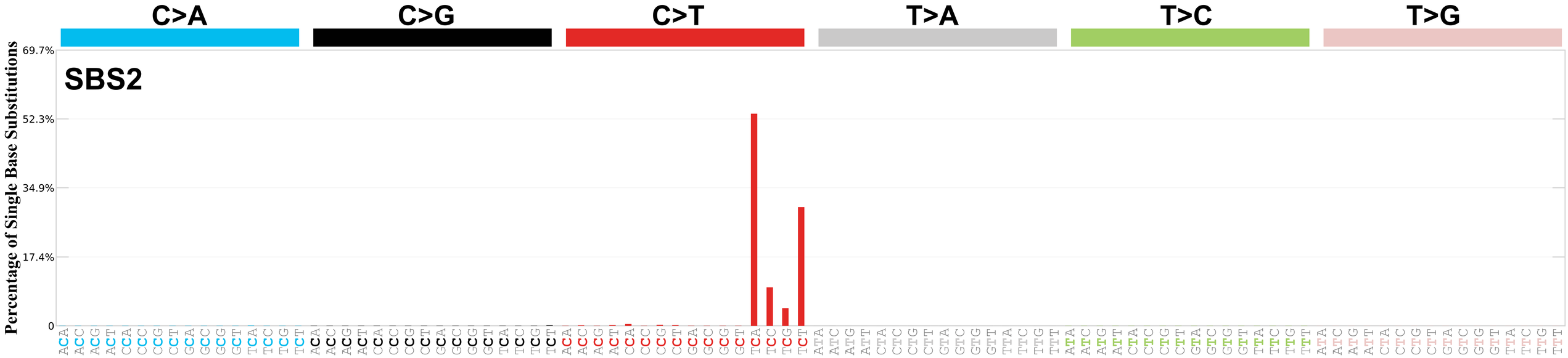
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C>G
C>T
T>A
T>C
T>G
SBS2
Percentage of Single Base Substitutions
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52.3%
34.9%
17.4%
0
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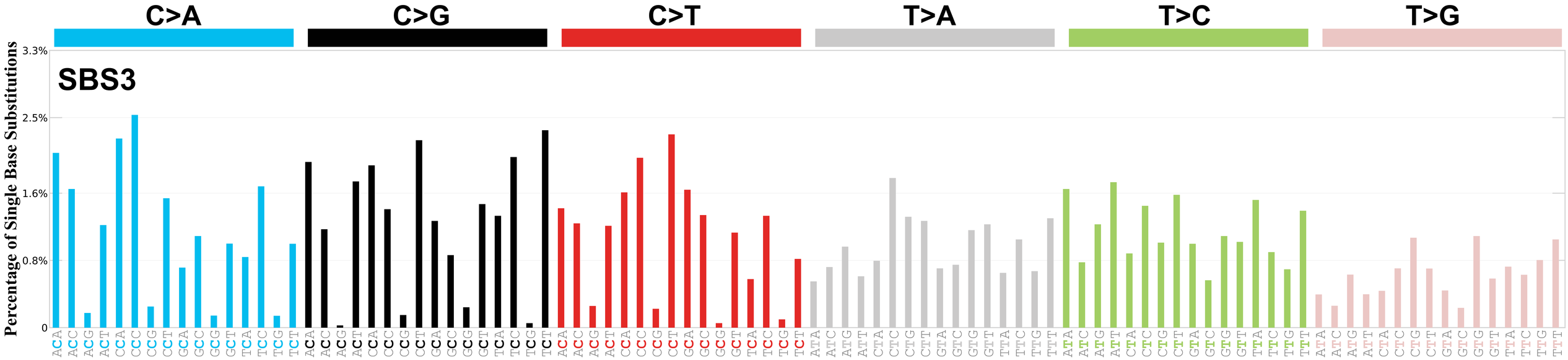
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C>G
C>T
T>A
T>C
T>G
SBS3
Percentage of Single Base Substitutions
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2.5%
1.6%
0.8%
0
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ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
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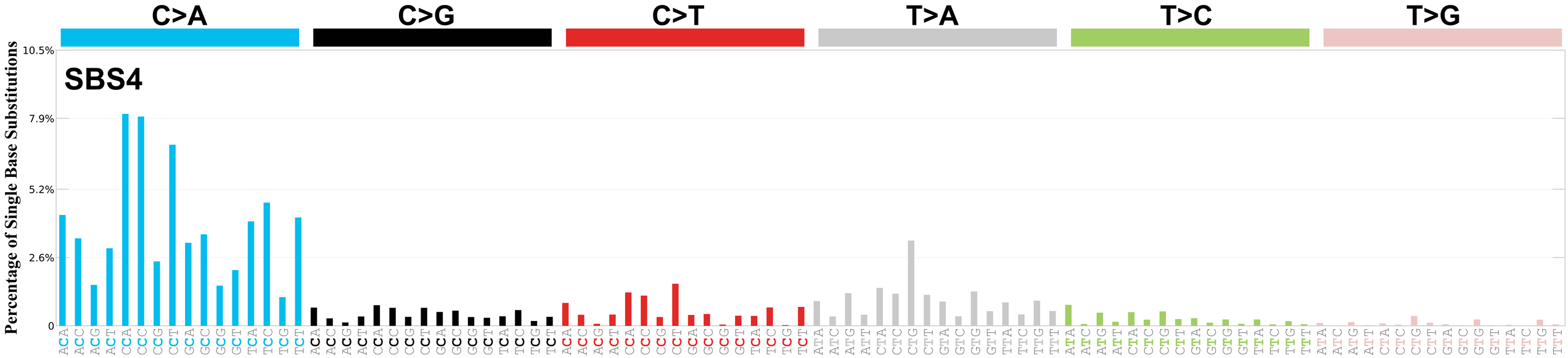
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C>T
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T>C
T>G
SBS4
Percentage of Single Base Substitutions
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7.9%
5.2%
2.6%
0
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ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
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ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT
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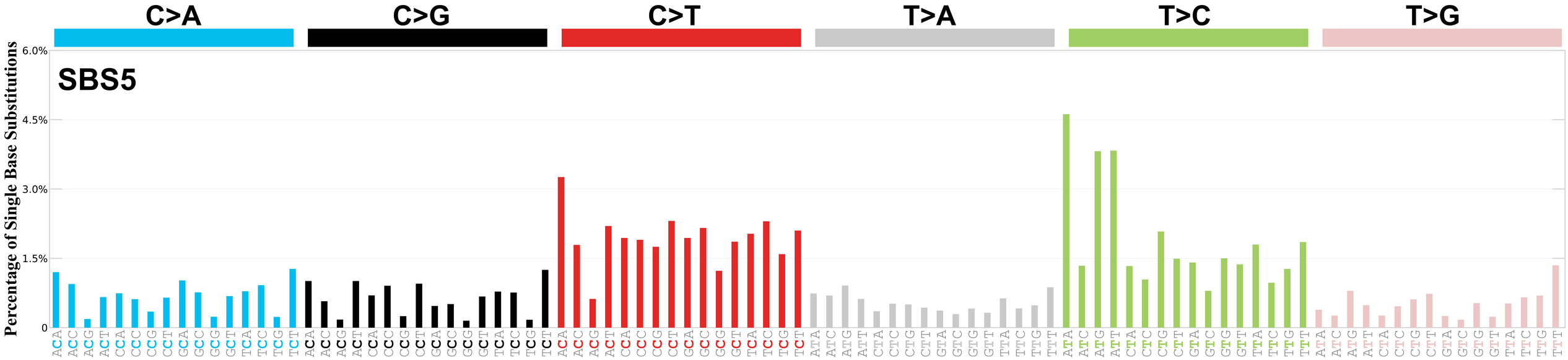
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C>G
C>T
T>A
T>C
T>G
SBS5
Percentage of Single Base Substitutions
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3.0%
1.5%
0
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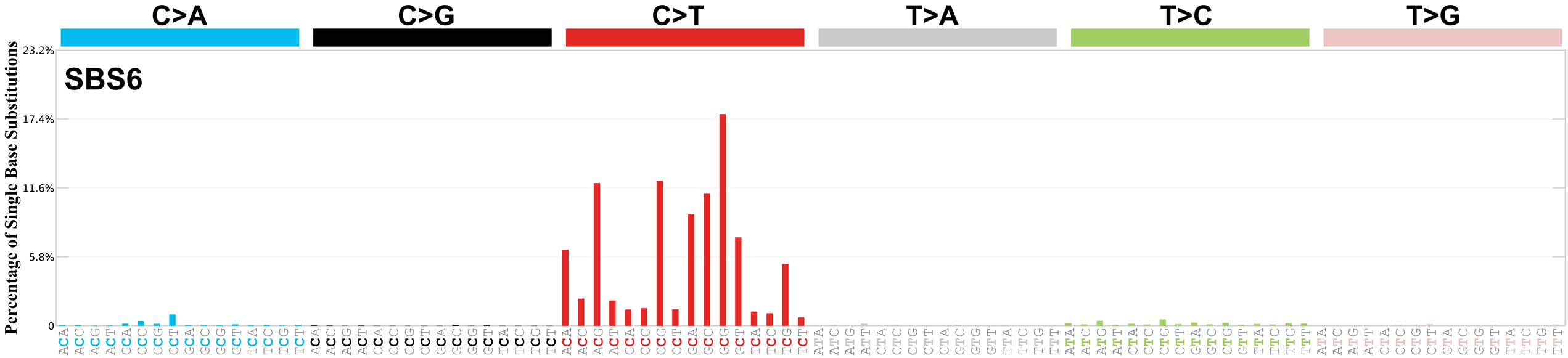
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C>G
C>T
T>A
T>C
T>G
SBS6
Percentage of Single Base Substitutions
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17.4%
11.6%
5.8%
0
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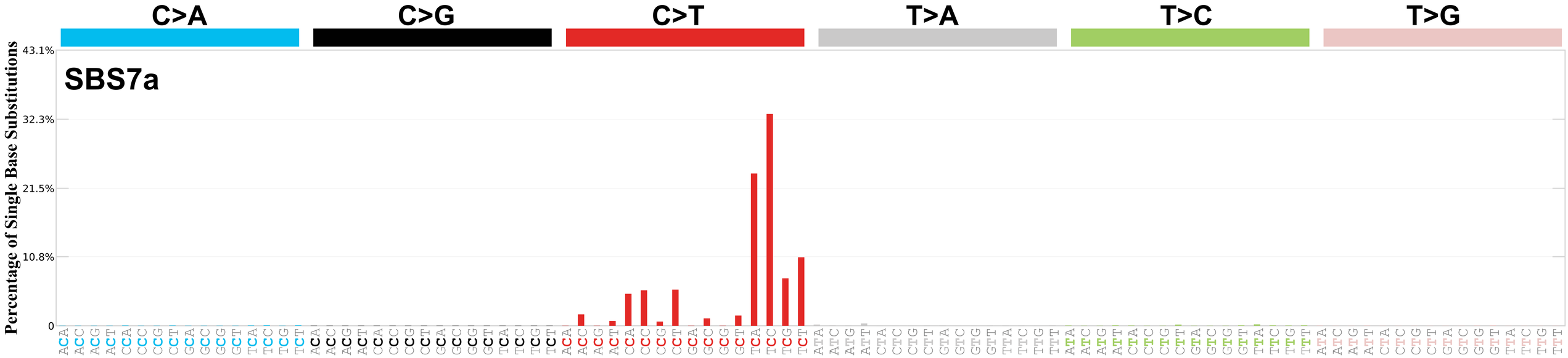
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C>G
C>T
T>A
T>C
T>G
SBS7a
Percentage of Single Base Substitutions
43.1%
32.3%
21.5%
10.8%
0
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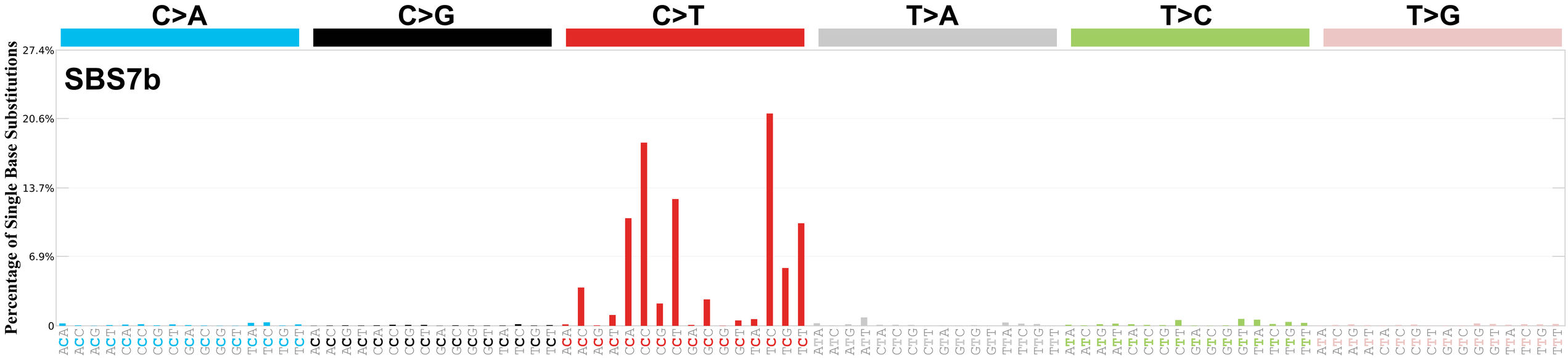
C>A
C>G
C>T
T>A
T>C
T>G
SBS7b
Percentage of Single Base Substitutions
27.4%
20.6%
13.7%
6.9%
0
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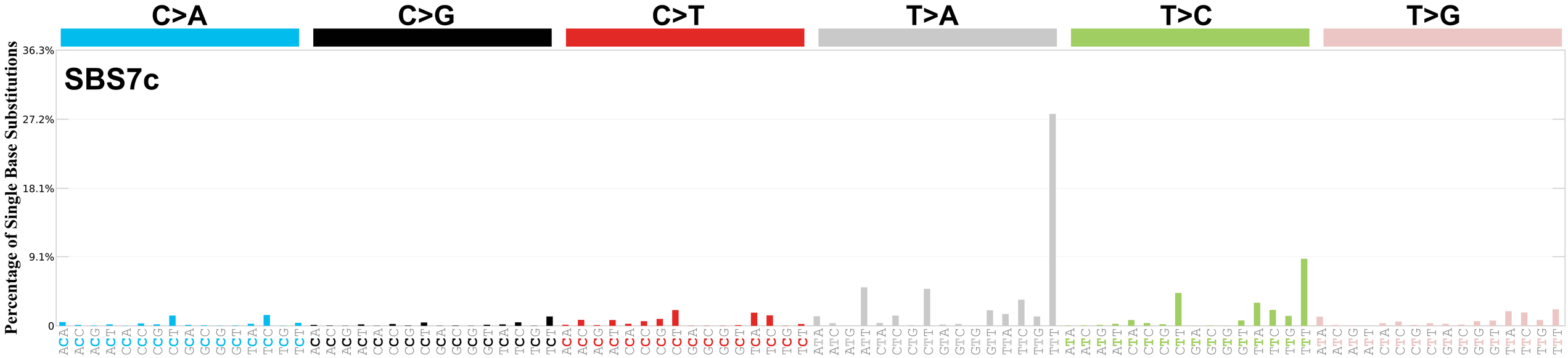
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C>G
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T>A
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T>G
SBS7c
Percentage of Single Base Substitutions
36.3%
27.2%
18.1%
9.1%
0
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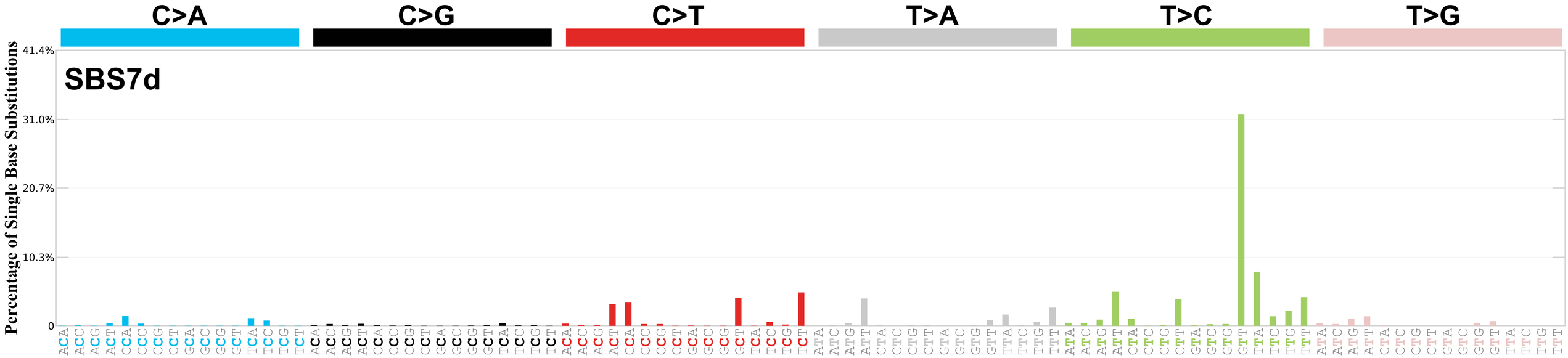
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SBS7d
Percentage of Single Base Substitutions
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20.7%
10.3%
0
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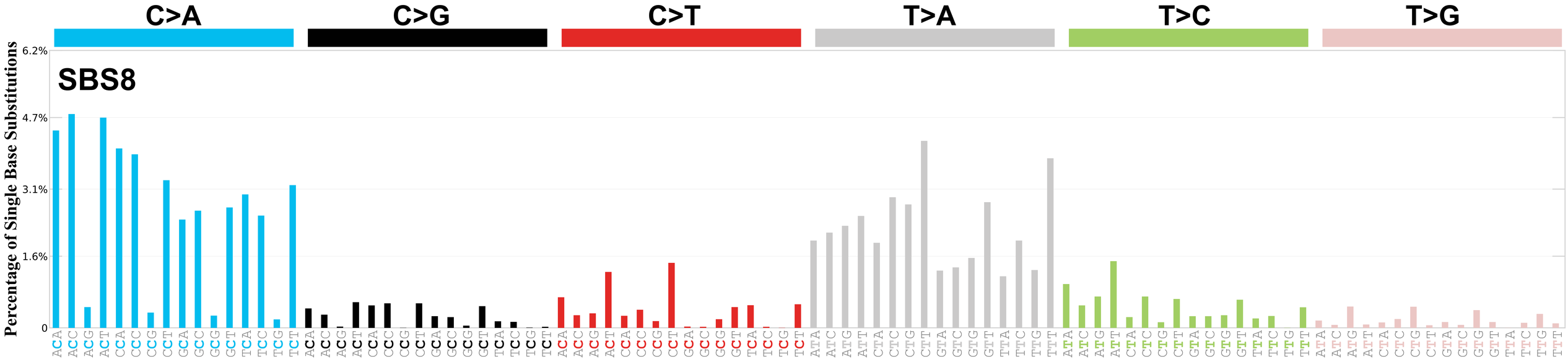
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SBS8
Percentage of Single Base Substitutions
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1.6%
0
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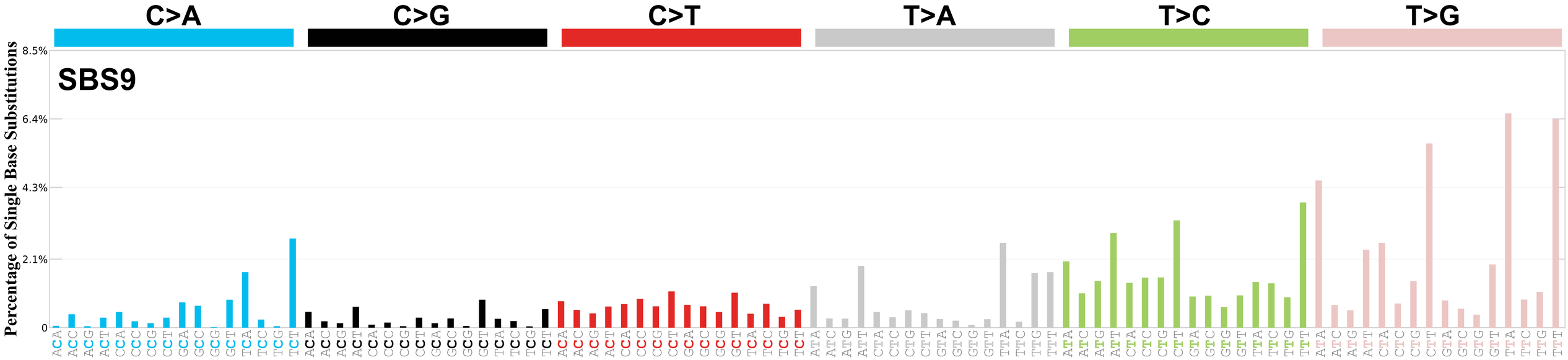
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SBS9
Percentage of Single Base Substitutions
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2.1%
0
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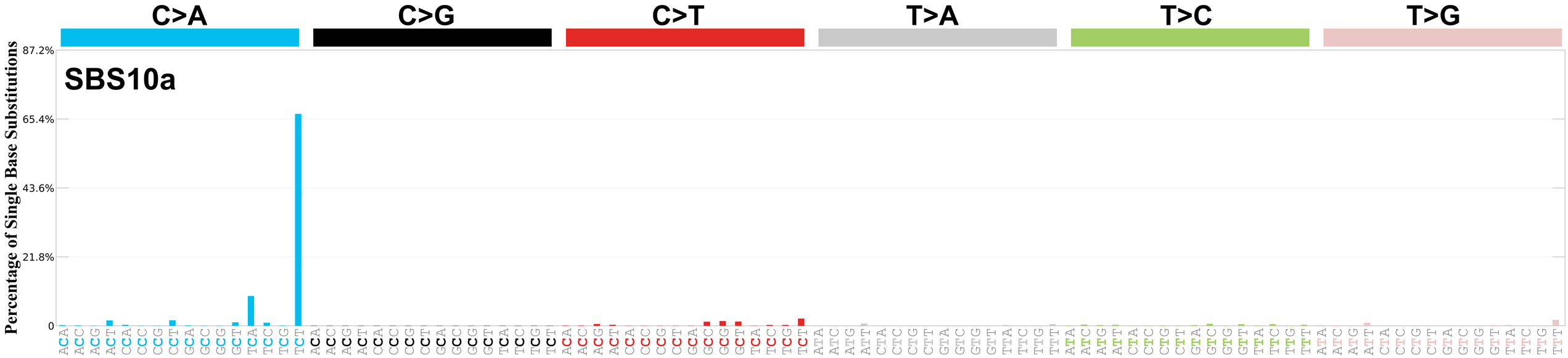
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C>G
C>T
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T>C
T>G
SBS10a
Percentage of Single Base Substitutions
87.2%
65.4%
43.6%
21.8%
0
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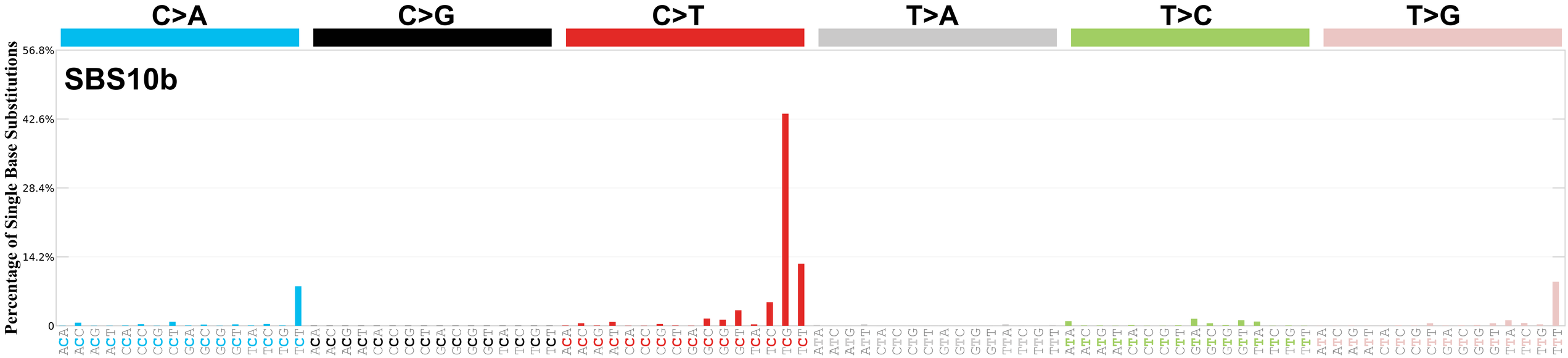
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SBS10b
Percentage of Single Base Substitutions
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28.4%
14.2%
0
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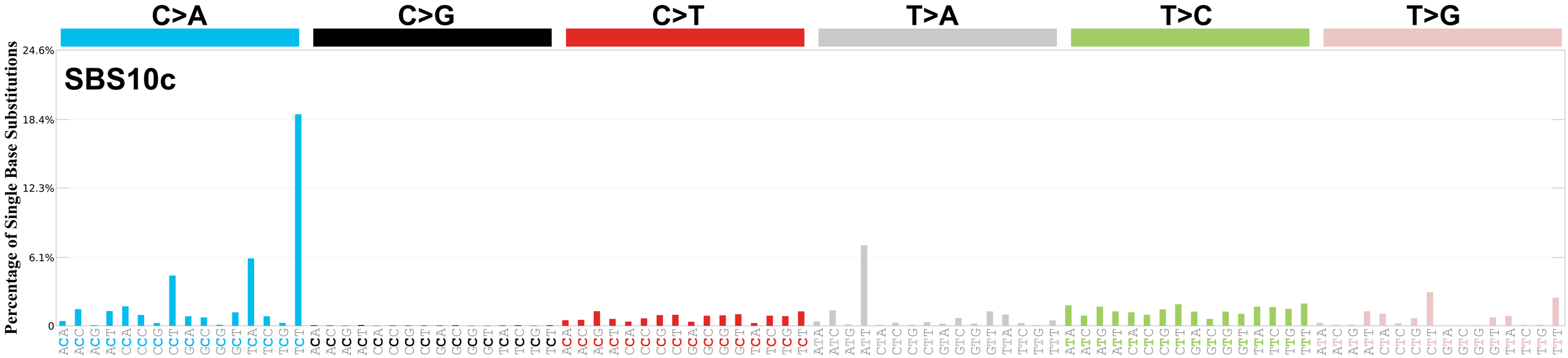
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SBS10c
Percentage of Single Base Substitutions
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12.3%
6.1%
0
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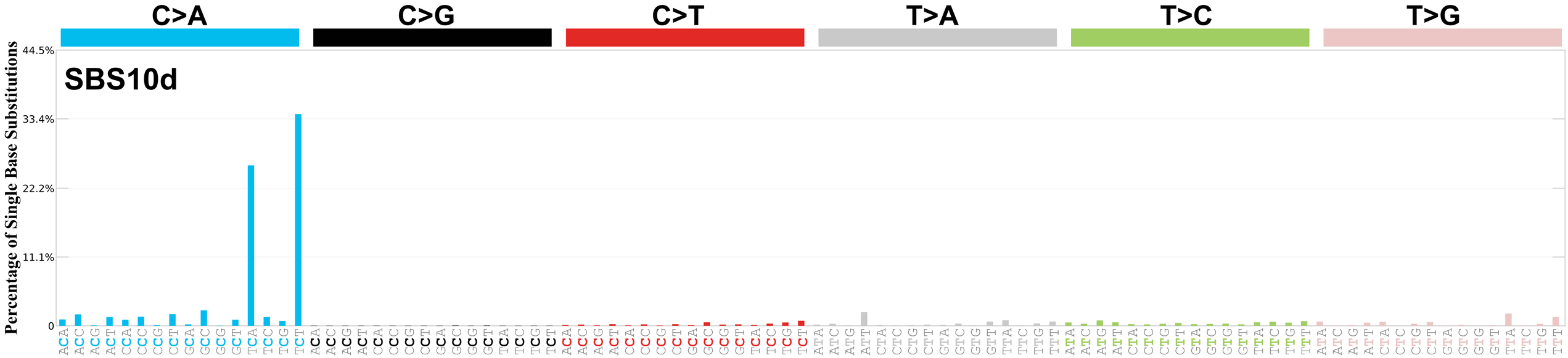
C>A
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SBS10d
Percentage of Single Base Substitutions
44.5%
33.4%
22.2%
11.1%
0
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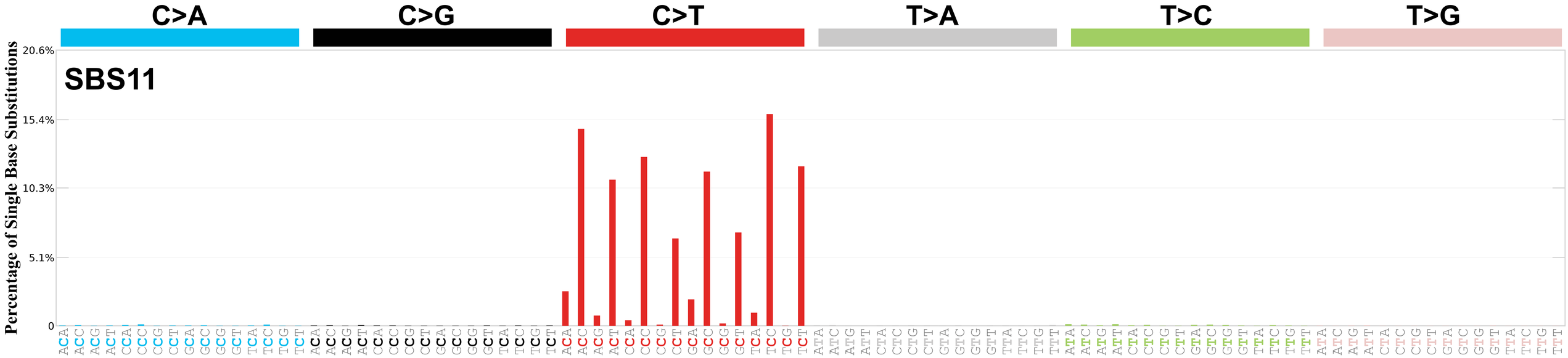
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C>G
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T>G
SBS11
Percentage of Single Base Substitutions
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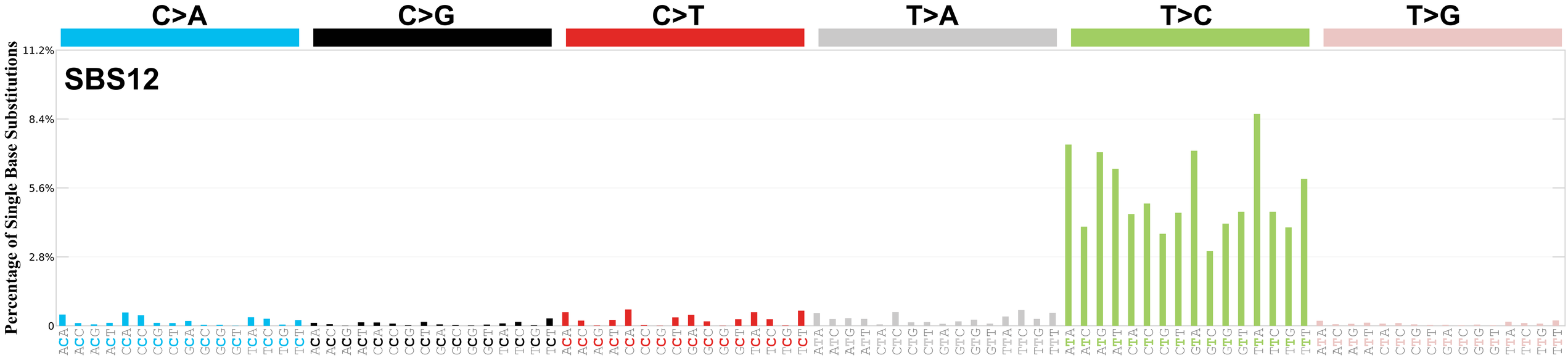
5.1%
0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SBS12
Percentage of Single Base Substitutions
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8.4%
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2.8%
0
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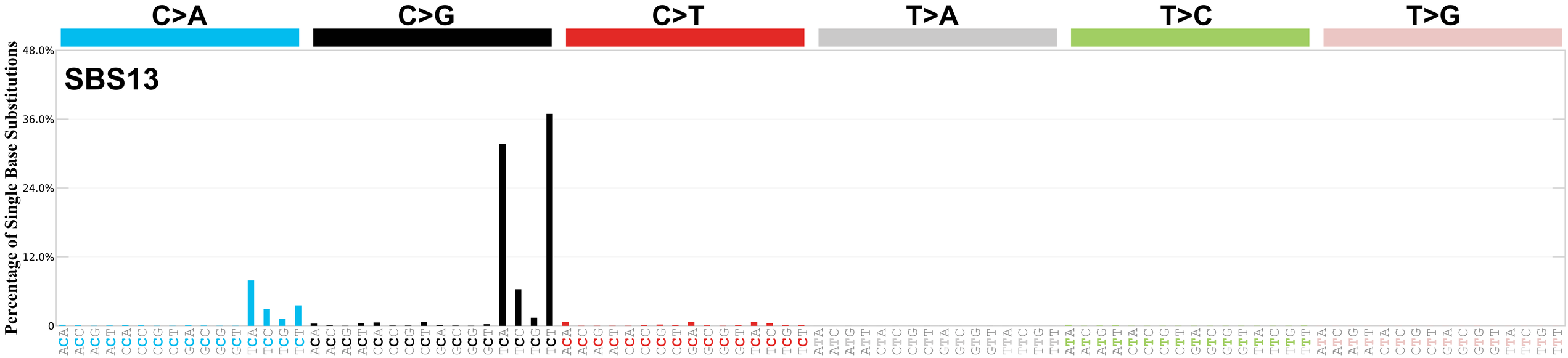
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T>G
SBS13
Percentage of Single Base Substitutions
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36.0%
24.0%
12.0%
0
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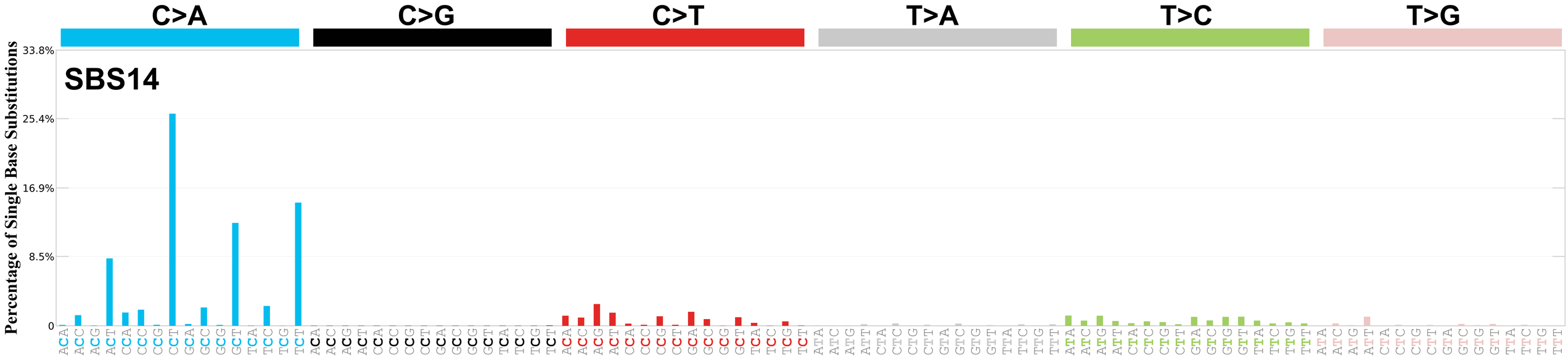
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Percentage of Single Base Substitutions
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0
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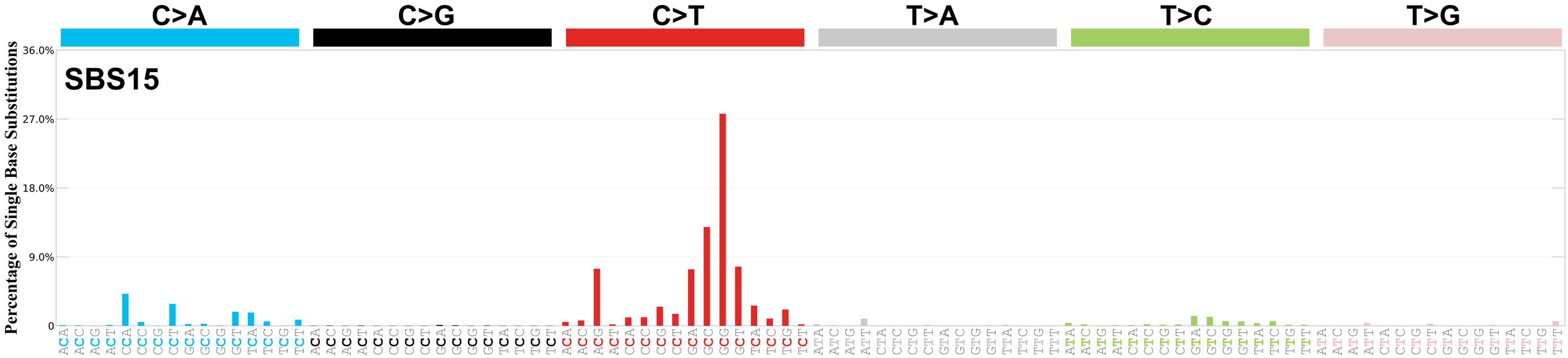
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SBS15
Percentage of Single Base Substitutions
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9.0%
0
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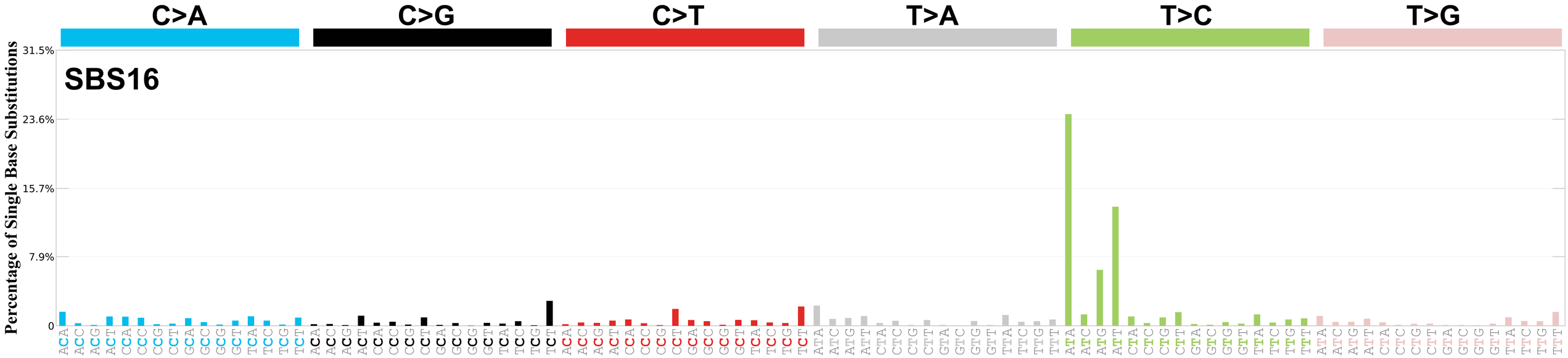
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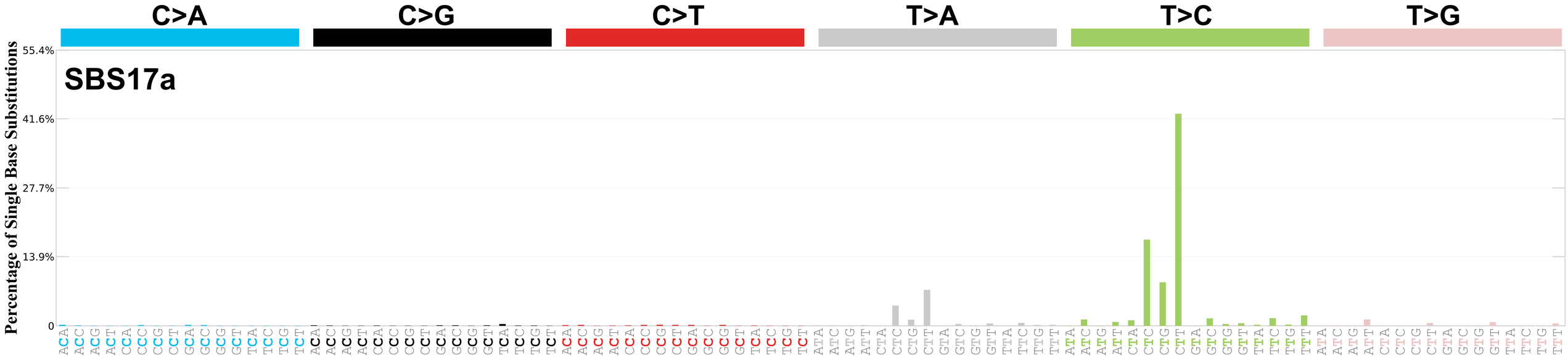
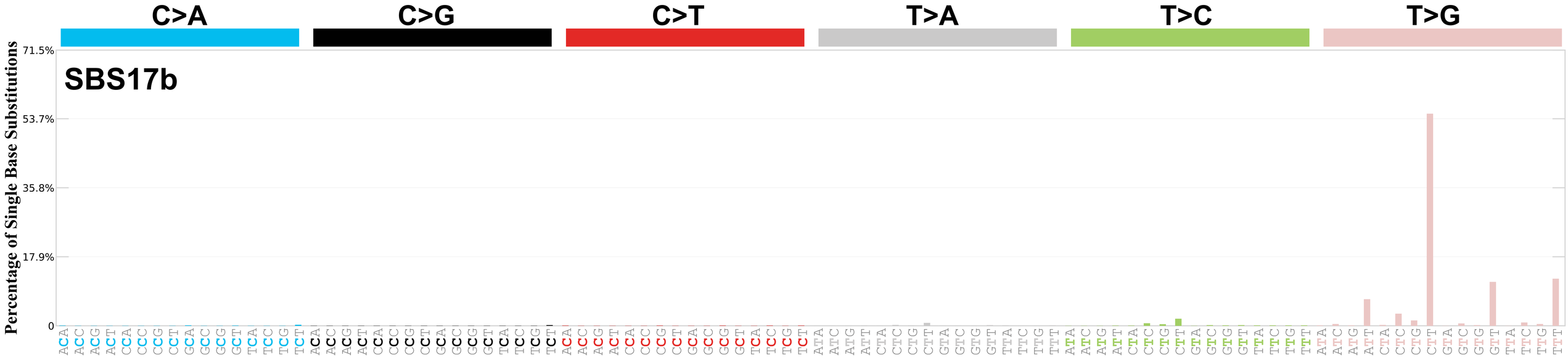
C>G
C>T
T>A
T>C
T>G
SBS16
Percentage of Single Base Substitutions
31.5%
23.6%
15.7%
7.9%
0
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT


C>A
C>G
C>T
T>A
T>C
T>G
SBS17a
Percentage of Single Base Substitutions
55.4%
41.6%
27.7%
13.9%
0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C>G
C>T
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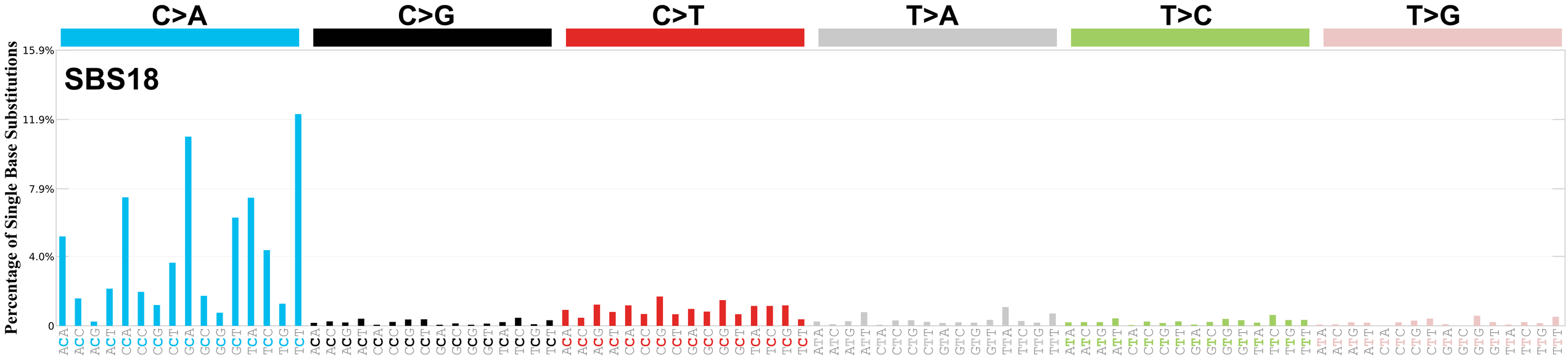
T>C
T>G
SBS17b
Percentage of Single Base Substitutions
71.5%
53.7%
35.8%
17.9%
0
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT


C>A
C>G
C>T
T>A
T>C
T>G
SBS18
Percentage of Single Base Substitutions
15.9%
11.9%
7.9%
4.0%
0
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ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT
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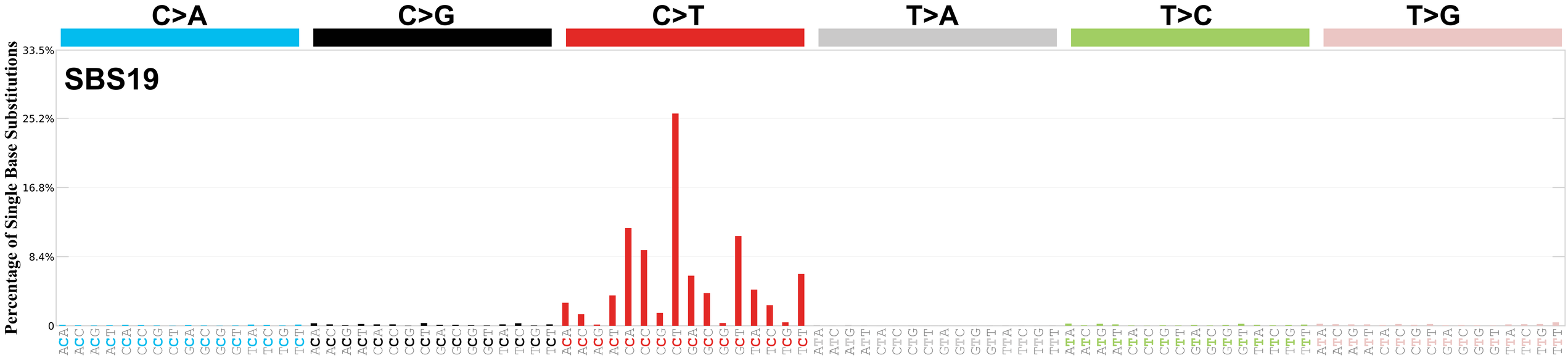
C>A
C>G
C>T
T>A
T>C
T>G
SBS19
Percentage of Single Base Substitutions
33.5%
25.2%
16.8%
8.4%
0
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
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ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT
ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT
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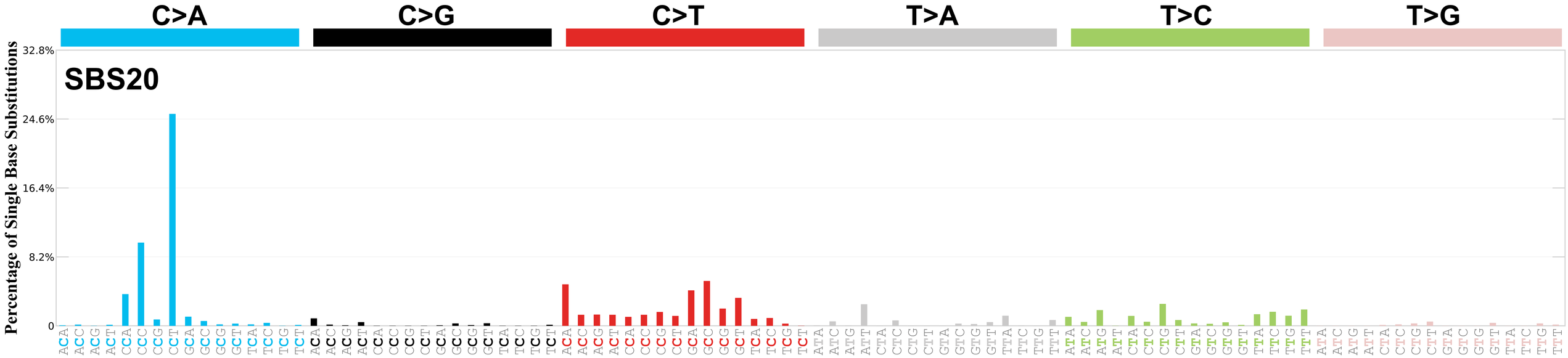
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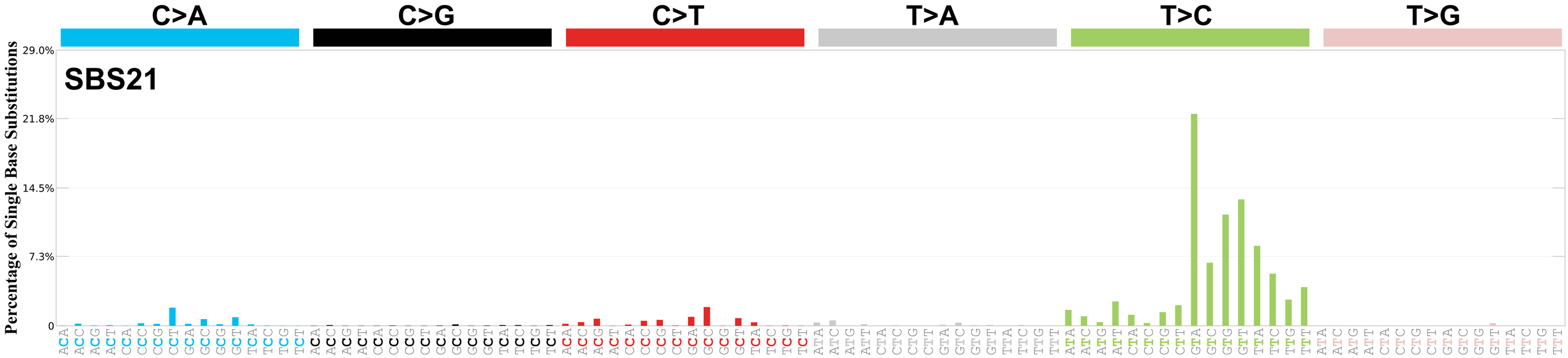
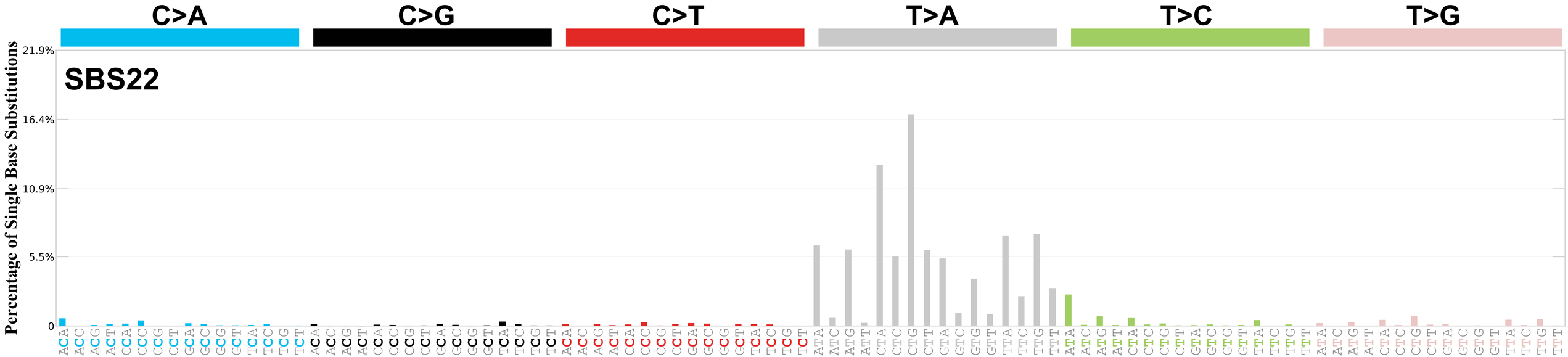
C>G
C>T
T>A
T>C
T>G
SBS20
Percentage of Single Base Substitutions
32.8%
24.6%
16.4%
8.2%
0
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT


C>A
C>G
C>T
T>A
T>C
T>G
SBS21
Percentage of Single Base Substitutions
29.0%
21.8%
14.5%
7.3%
0


C>A
C>G
C>T
T>A
T>C
T>G
SBS22
Percentage of Single Base Substitutions
21.9%
16.4%
10.9%
5.5%
0
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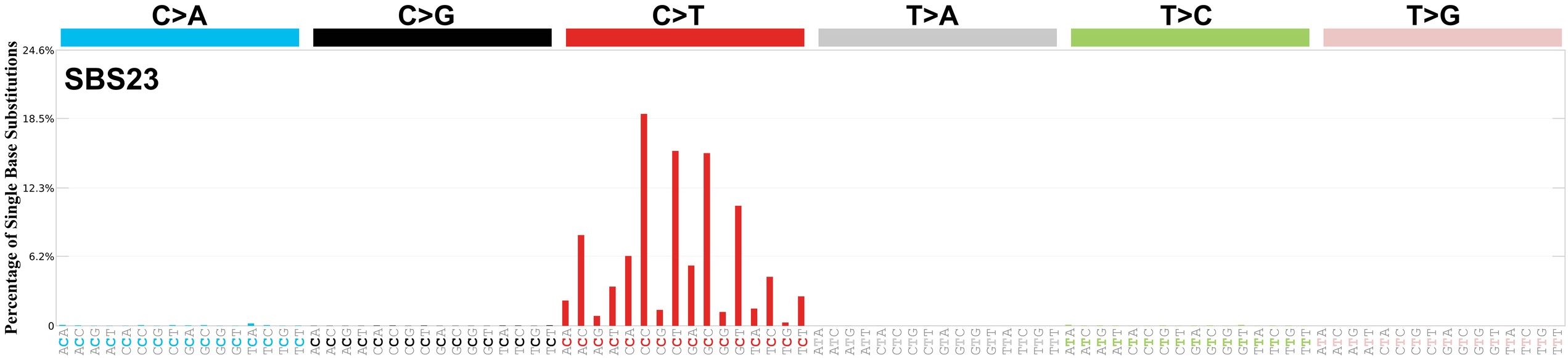
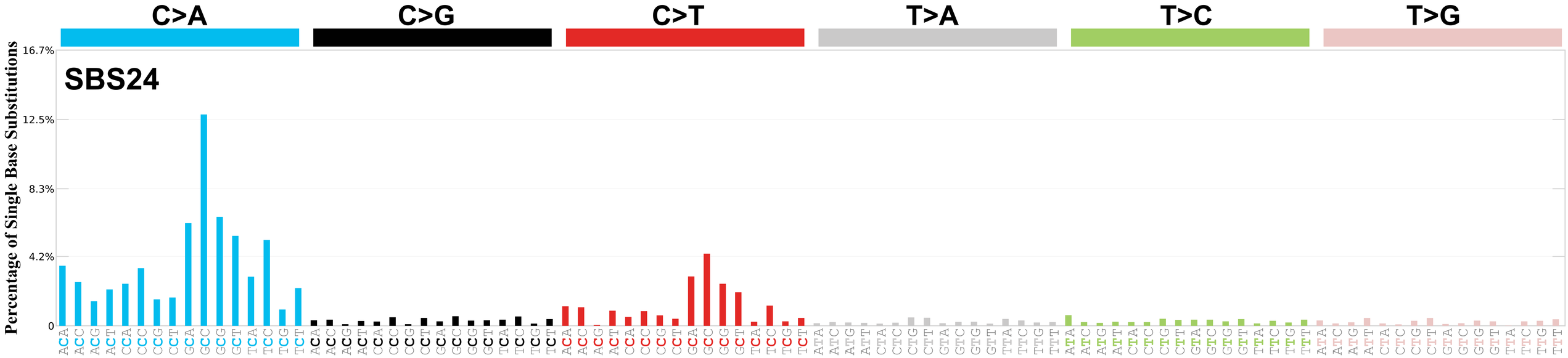

C>A
C>G
C>T
T>A
T>C
T>G
SBS23
Percentage of Single Base Substitutions
24.6%
18.5%
12.3%
6.2%
0
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT


C>A
C>G
C>T
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T>C
T>G
SBS24
Percentage of Single Base Substitutions
16.7%
12.5%
8.3%
4.2%
0
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ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT
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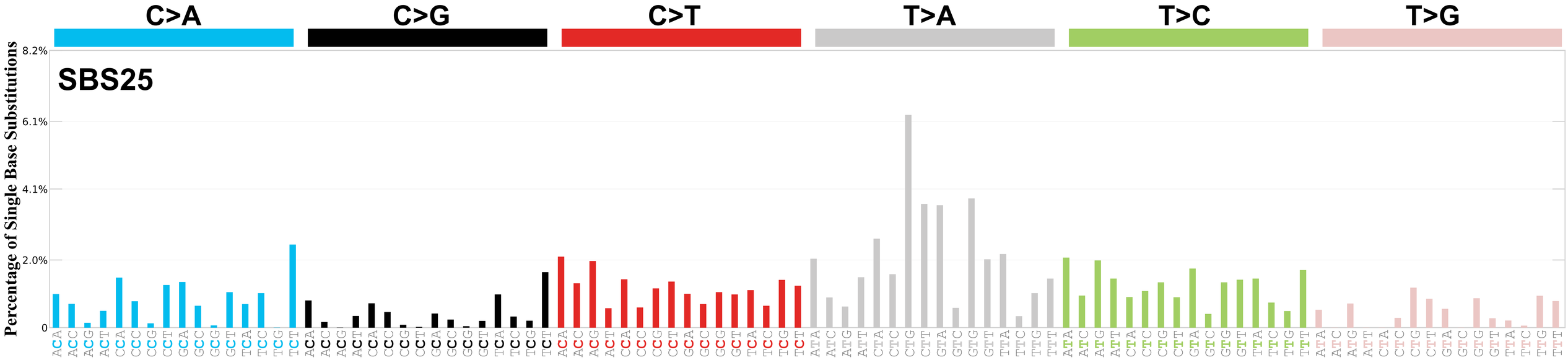
C>A
C>G
C>T
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T>C
T>G
SBS25
Percentage of Single Base Substitutions
8.2%
6.1%
4.1%
2.0%
0
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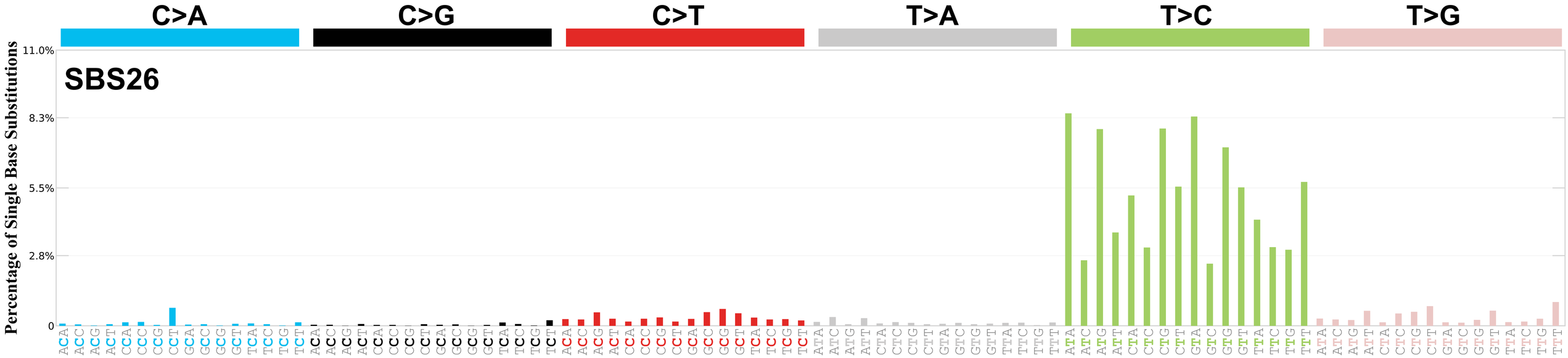
C>A
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T>G
SBS26
Percentage of Single Base Substitutions
11.0%
8.3%
5.5%
2.8%
0
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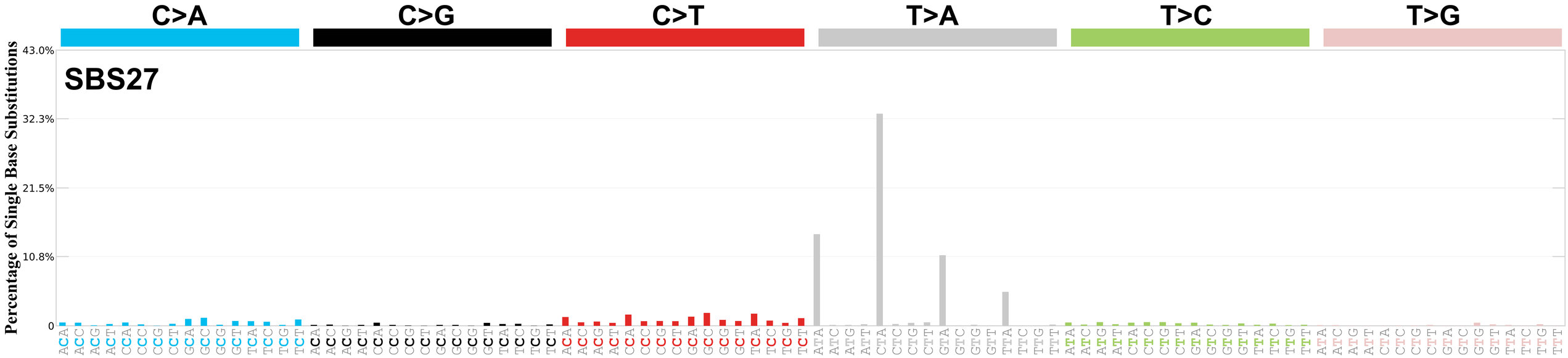
C>A
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T>G
SBS27
Percentage of Single Base Substitutions
43.0%
32.3%
21.5%
10.8%
0
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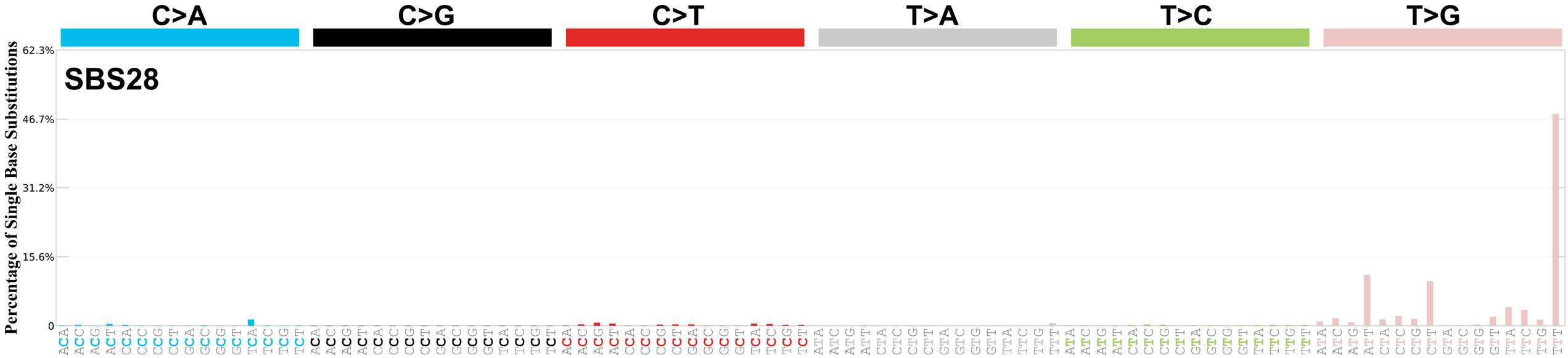
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T>G
SBS28
Percentage of Single Base Substitutions
62.3%
46.7%
31.2%
15.6%
0
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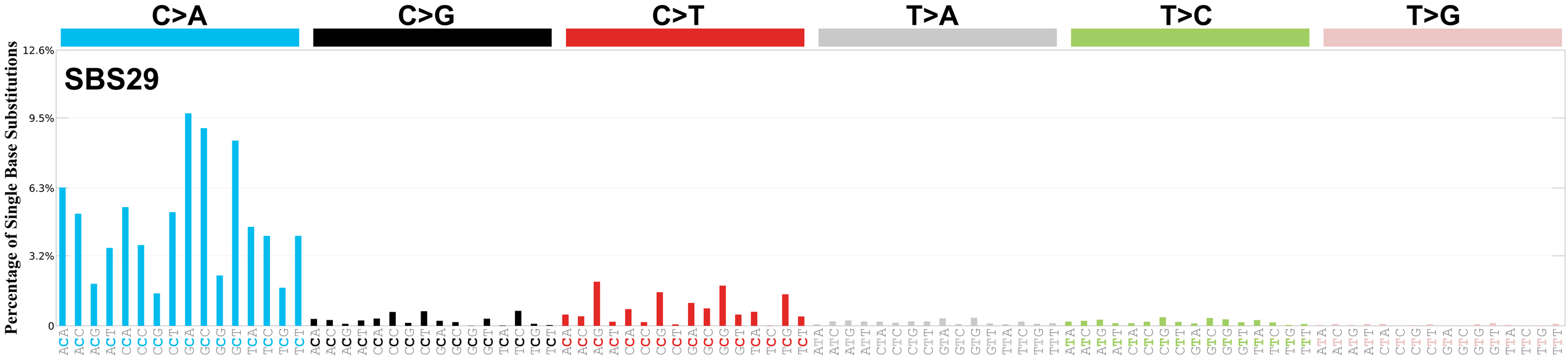
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T>G
SBS29
Percentage of Single Base Substitutions
12.6%
9.5%
6.3%
3.2%
0
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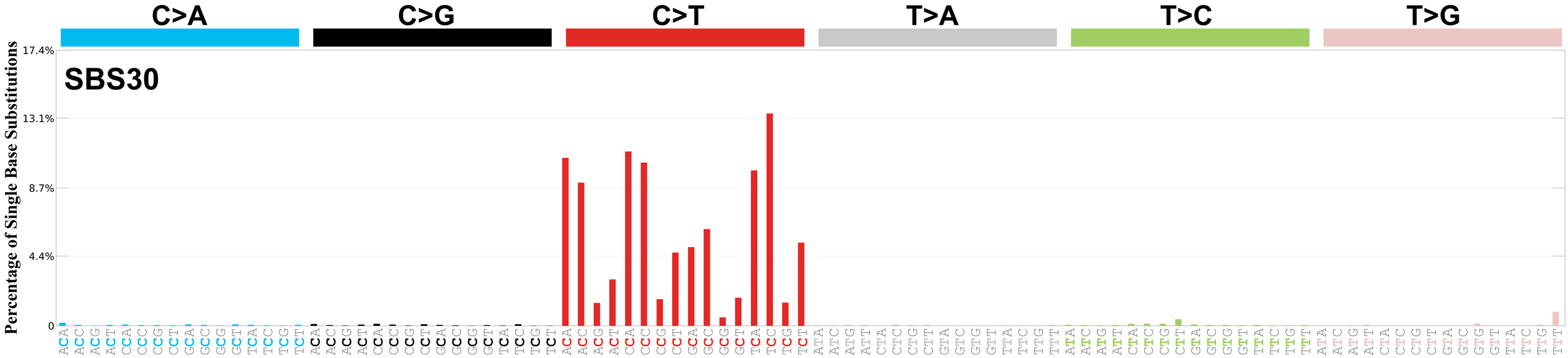
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SBS30
Percentage of Single Base Substitutions
17.4%
13.1%
8.7%
4.4%
0
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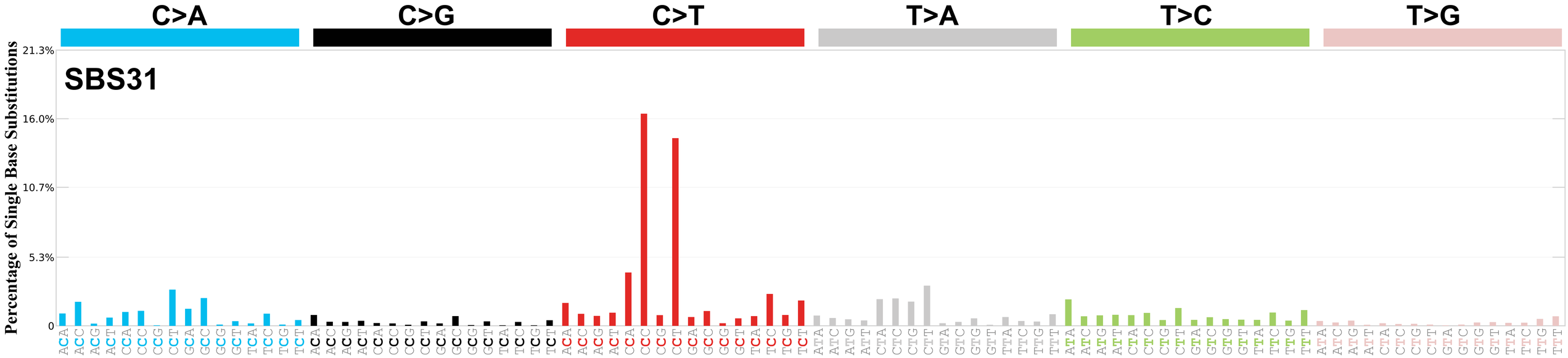
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SBS31
Percentage of Single Base Substitutions
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16.0%
10.7%
5.3%
0
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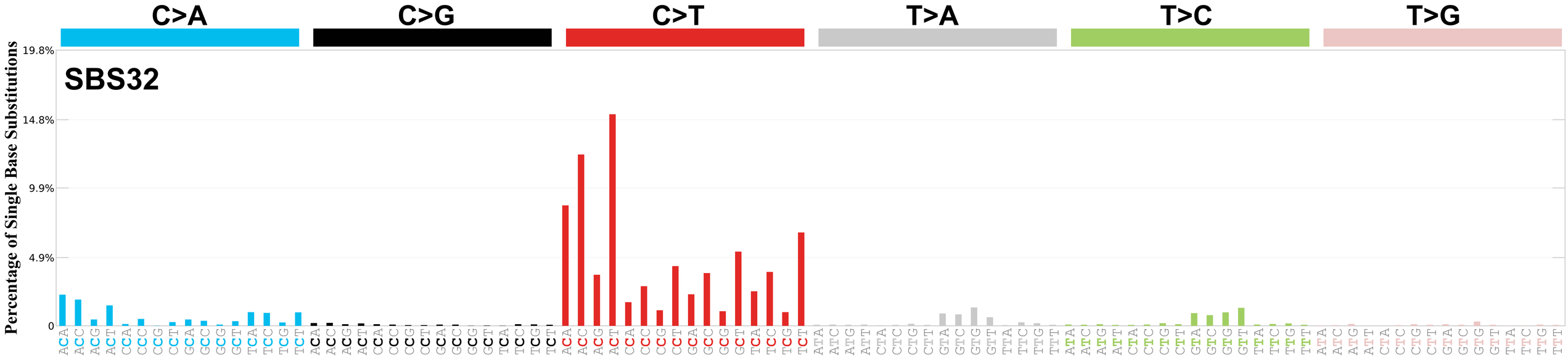
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T>G
SBS32
Percentage of Single Base Substitutions
19.8%
14.8%
9.9%
4.9%
0
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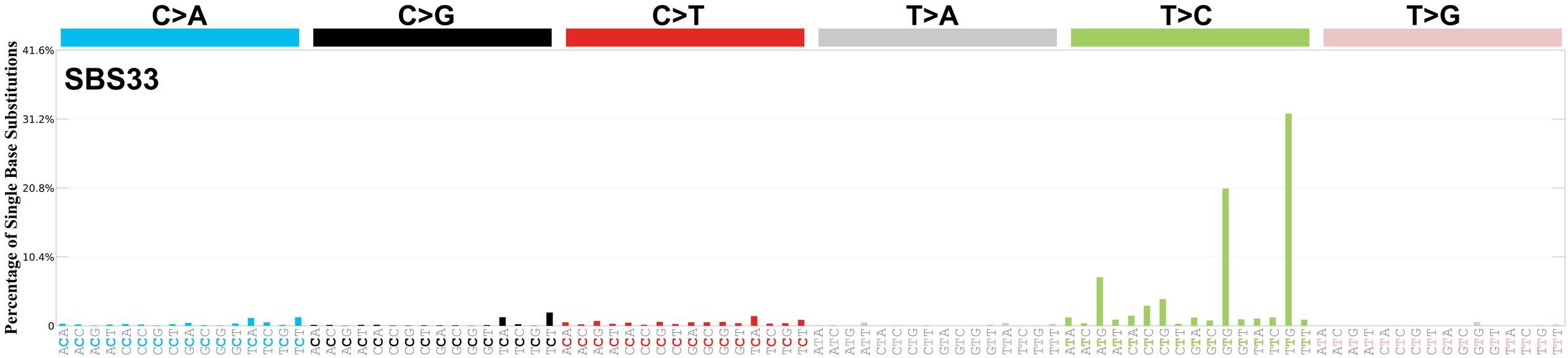
C>A
C>G
C>T
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T>C
T>G
SBS33
Percentage of Single Base Substitutions
41.6%
31.2%
20.8%
10.4%
0
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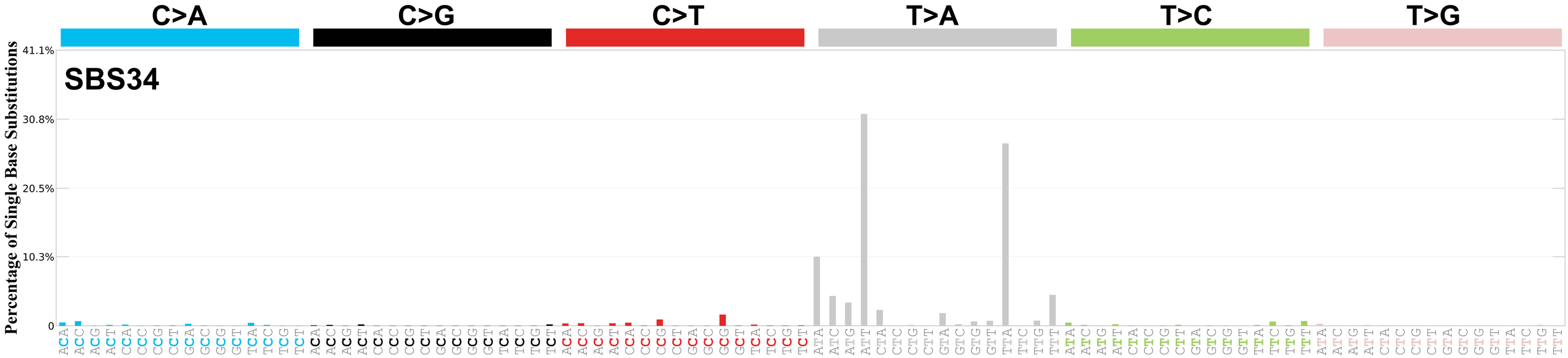
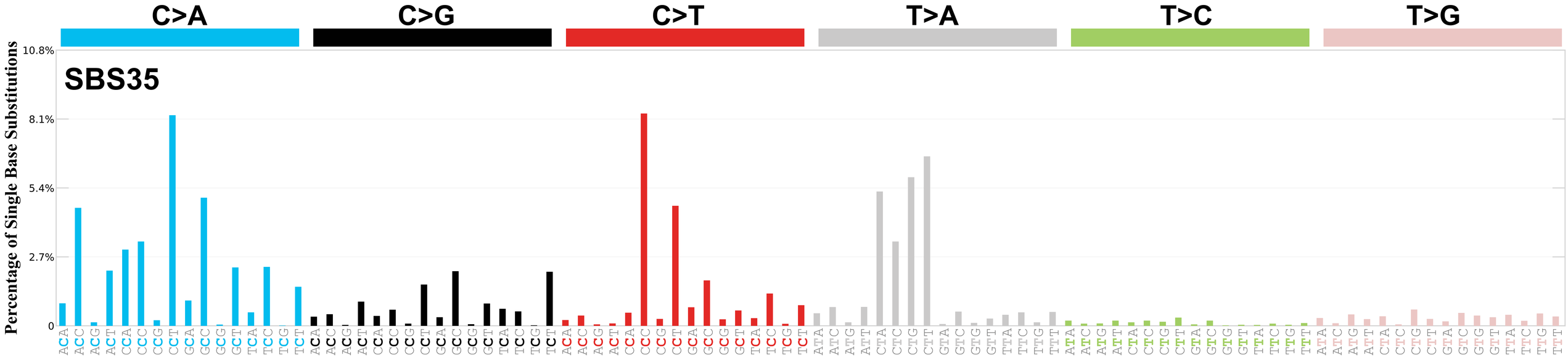

C>A
C>G
C>T
T>A
T>C
T>G
SBS34
Percentage of Single Base Substitutions
41.1%
30.8%
20.5%
10.3%
0
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT


C>A
C>G
C>T
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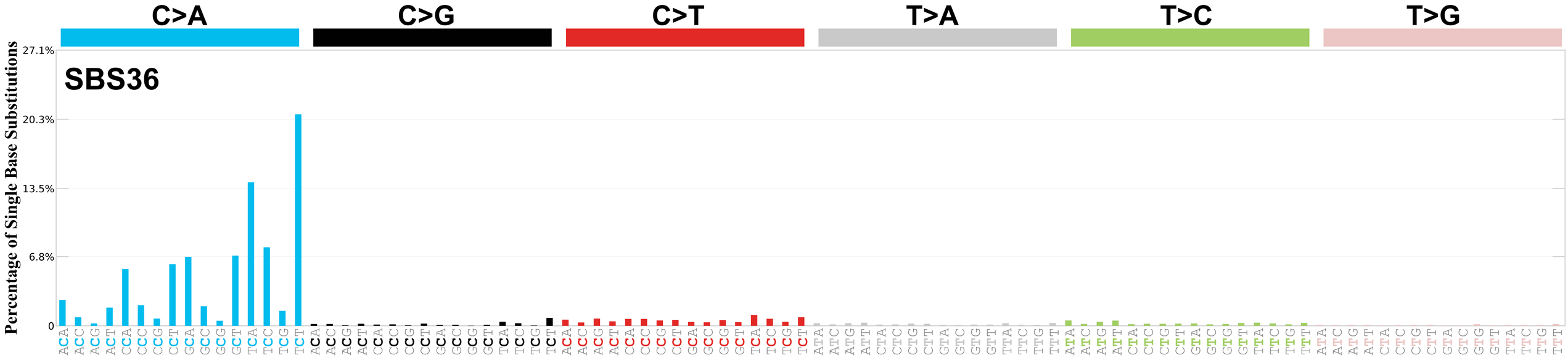
T>G
SBS35
Percentage of Single Base Substitutions
10.8%
8.1%
5.4%
2.7%
0
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT


C>A
C>G
C>T
T>A
T>C
T>G
SBS36
Percentage of Single Base Substitutions
27.1%
20.3%
13.5%
6.8%
0
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT
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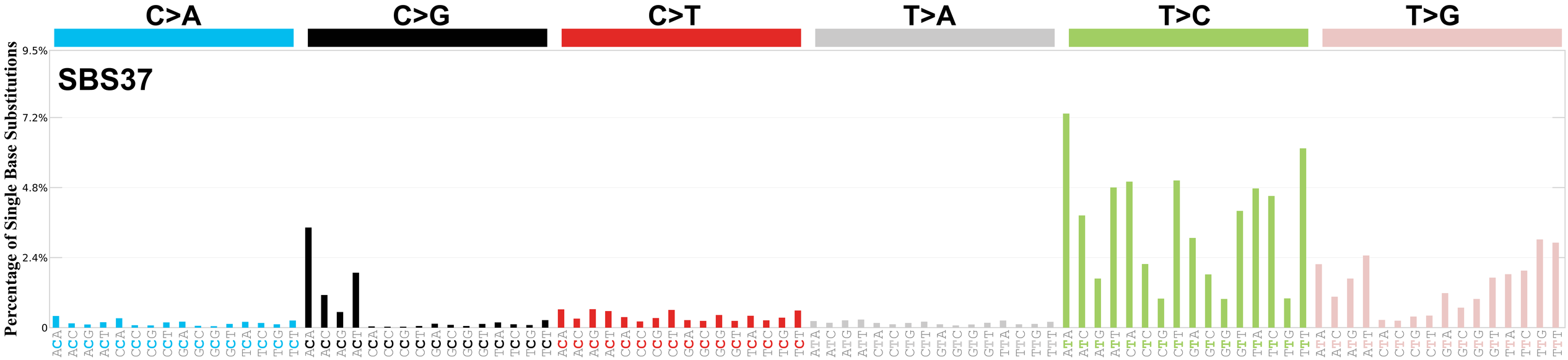
C>A
C>G
C>T
T>A
T>C
T>G
SBS37
Percentage of Single Base Substitutions
9.5%
7.2%
4.8%
2.4%
0
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT
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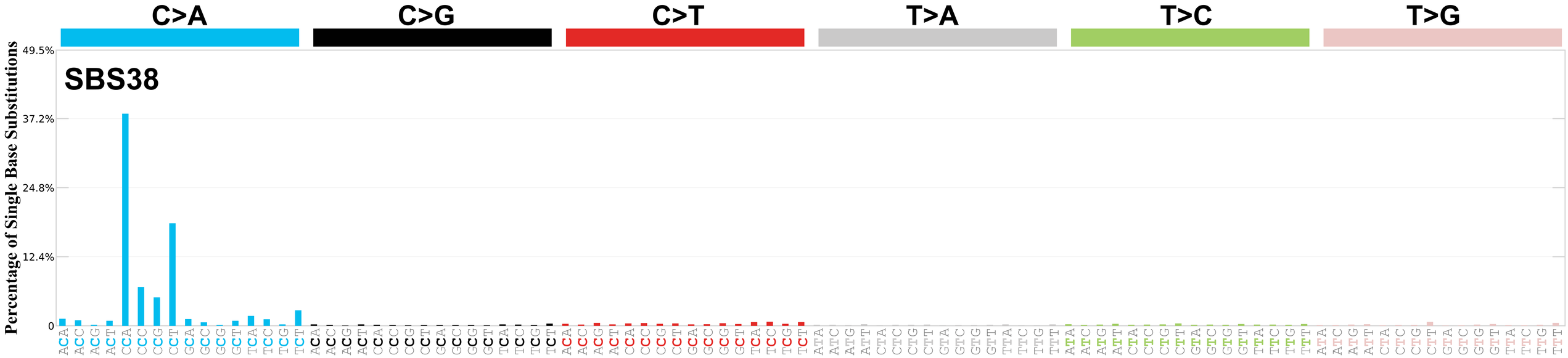
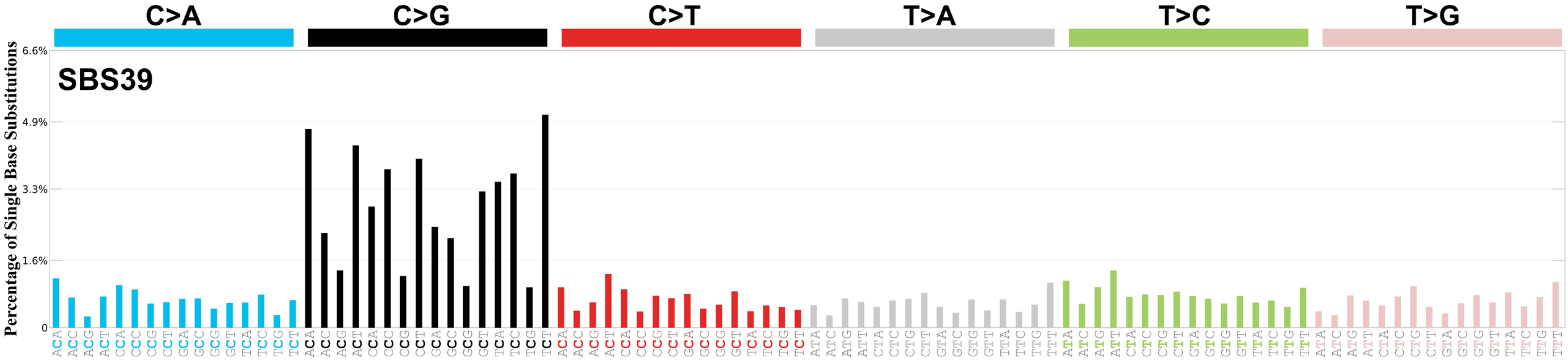

C>A
C>G
C>T
T>A
T>C
T>G
SBS38
Percentage of Single Base Substitutions
49.5%
37.2%
24.8%
12.4%
0
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT


C>A
C>G
C>T
T>A
T>C
T>G
SBS39
Percentage of Single Base Substitutions
6.6%
4.9%
3.3%
1.6%
0
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ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT
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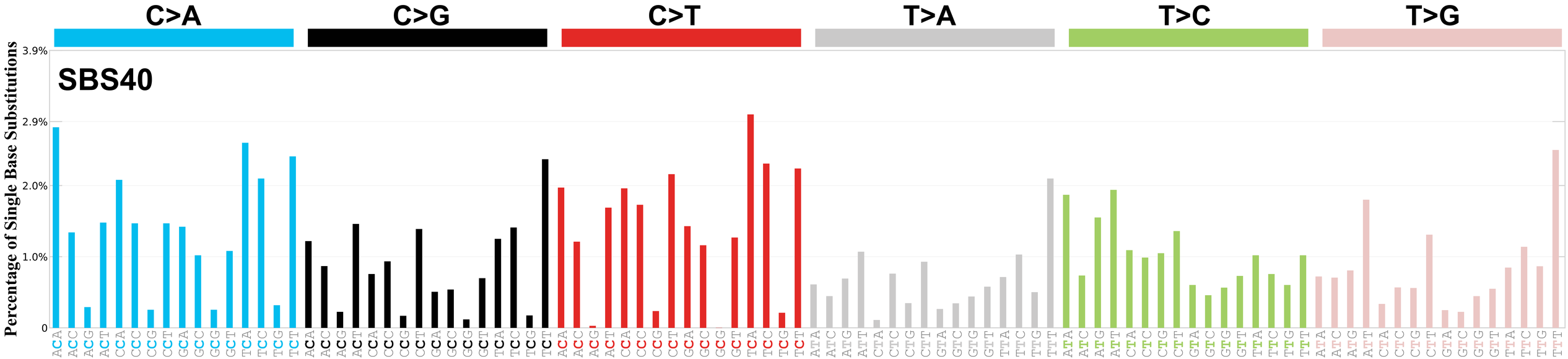
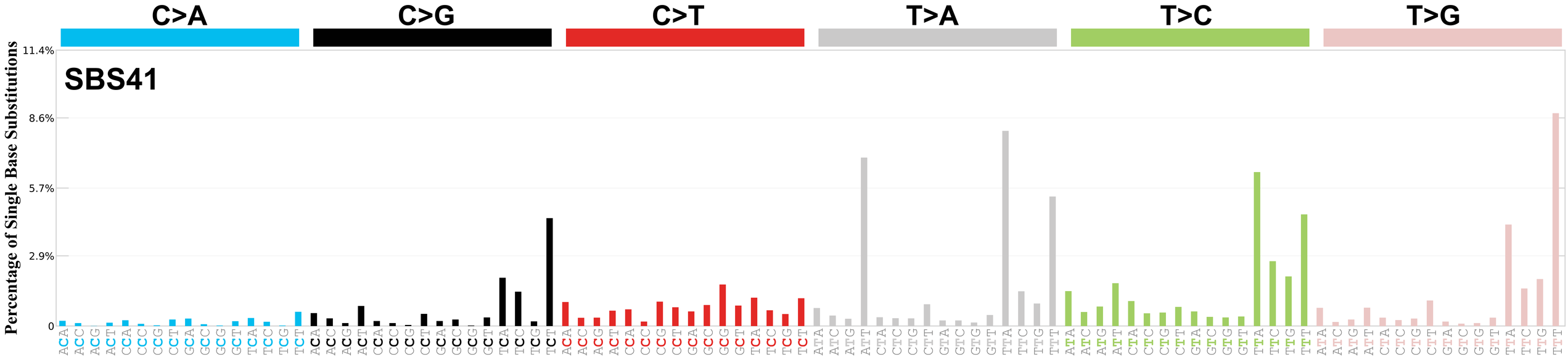
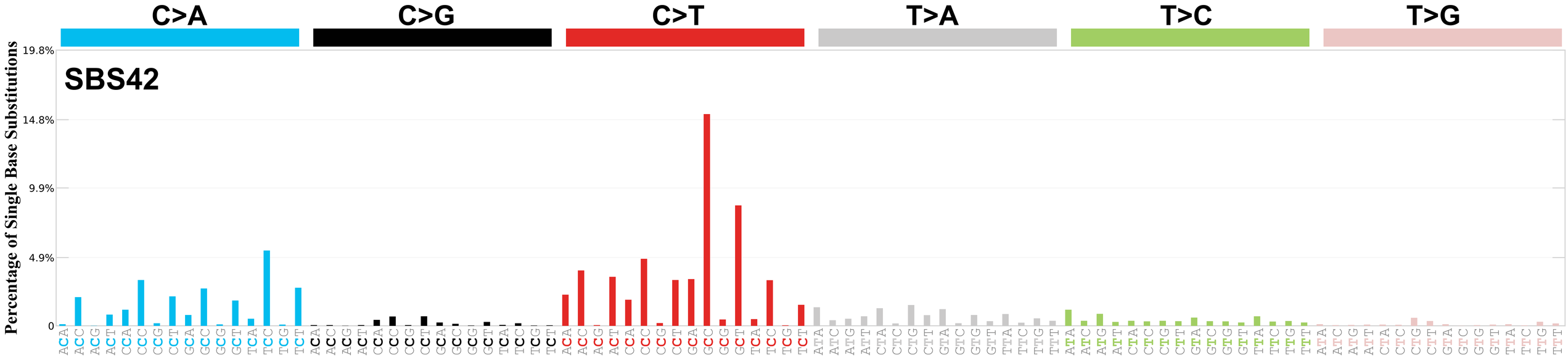
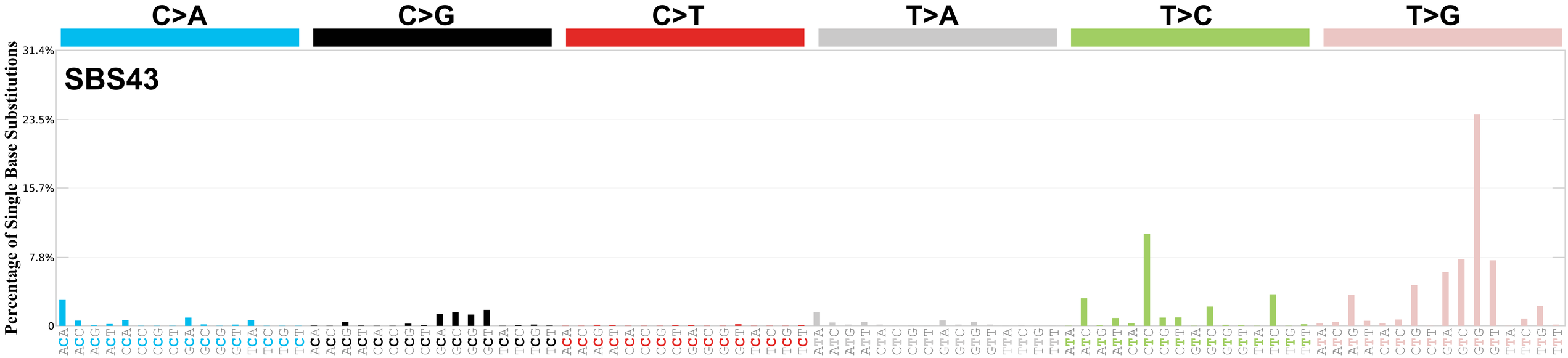

C>A
C>G
C>T
T>A
T>C
T>G
SBS40
Percentage of Single Base Substitutions
3.9%
2.9%
2.0%
1.0%
0
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT


C>A
C>G
C>T
T>A
T>C
T>G
SBS41
Percentage of Single Base Substitutions
11.4%
8.6%
5.7%
2.9%
0
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT


C>A
C>G
C>T
T>A
T>C
T>G
SBS42
Percentage of Single Base Substitutions
19.8%
14.8%
9.9%
4.9%
0
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT


C>A
C>G
C>T
T>A
T>C
T>G
SBS43
Percentage of Single Base Substitutions
31.4%
23.5%
15.7%
7.8%
0
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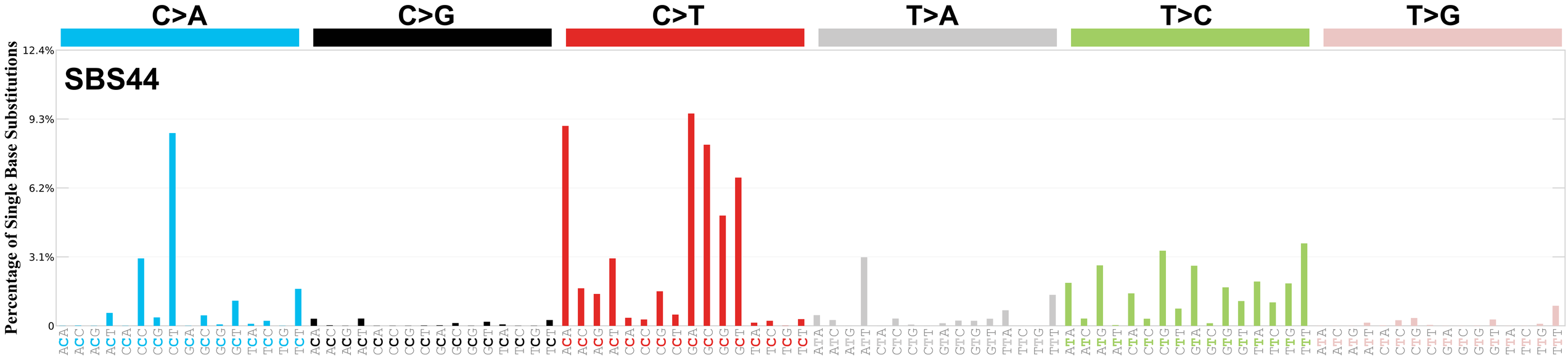
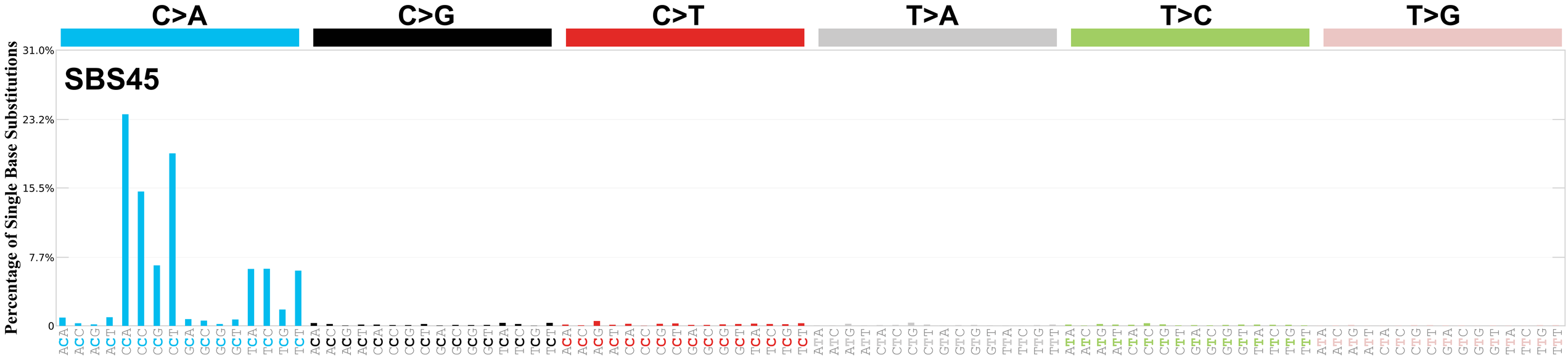

C>A
C>G
C>T
T>A
T>C
T>G
SBS44
Percentage of Single Base Substitutions
12.4%
9.3%
6.2%
3.1%
0
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT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T>C
T>G
SBS45
Percentage of Single Base Substitutions
31.0%
23.2%
15.5%
7.7%
0
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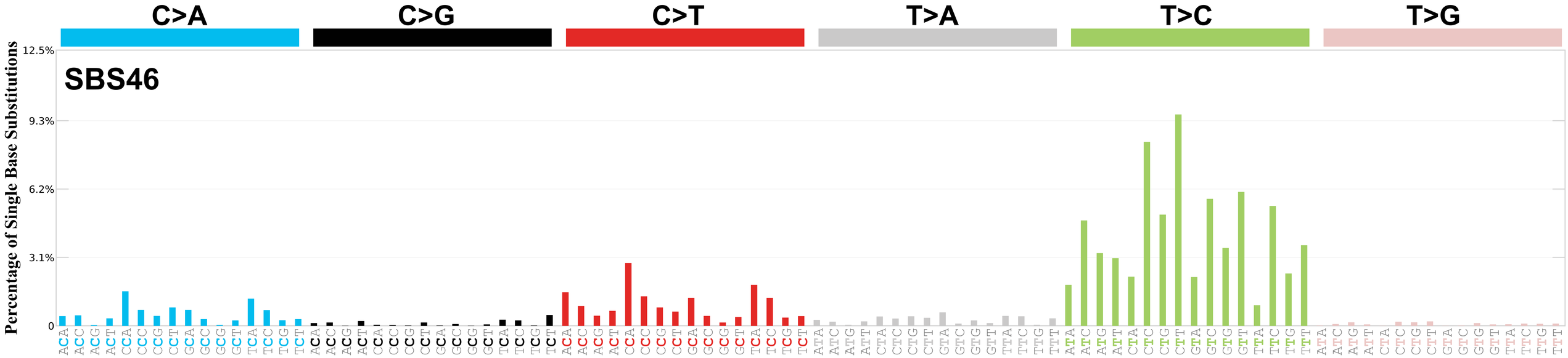
C>A
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T>C
T>G
SBS46
Percentage of Single Base Substitutions
12.5%
9.3%
6.2%
3.1%
0
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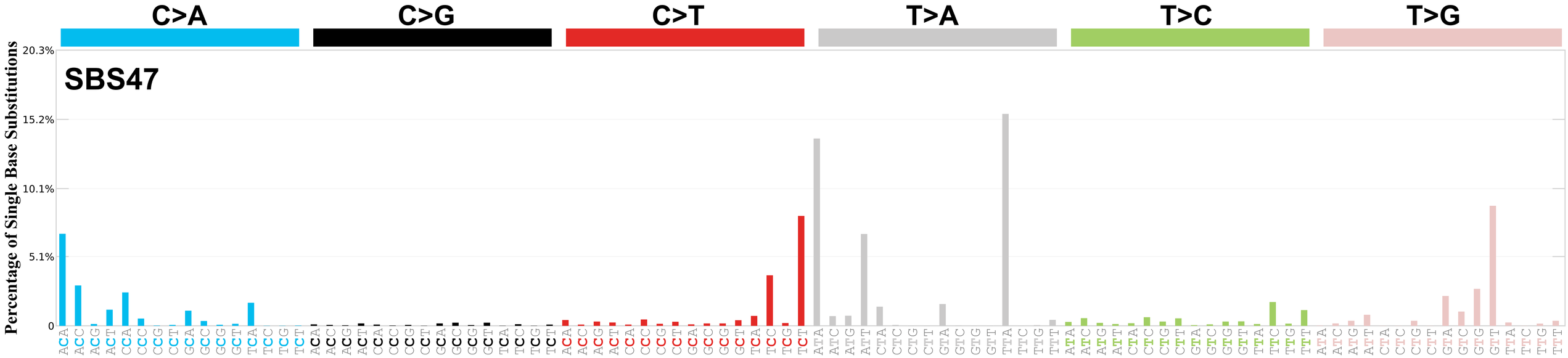
C>A
C>G
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T>C
T>G
SBS47
Percentage of Single Base Substitutions
20.3%
15.2%
10.1%
5.1%
0
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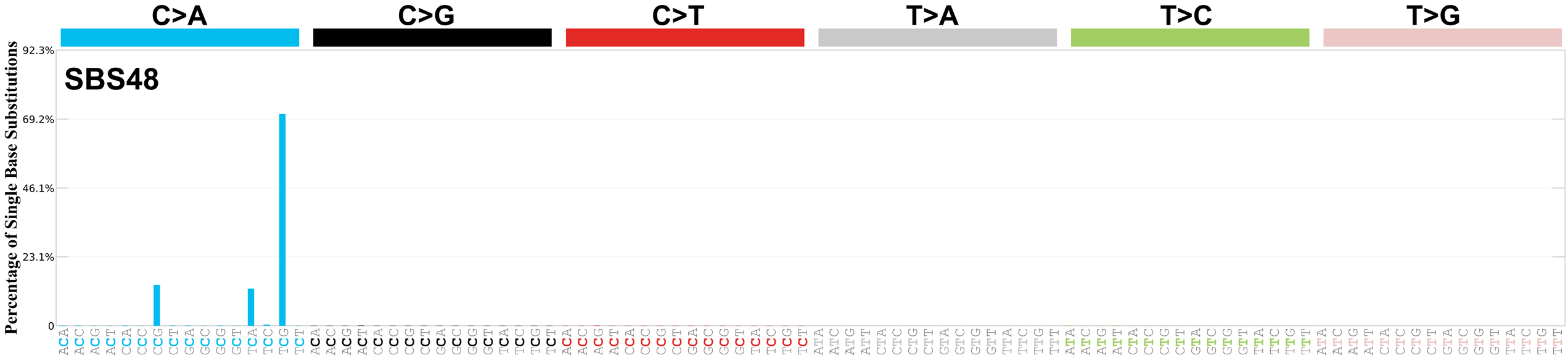
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C>G
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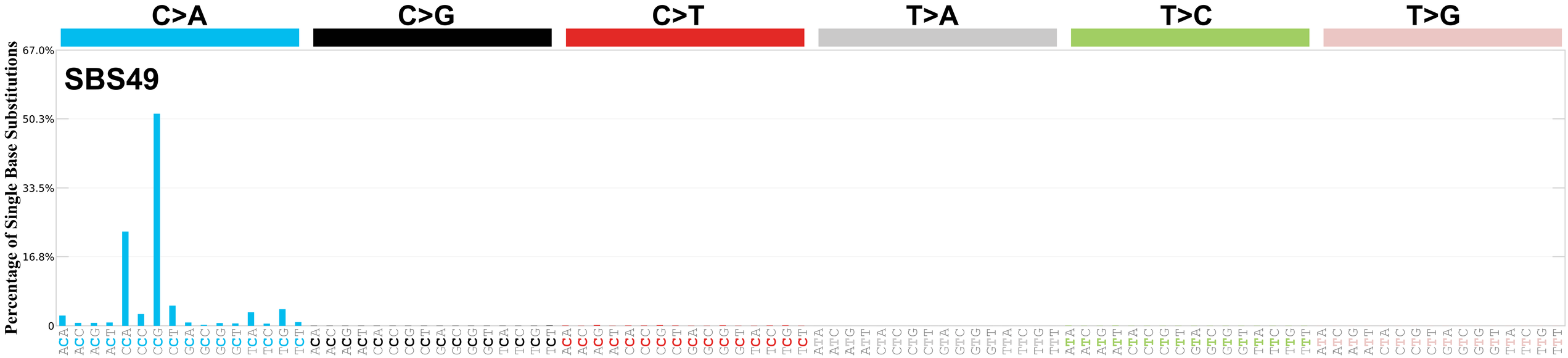
T>C
T>G
SBS48
Percentage of Single Base Substitutions
92.3%
69.2%
46.1%
23.1%
0
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT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C>G
C>T
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T>C
T>G
SBS49
Percentage of Single Base Substitutions
67.0%
50.3%
33.5%
16.8%
0
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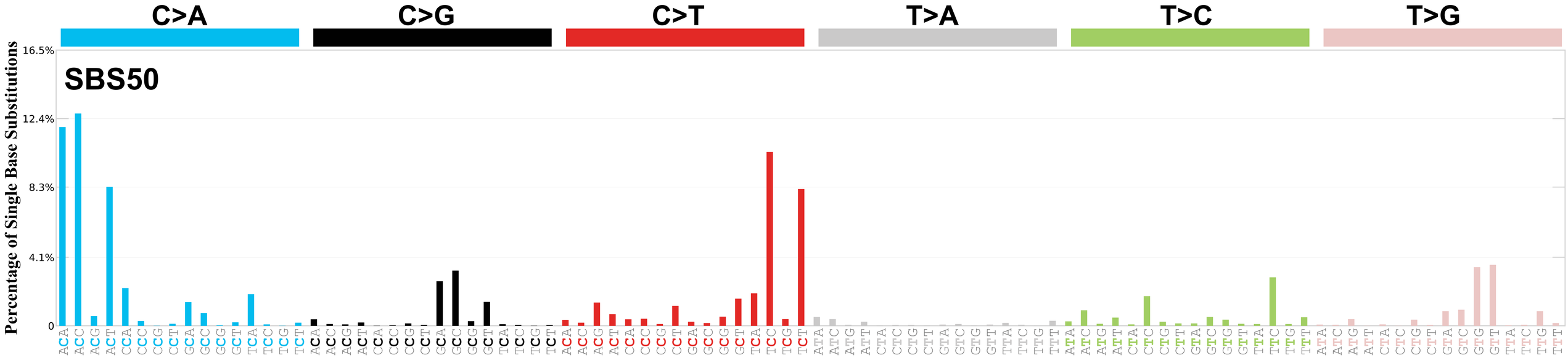
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C>T
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T>C
T>G
SBS50
Percentage of Single Base Substitutions
16.5%
12.4%
8.3%
4.1%
0
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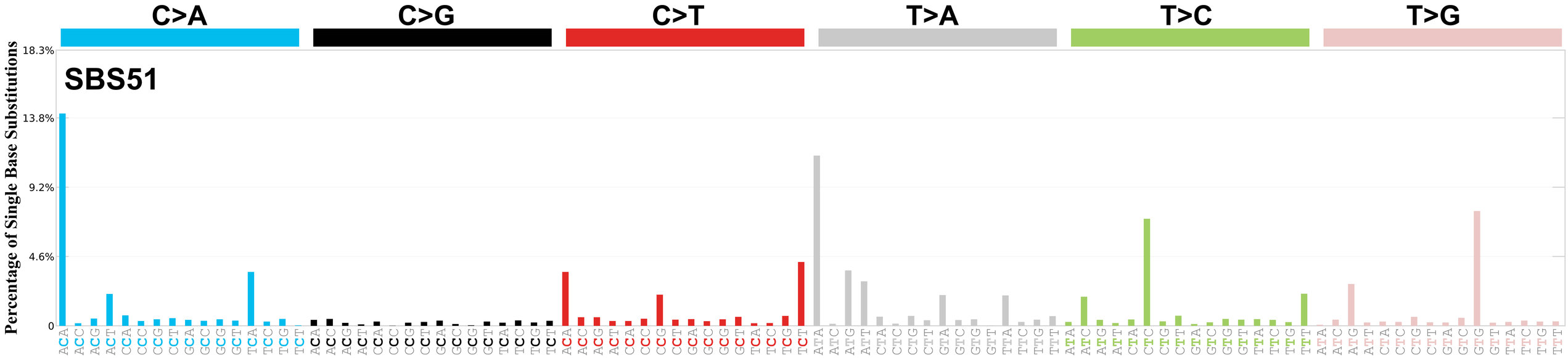
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T>C
T>G
SBS51
Percentage of Single Base Substitutions
18.3%
13.8%
9.2%
4.6%
0
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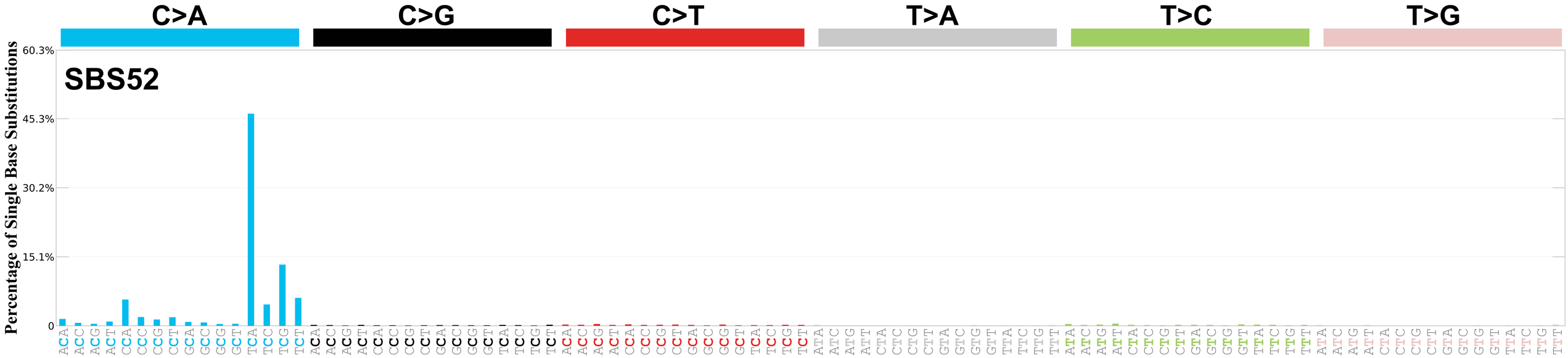
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T>C
T>G
SBS52
Percentage of Single Base Substitutions
60.3%
45.3%
30.2%
15.1%
0
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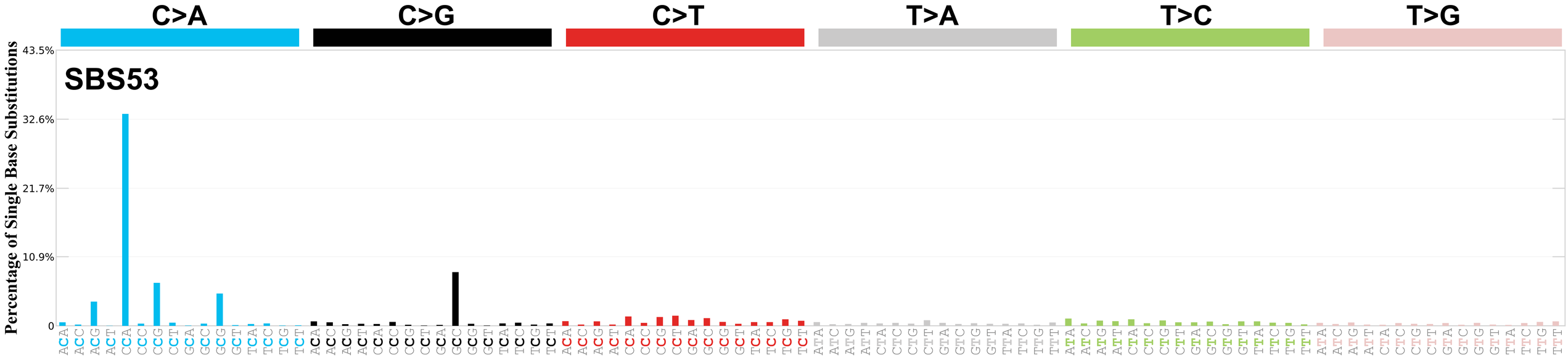
C>A
C>G
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T>C
T>G
SBS53
Percentage of Single Base Substitutions
43.5%
32.6%
21.7%
10.9%
0
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ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
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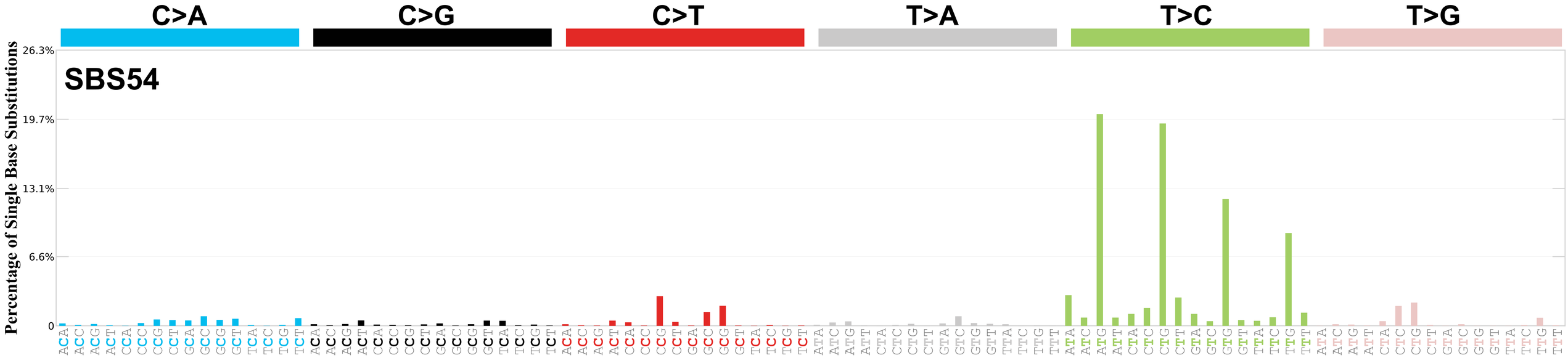
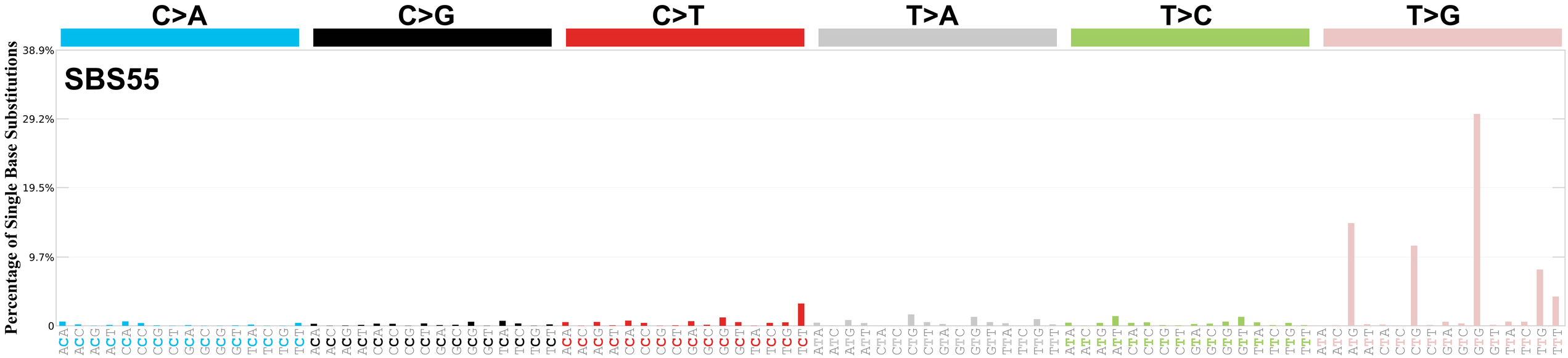

C>A
C>G
C>T
T>A
T>C
T>G
SBS54
Percentage of Single Base Substitutions
26.3%
19.7%
13.1%
6.6%
0
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT


C>A
C>G
C>T
T>A
T>C
T>G
SBS55
Percentage of Single Base Substitutions
38.9%
29.2%
19.5%
9.7%
0
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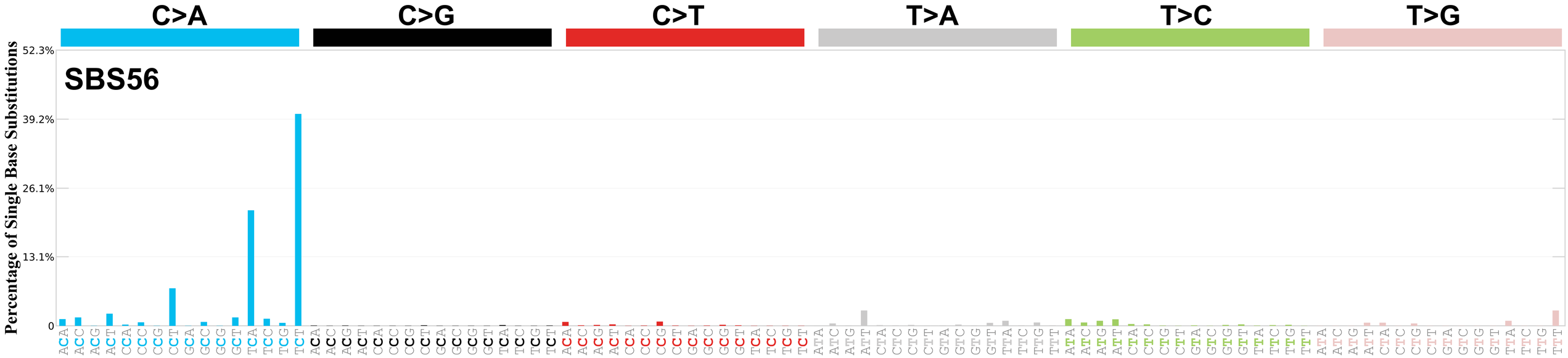
C>A
C>G
C>T
T>A
T>C
T>G
SBS56
Percentage of Single Base Substitutions
52.3%
39.2%
26.1%
13.1%
0
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ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
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ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT
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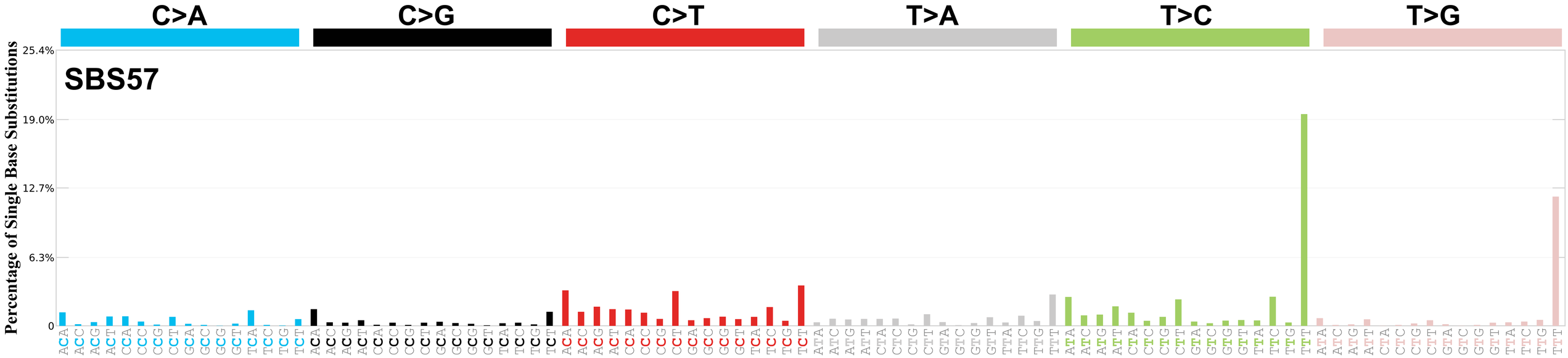
C>A
C>G
C>T
T>A
T>C
T>G
SBS57
Percentage of Single Base Substitutions
25.4%
19.0%
12.7%
6.3%
0
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
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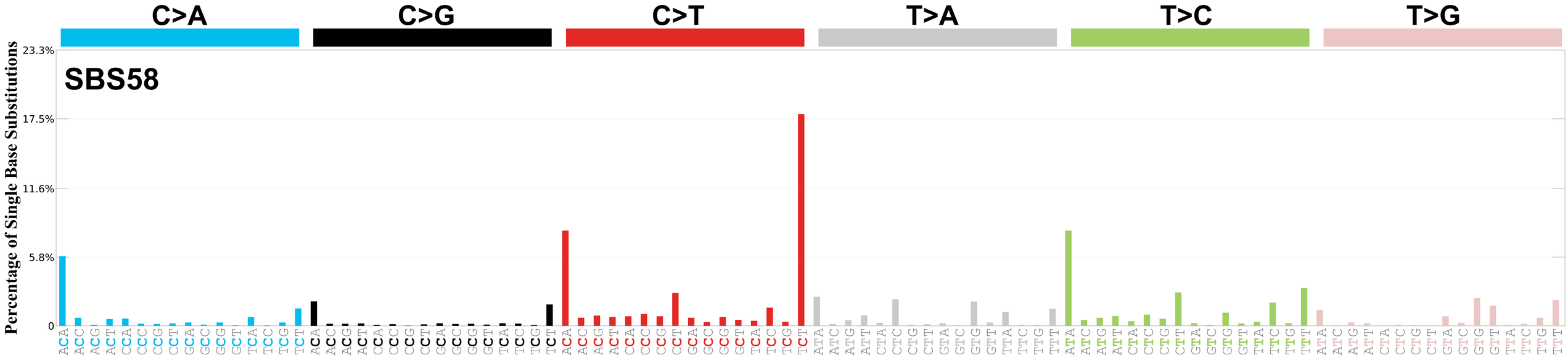
C>A
C>G
C>T
T>A
T>C
T>G
SBS58
Percentage of Single Base Substitutions
23.3%
17.5%
11.6%
5.8%
0
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
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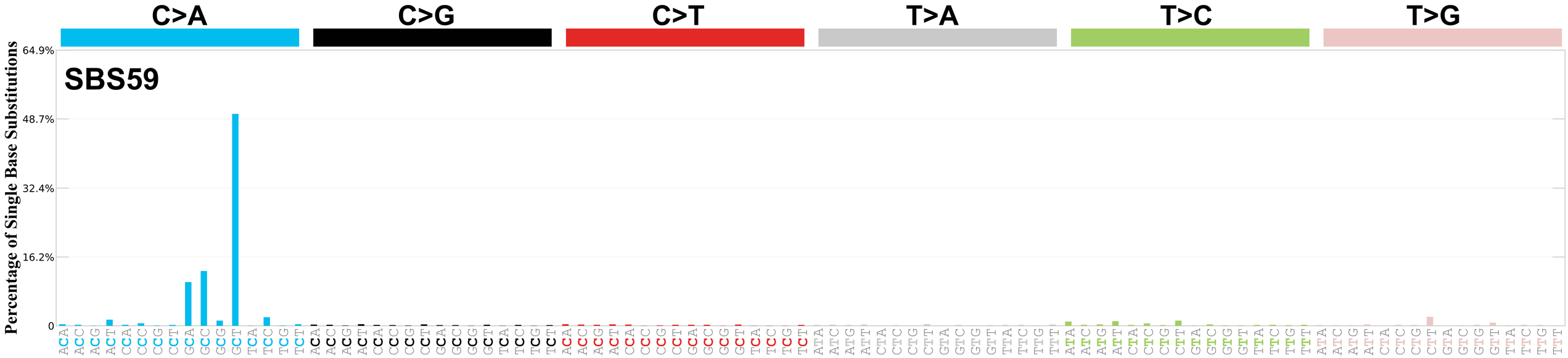
C>A
C>G
C>T
T>A
T>C
T>G
SBS59
Percentage of Single Base Substitutions
64.9%
48.7%
32.4%
16.2%
0
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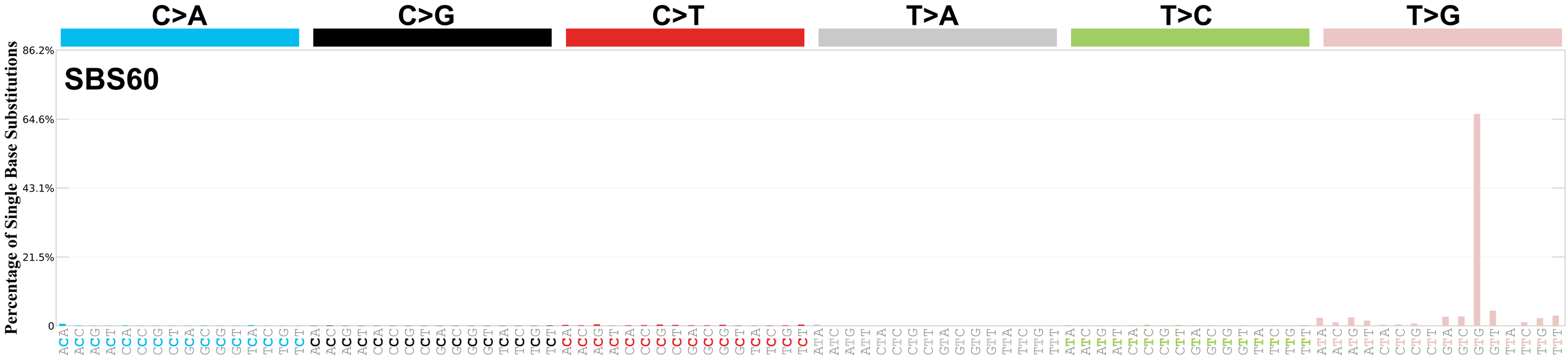
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T>G
SBS60
Percentage of Single Base Substitutions
86.2%
64.6%
43.1%
21.5%
0
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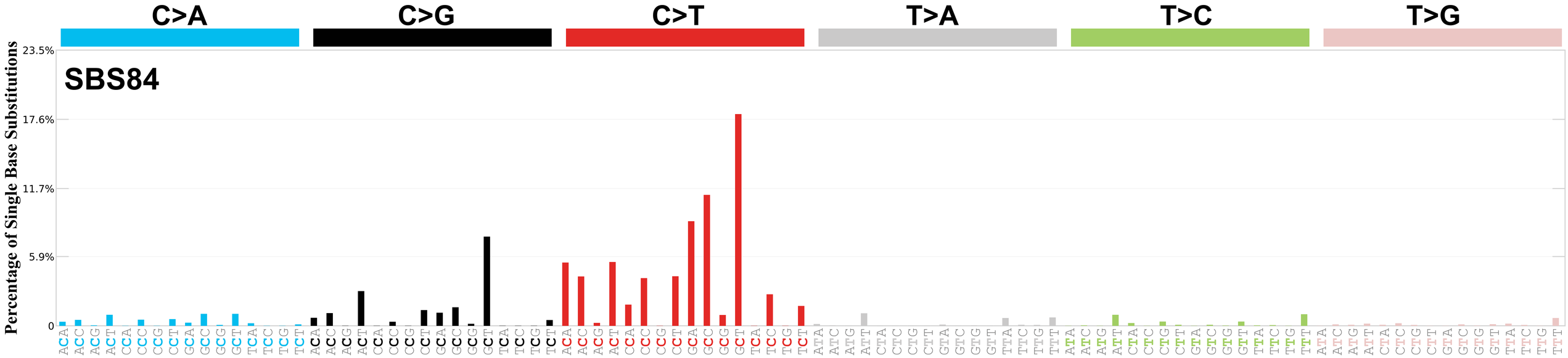
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T>C
T>G
SBS84
Percentage of Single Base Substitutions
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17.6%
11.7%
5.9%
0
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ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
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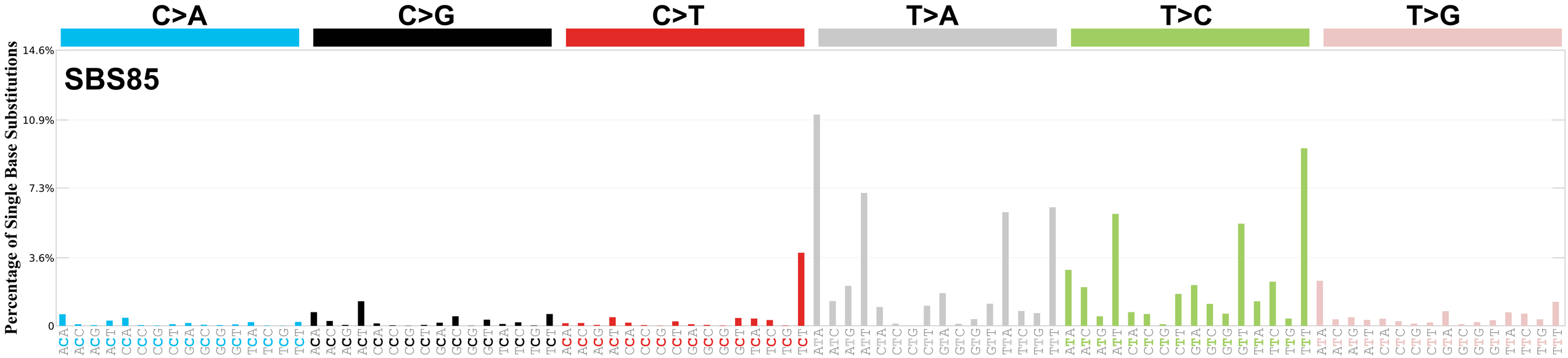
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T>C
T>G
SBS85
Percentage of Single Base Substitutions
14.6%
10.9%
7.3%
3.6%
0
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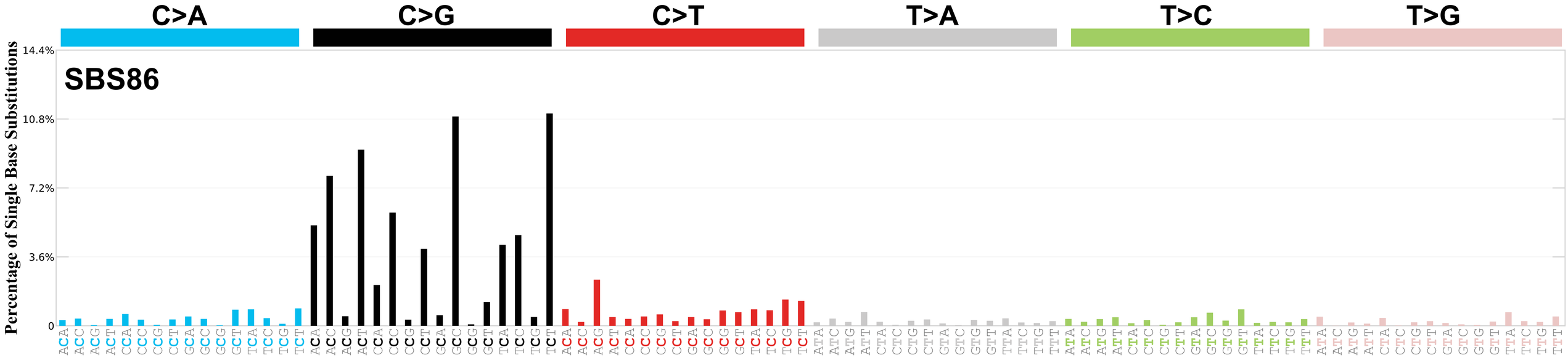
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SBS86
Percentage of Single Base Substitutions
14.4%
10.8%
7.2%
3.6%
0
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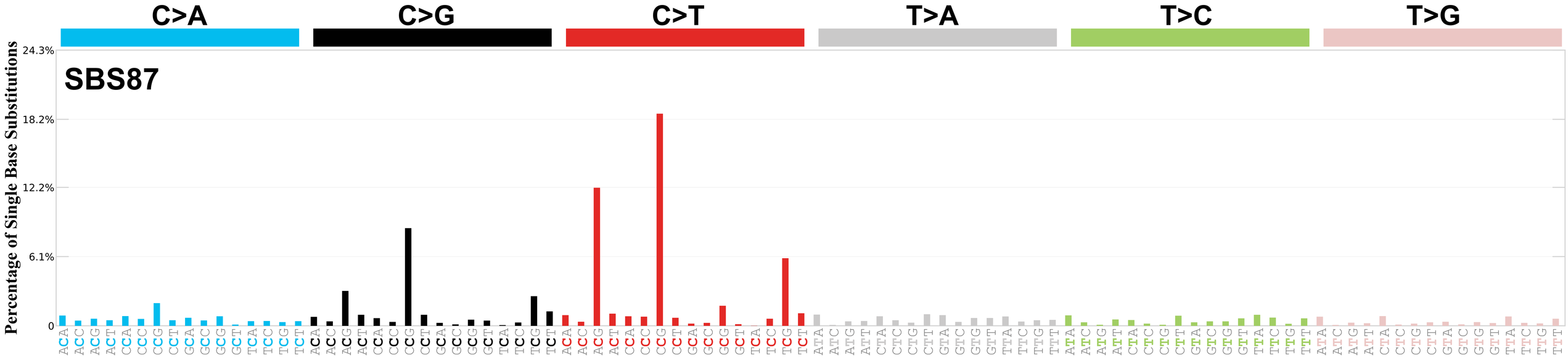
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T>C
T>G
SBS87
Percentage of Single Base Substitutions
24.3%
18.2%
12.2%
6.1%
0
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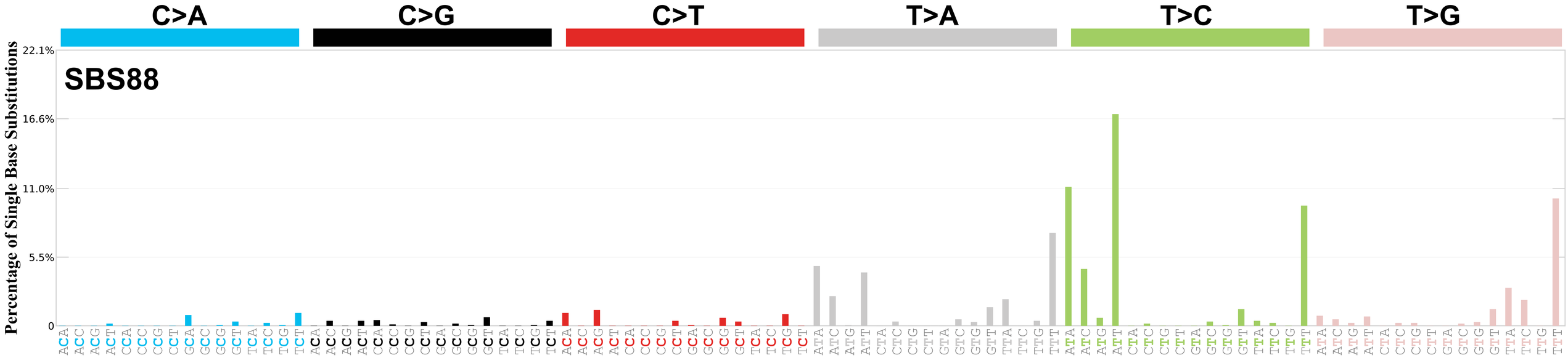
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SBS88
Percentage of Single Base Substitutions
22.1%
16.6%
11.0%
5.5%
0
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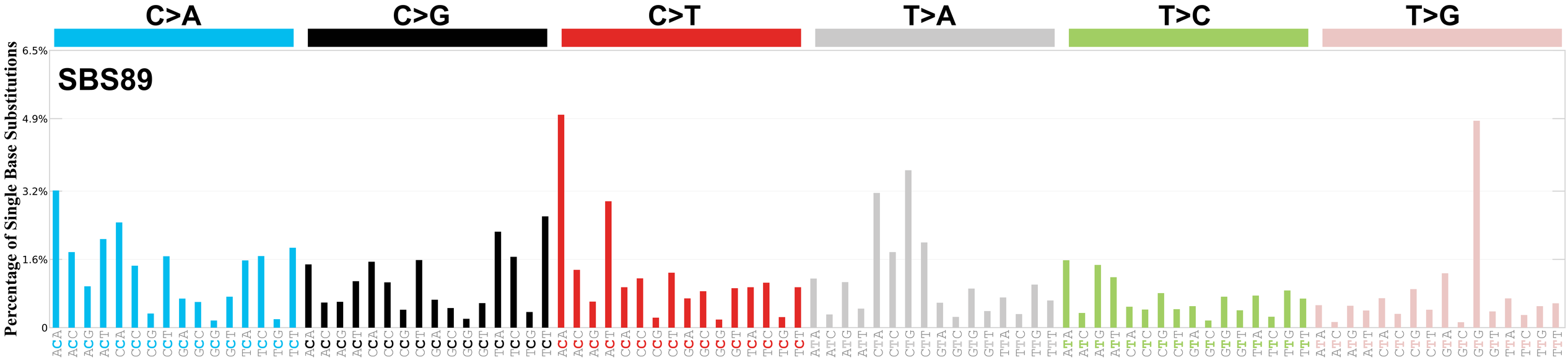
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SBS89
Percentage of Single Base Substitutions
6.5%
4.9%
3.2%
1.6%
0
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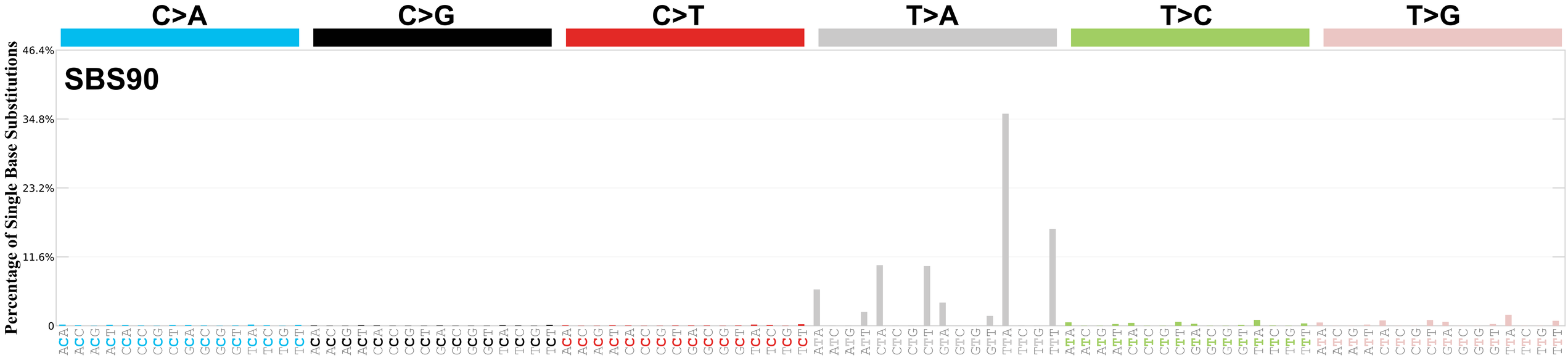
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SBS90
Percentage of Single Base Substitutions
46.4%
34.8%
23.2%
11.6%
0
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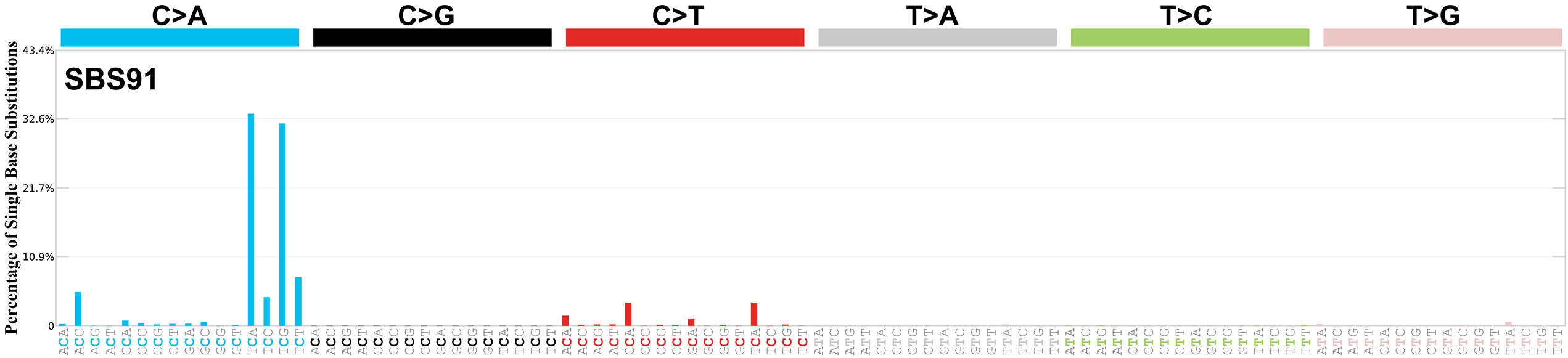
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SBS91
Percentage of Single Base Substitutions
43.4%
32.6%
21.7%
10.9%
0
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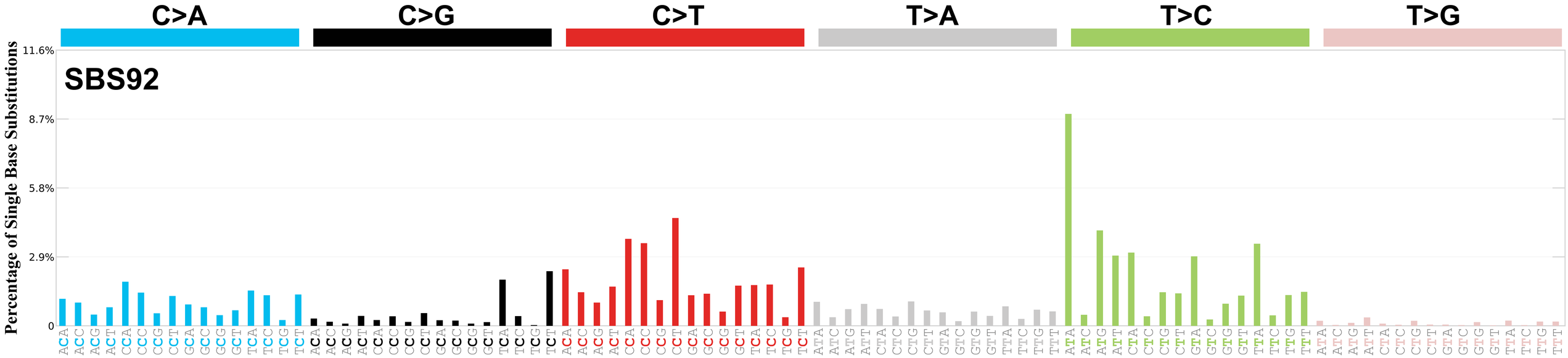
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SBS92
Percentage of Single Base Substitutions
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5.8%
2.9%
0
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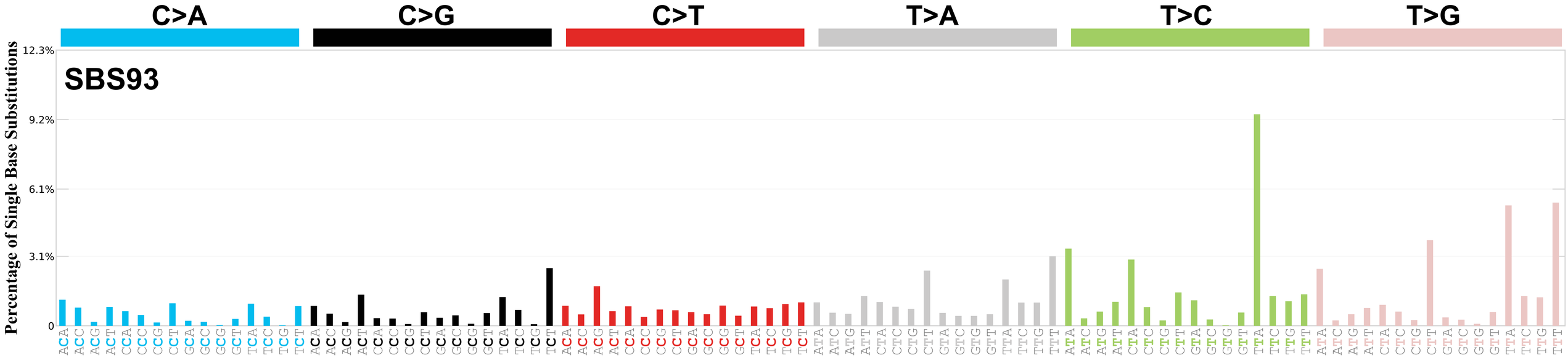
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T>G
SBS93
Percentage of Single Base Substitutions
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6.1%
3.1%
0
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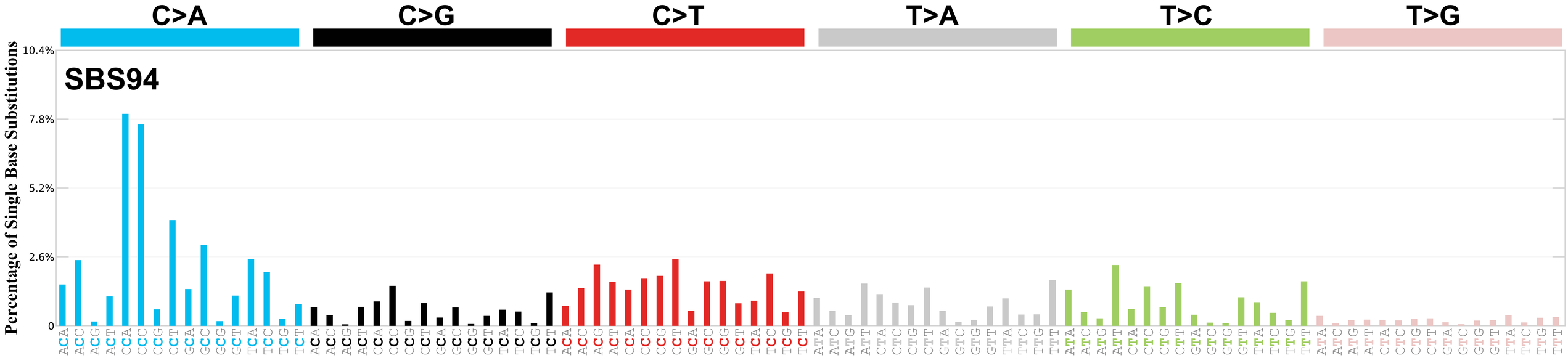
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T>G
SBS94
Percentage of Single Base Substitutions
10.4%
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5.2%
2.6%
0
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