



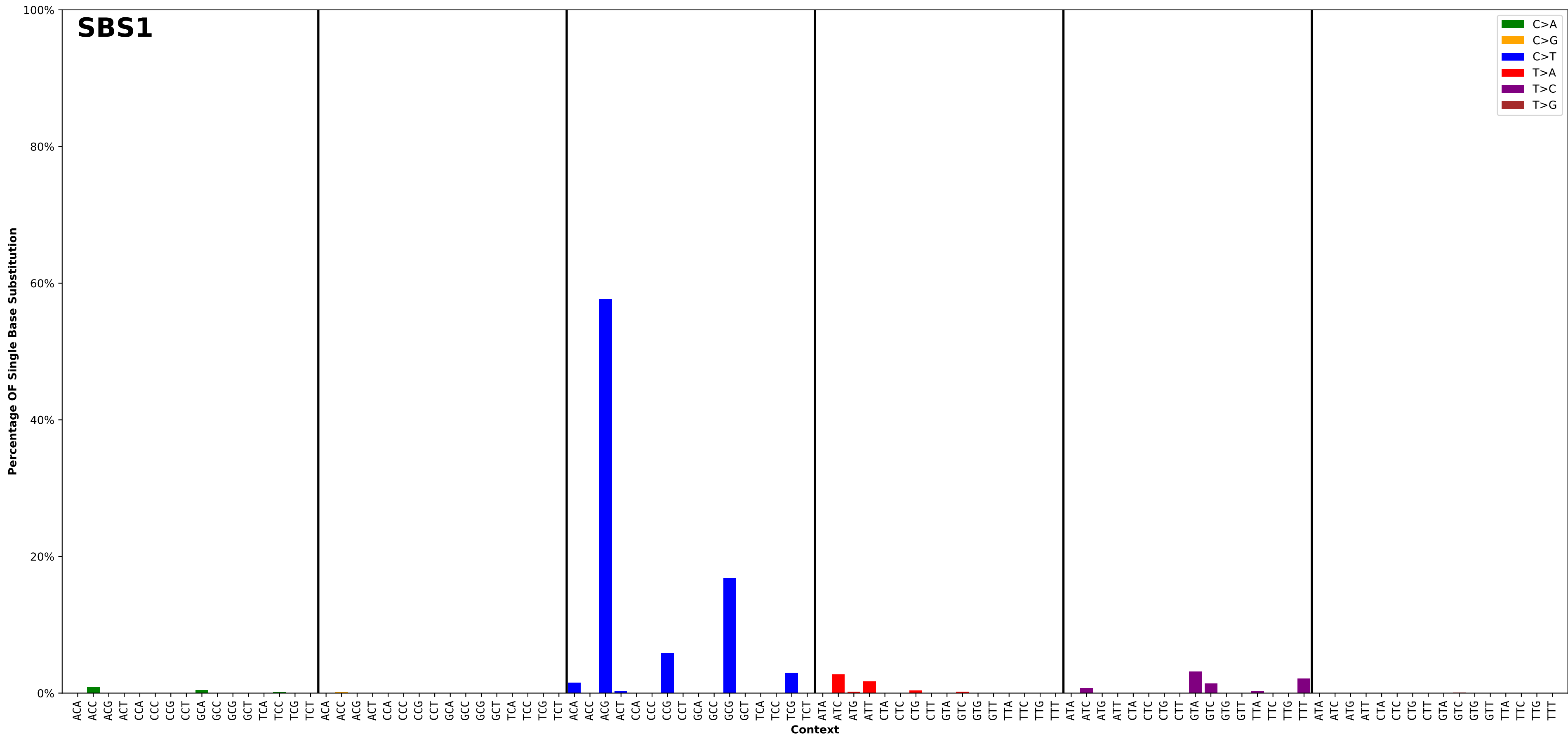


T>G

| | |
|---|-----|
|  | C>A |
|  | C>G |
|  | C>T |
|  | T>A |
|  | T>C |
|  | T>G |



C>A

C>G

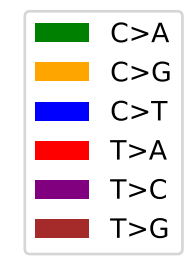
C>T

T>A

T>C

T>G

SBS2



Percentage OF Single Base Substitution

100%
80%
60%
40%
20%
0%

Context

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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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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****SBS3****Percentage OF Single Base Substitution**100%
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40%
20%
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ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT**Context**

C>A

C>G

C>T

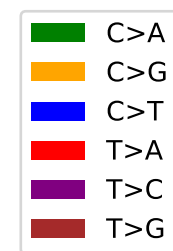
T>A

T>C

T>G

SBS4

Percentage OF Single Base Substitution



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Context

C>A

C>G

C>T

T>A

T>C

T>G

SBS7a



Percentage OF Single Base Substitution

100%
80%
60%
40%
20%
0%

Context

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C>A

C>G

C>T

T>A

T>C

T>G

SBS7b



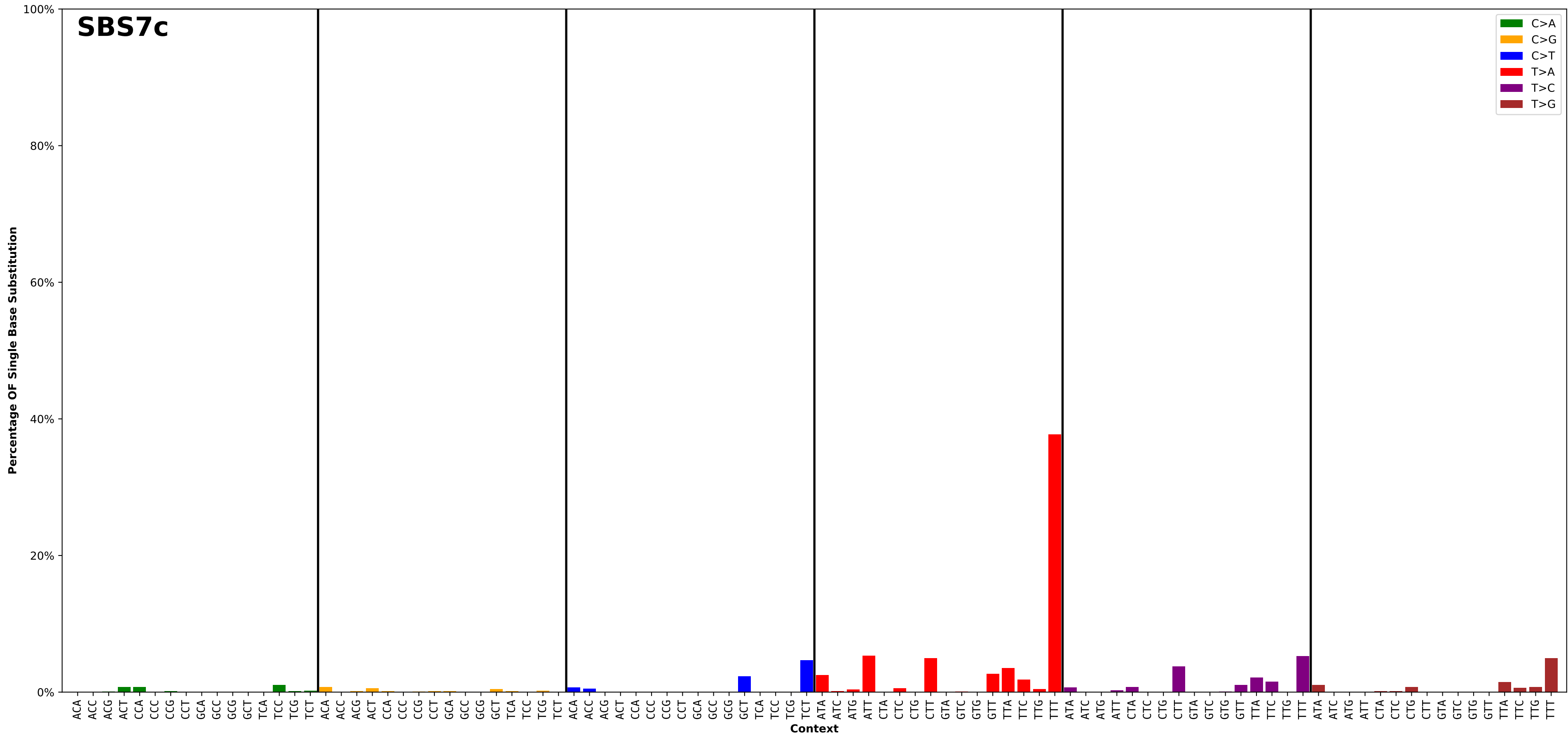
Percentage OF Single Base Substitution

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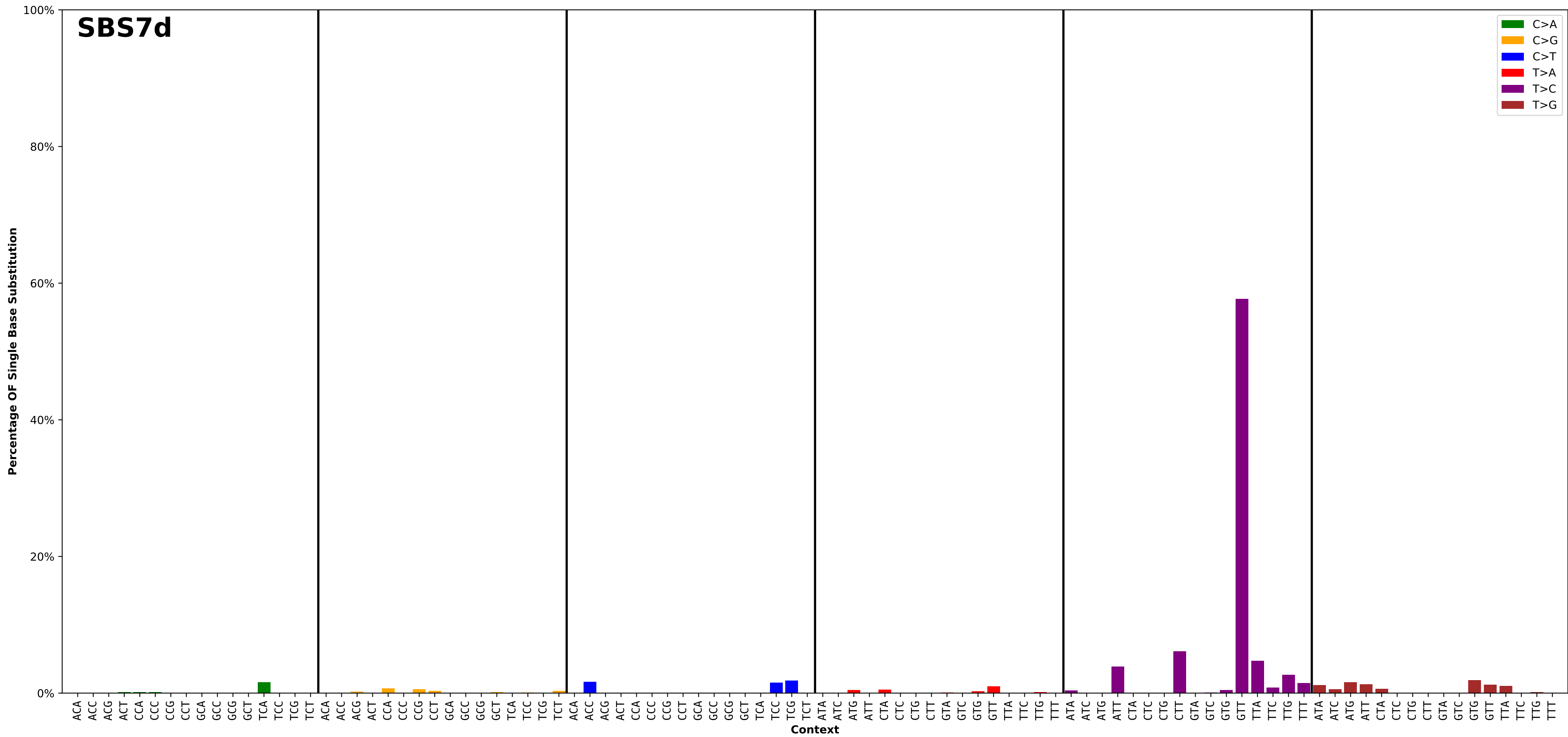
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Context

T>G

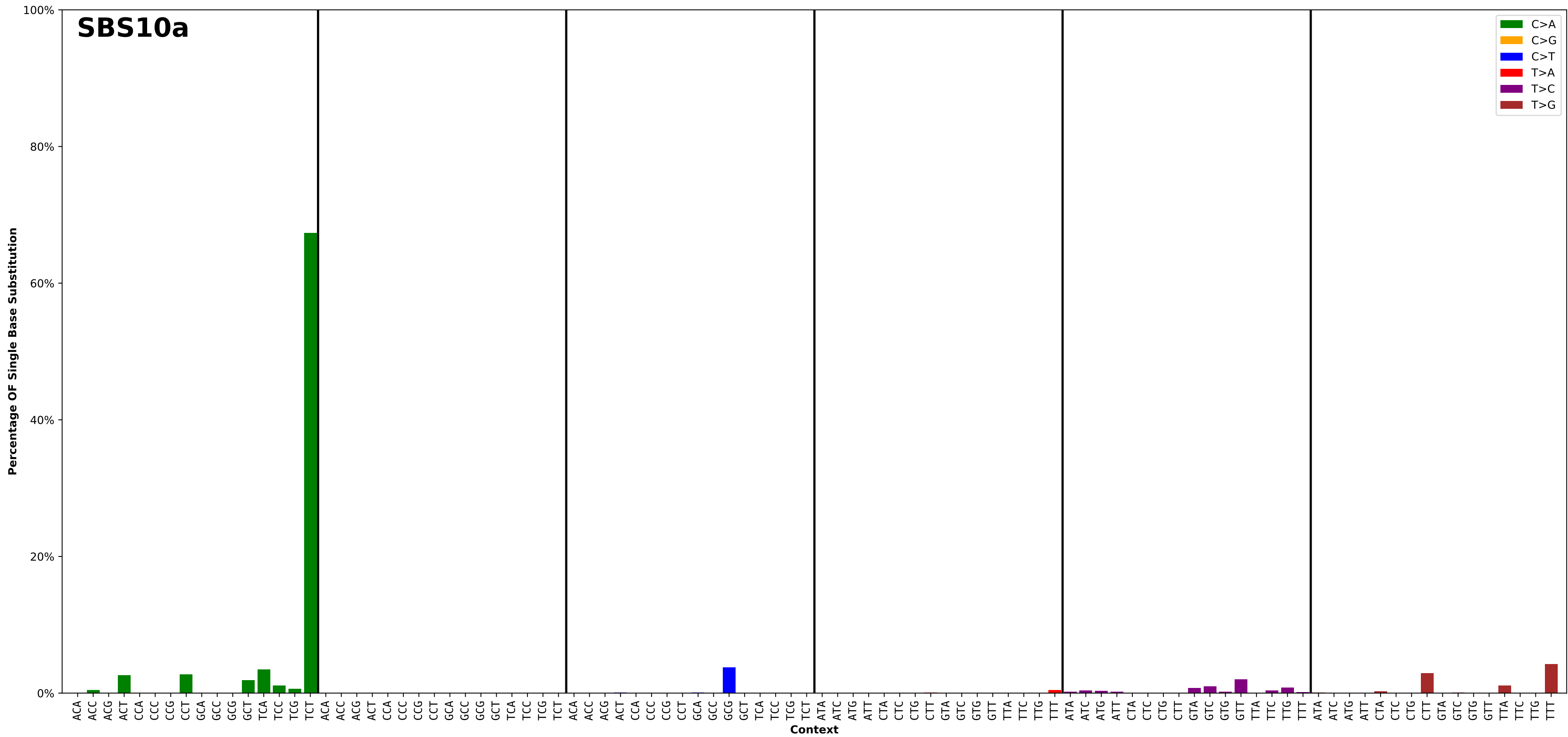


T>G



C>A**C>G****C>T****T>A****T>C****T>G****SBS8****Percentage OF Single Base Substitution**100%
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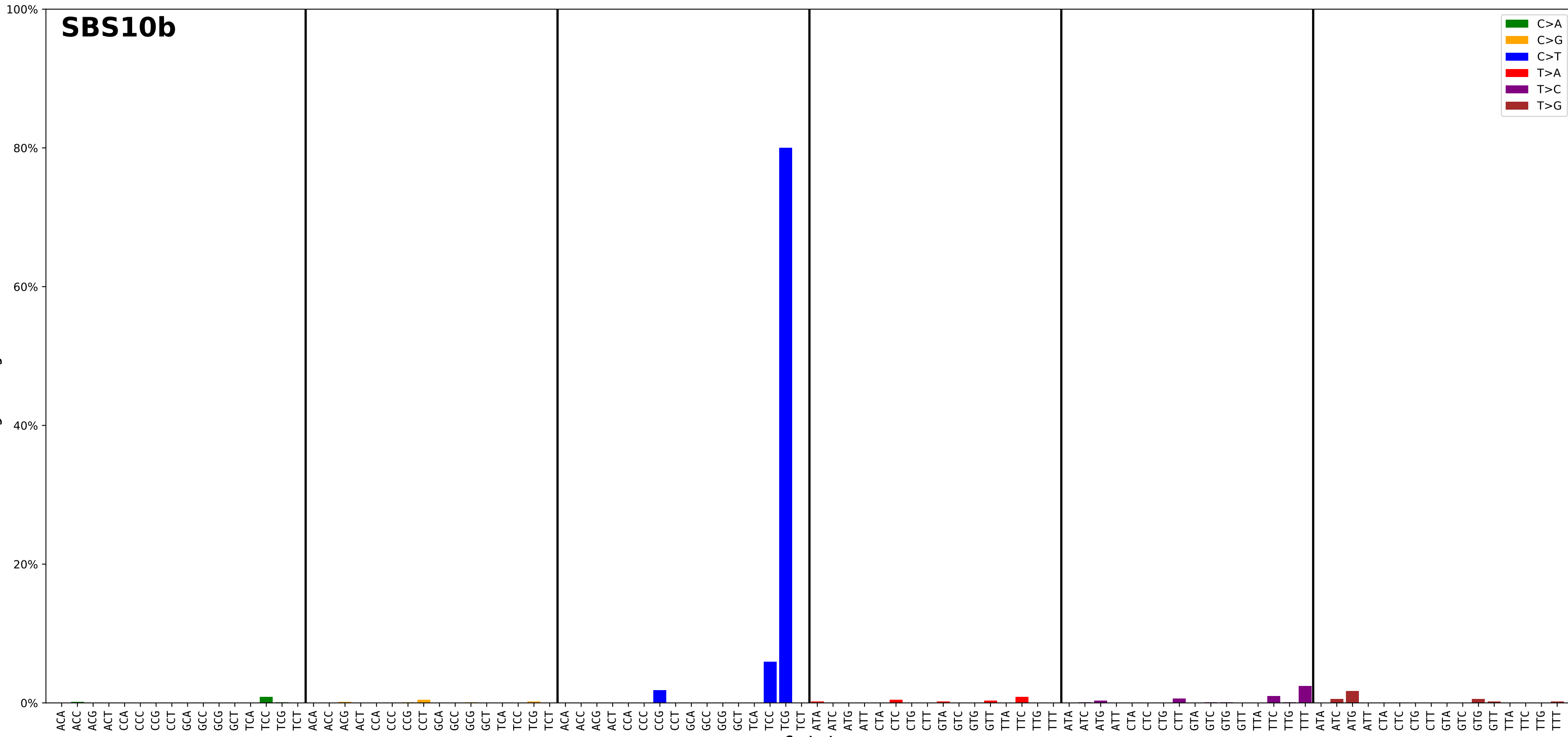
T>G



T>G

| | |
|---|-----|
|  | C>A |
|  | C>G |
|  | C>T |
|  | T>A |
|  | T>C |
|  | T>G |

Context



C>A

C>G

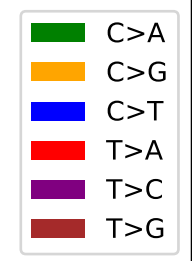
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T>A

T>C

T>G

SBS11



Percentage OF Single Base Substitution

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40%
20%
0%

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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

Context

C>A

C>G

C>T

T>A

T>C

T>G

SBS13

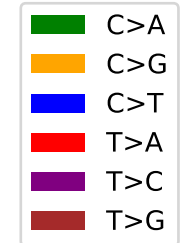


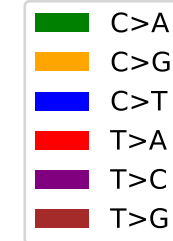
Percentage OF Single Base Substitution

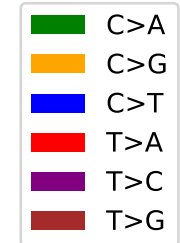
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20%
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Context

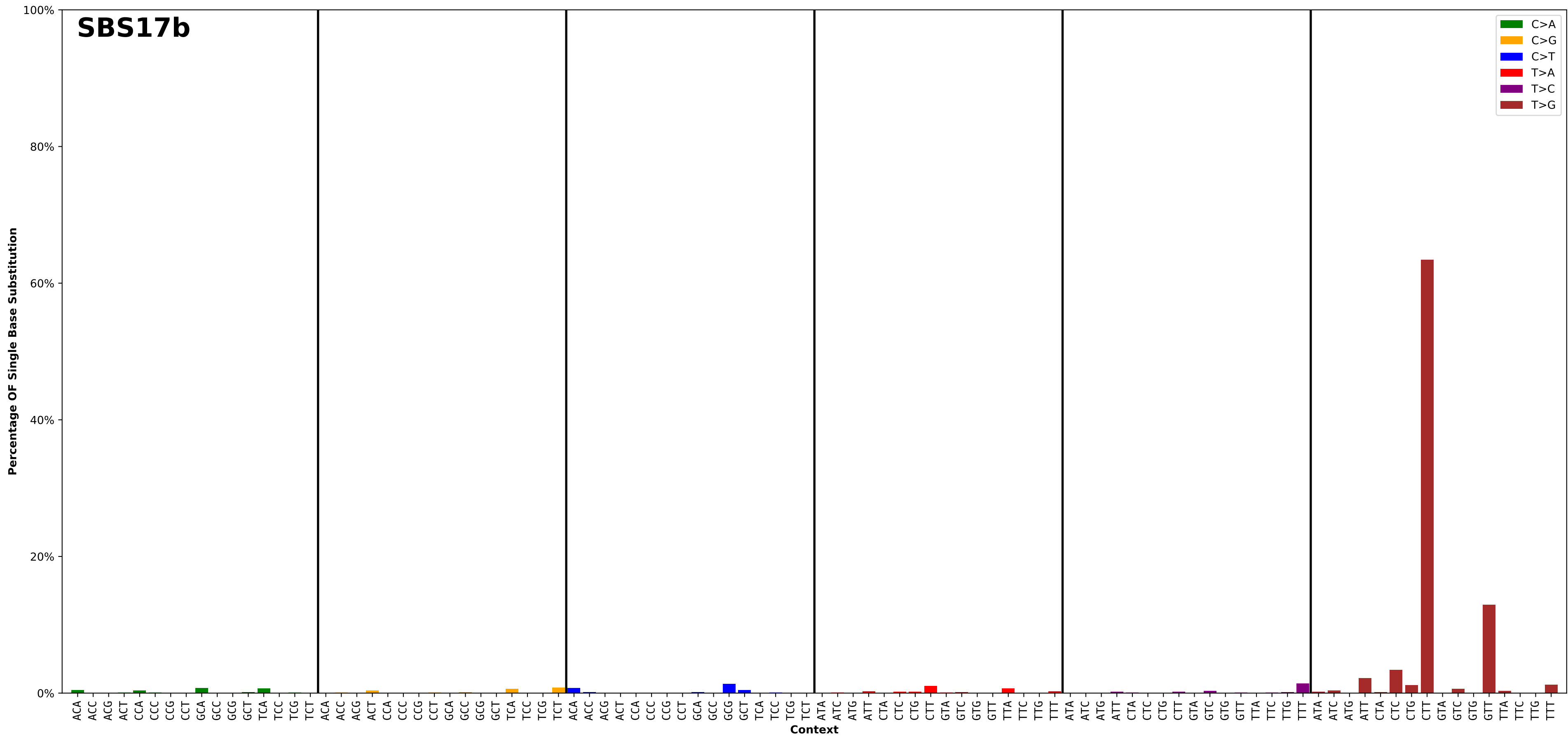
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80%
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40%
20%
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ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT
ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT**Context**

C>A**C>G****C>T****T>A****T>C****T>G****SBS16****Percentage OF Single Base Substitution**100%
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40%
20%
0%ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GCT TCA TCC TCG TCT
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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**Context**

C>A**C>G****C>T****T>A****T>C****T>G****SBS17a****Percentage OF Single Base Substitution**100%
80%
60%
40%
20%
0%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**Context**

T>G



C>A

C>G

C>T

T>A

T>C

T>G

SBS19



Percentage OF Single Base Substitution

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80%
60%
40%
20%
0%

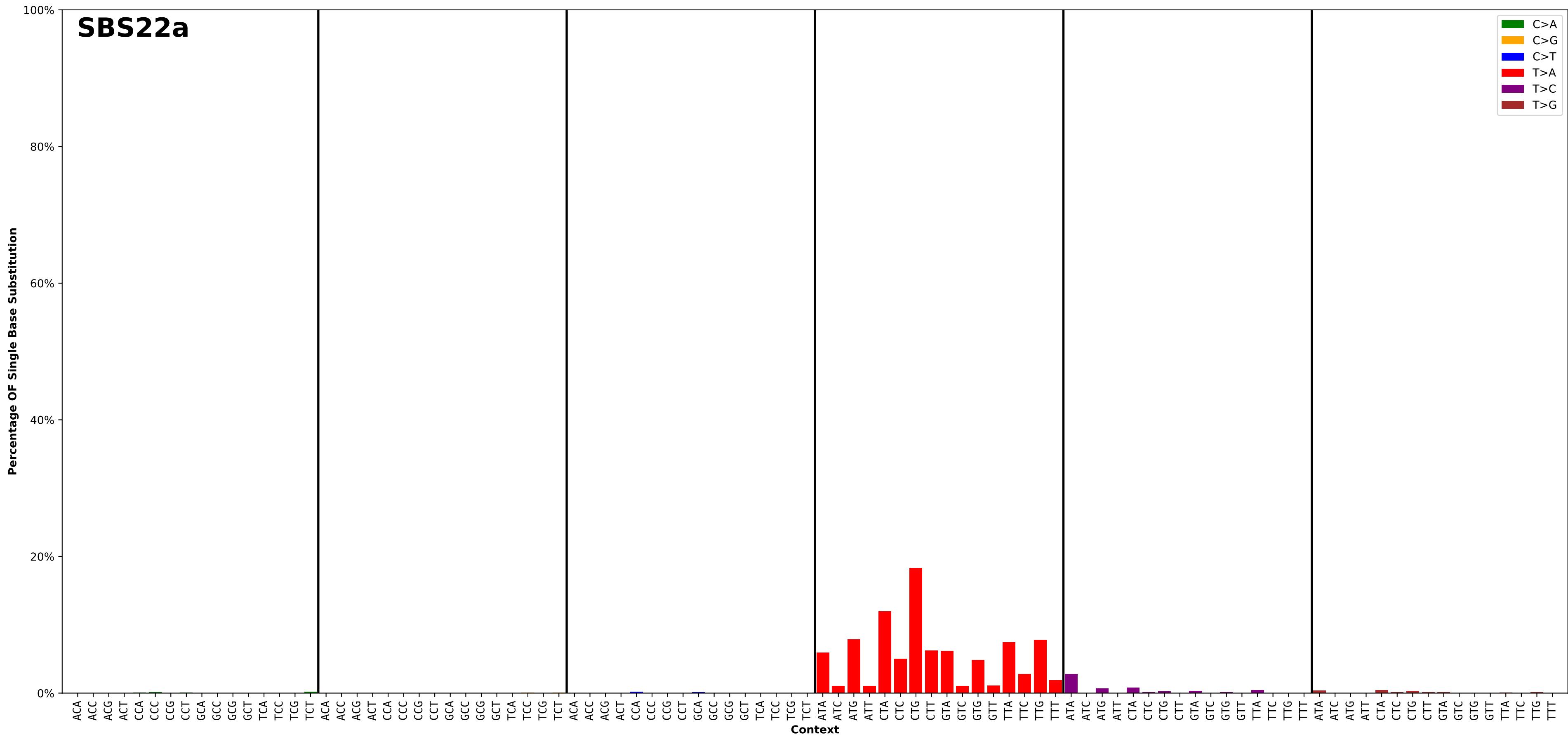
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C>A**C>G****C>T****T>A****T>C****T>G****SBS20****Percentage OF Single Base Substitution**100%
80%
60%
40%
20%
0%ACA
ACC
ACG
ACT
CCA
CCC
CCG
CCT
GCA
GCC
GCG
GCT
TCA
TCC
TCG
TCT
ACA
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ACG
ACT
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TTG
TTT
ATA
ATC
ATG
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CTA
CTC
CTG
CTT
GTA
GTC
GTG
GTT
TTA
TTC
TTG
TTT**Context**

C>A**C>G****C>T****T>A****T>C****T>G****SBS21****Percentage OF Single Base Substitution**100%
80%
60%
40%
20%
0%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**Context**

T>G



C>A**C>G****C>T****T>A****T>C****T>G****SBS22b****Percentage OF Single Base Substitution**100%
80%
60%
40%
20%
0%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

SBS23



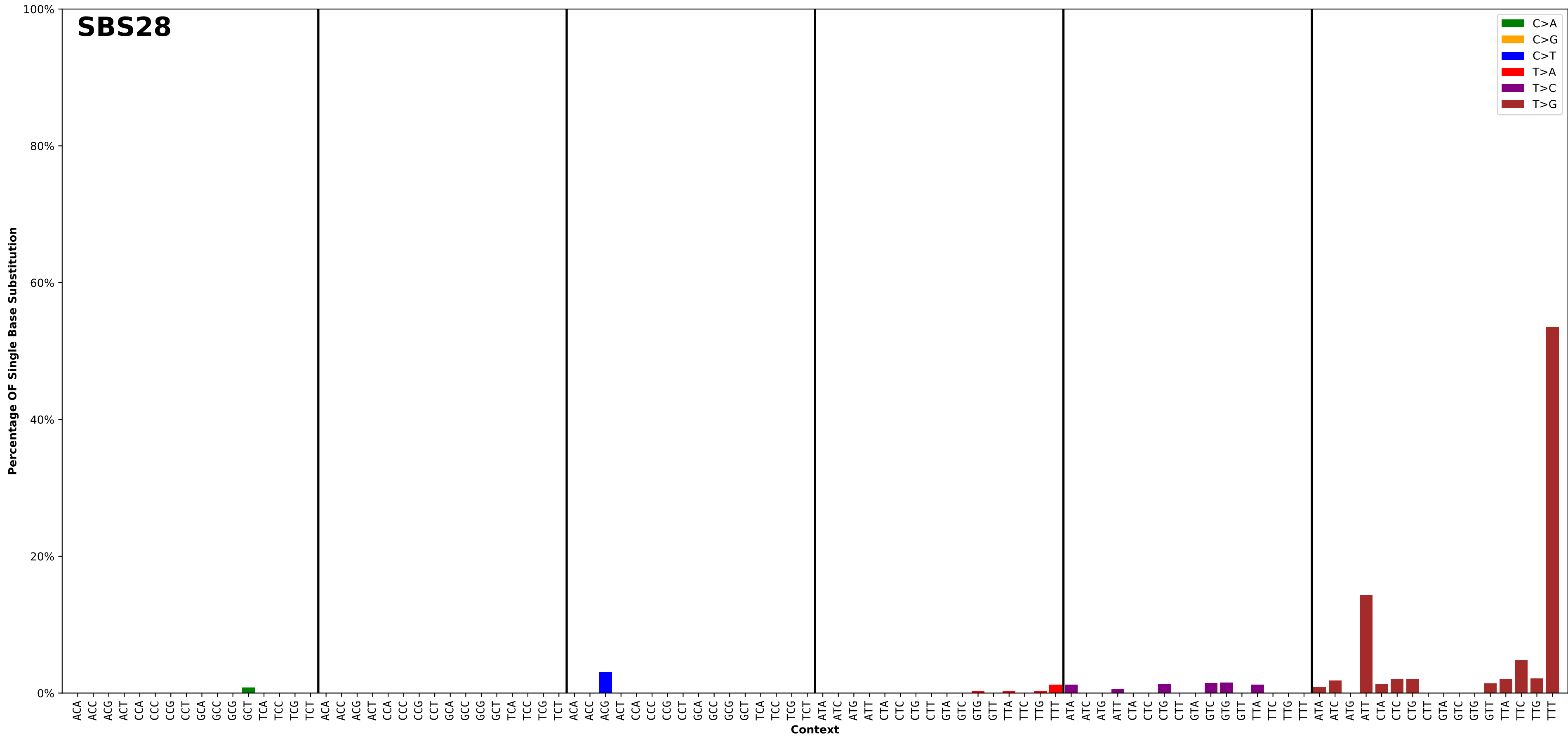
Percentage OF Single Base Substitution

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80%
60%
40%
20%
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Context

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T>G



C>A

C>G

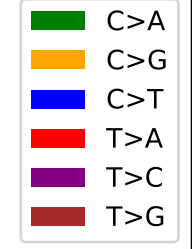
C>T

T>A

T>C

T>G

SBS29



Percentage OF Single Base Substitution

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20%
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Context

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C>A

C>G

C>T

T>A

T>C

T>G

SBS31



Percentage OF Single Base Substitution

100%
80%
60%
40%
20%
0%

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Context

C>A

C>G

C>T

T>A

T>C

T>G

SBS32



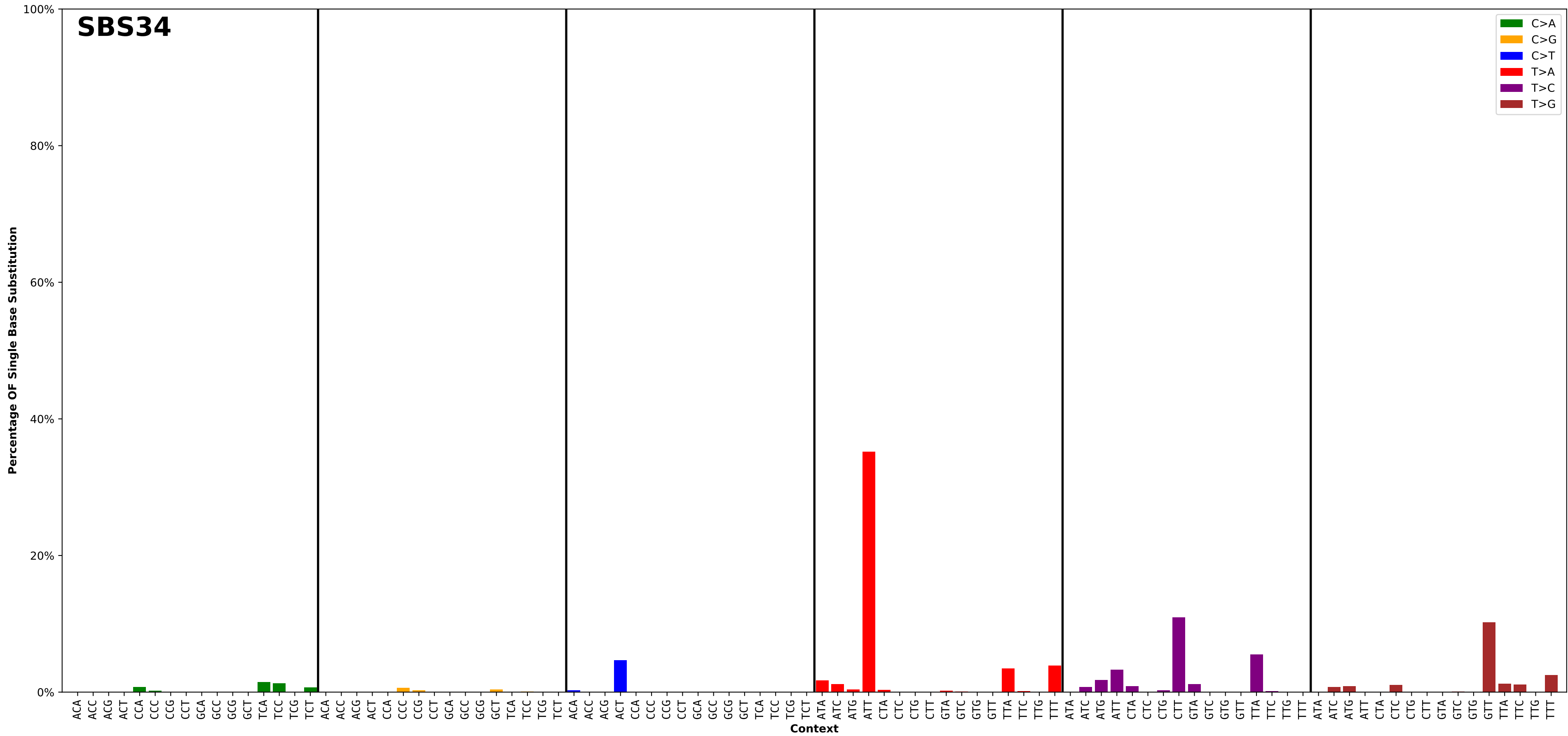
Percentage OF Single Base Substitution

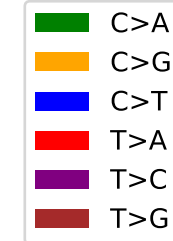
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Context

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T>G



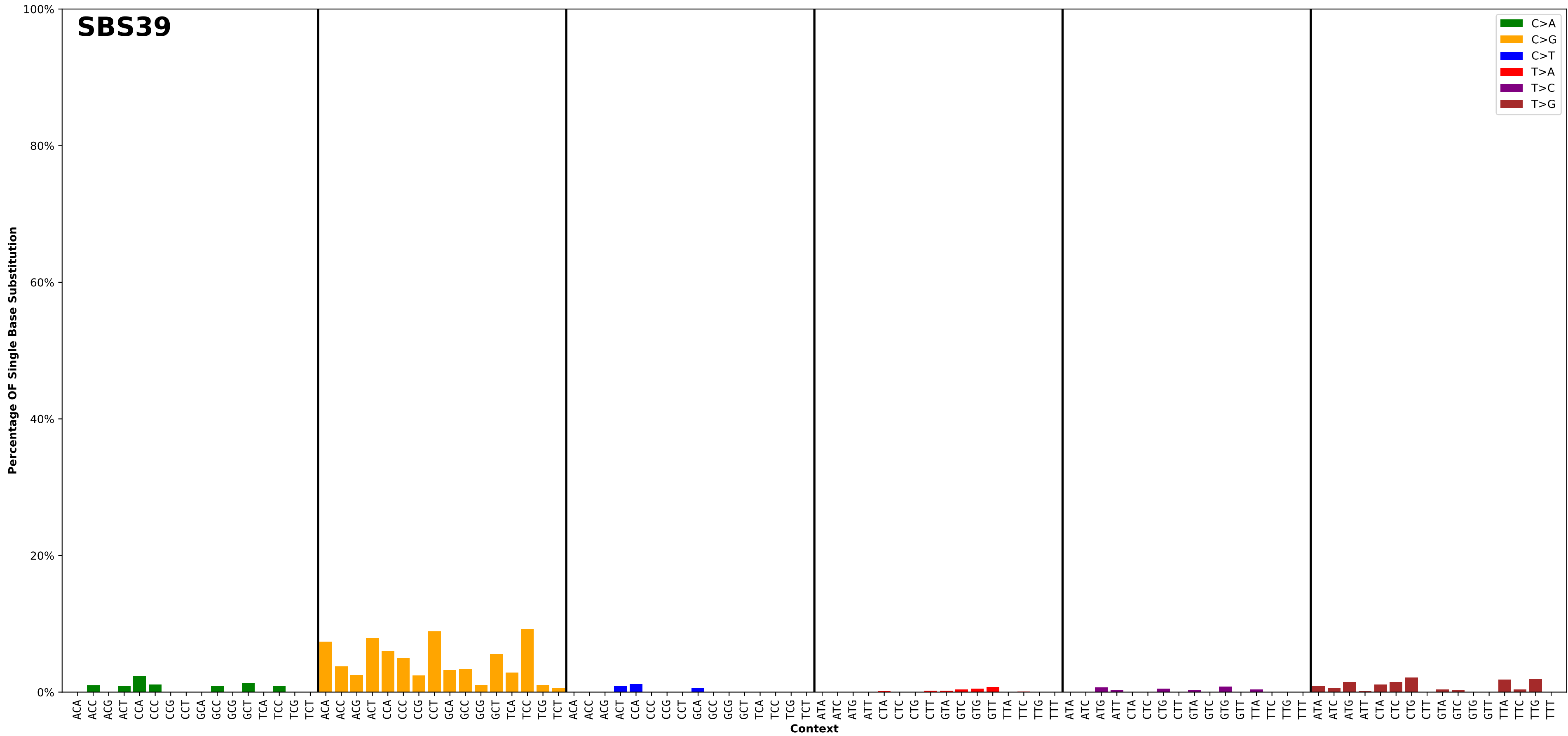
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ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT
ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT**Context**

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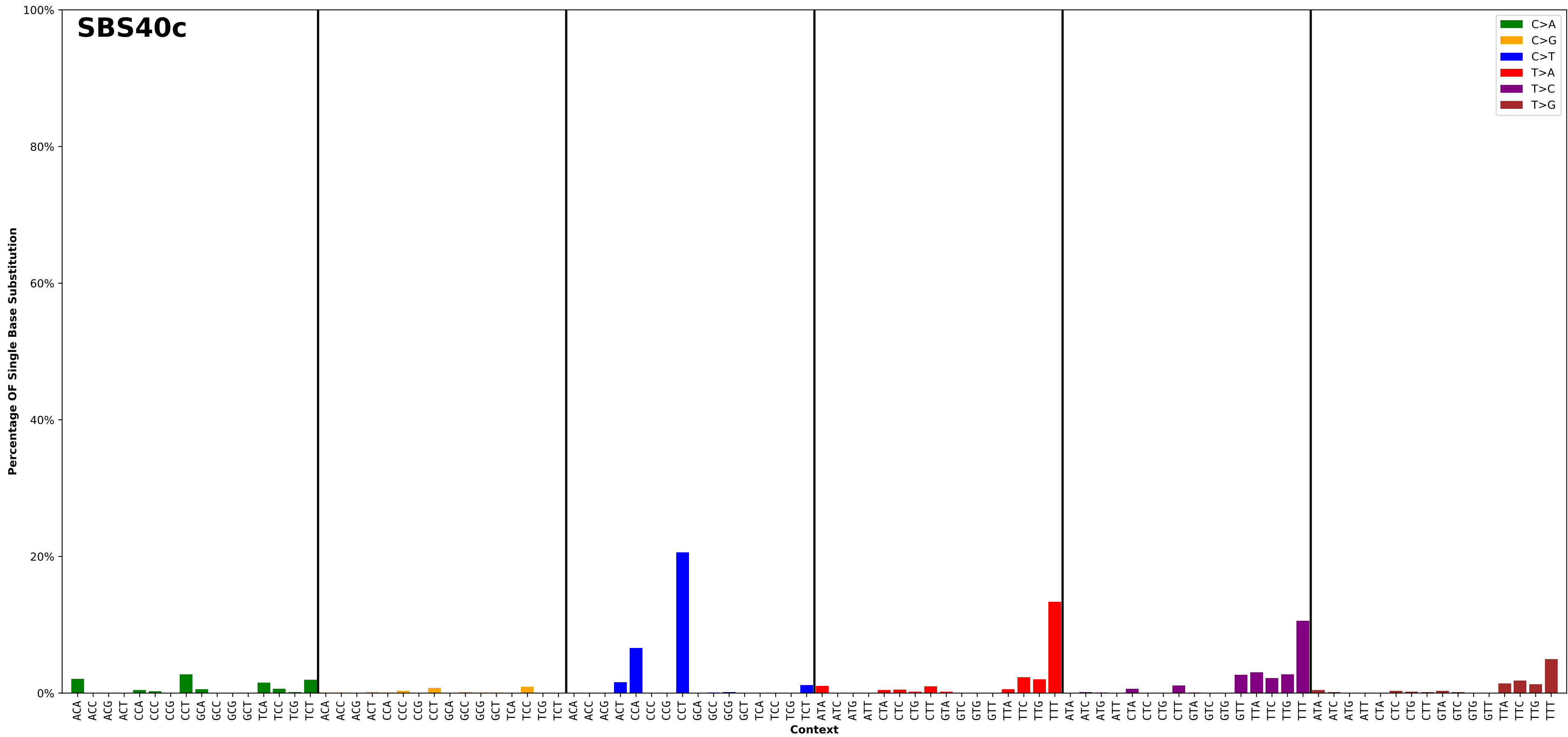
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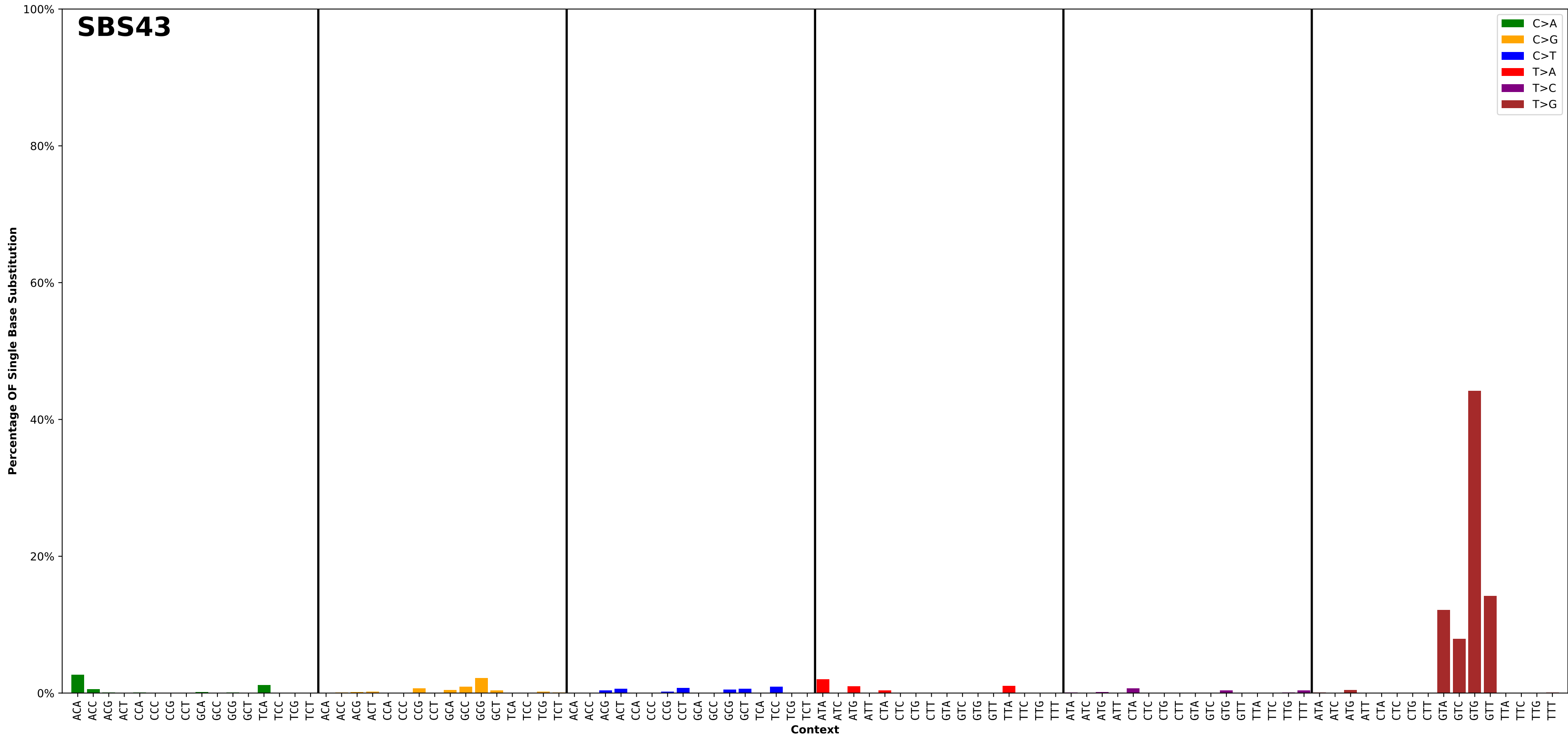
T>G



T>G



T>G



C>A

C>G

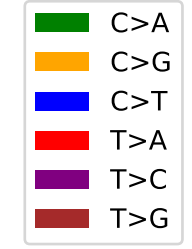
C>T

T>A

T>C

T>G

SBS44



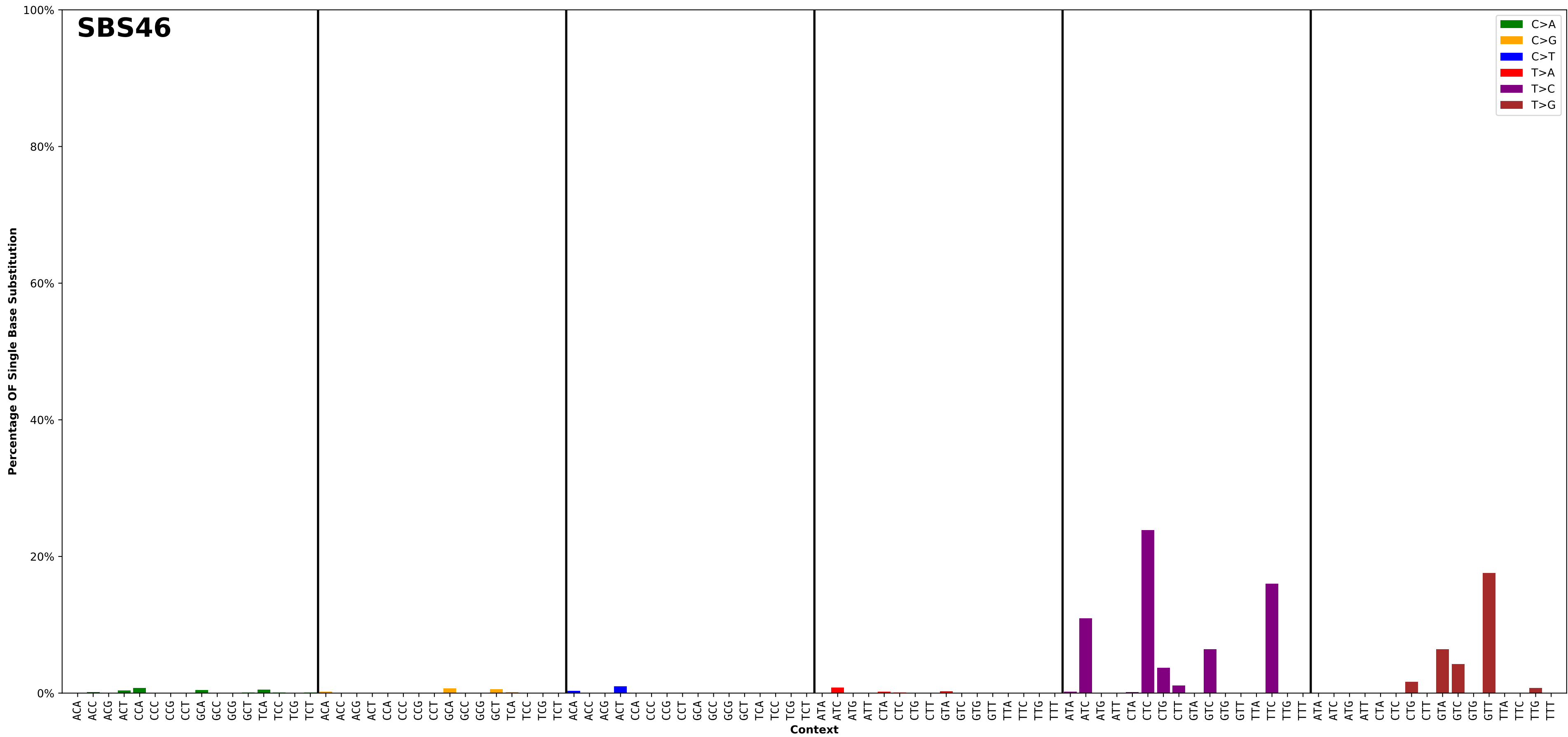
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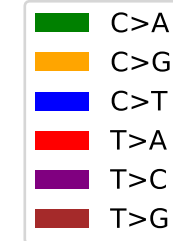
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Context

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T>G



C>A**C>G****C>T****T>A****T>C****T>G****SBS51****Percentage OF Single Base Substitution**100%
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40%
20%
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C>A

C>G

C>T

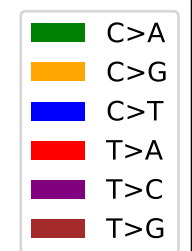
T>A

T>C

T>G

SBS52

Percentage OF Single Base Substitution

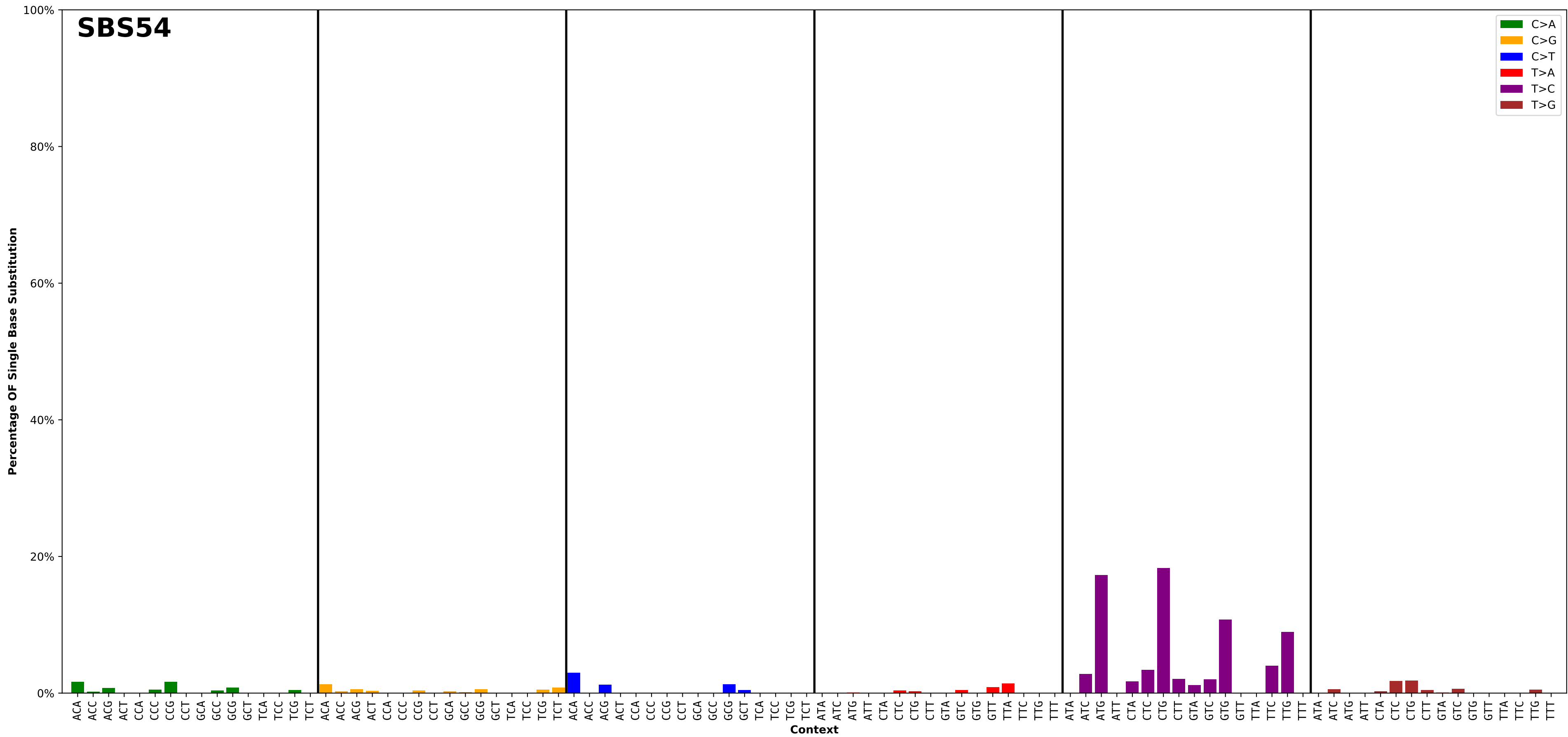


100%
80%
60%
40%
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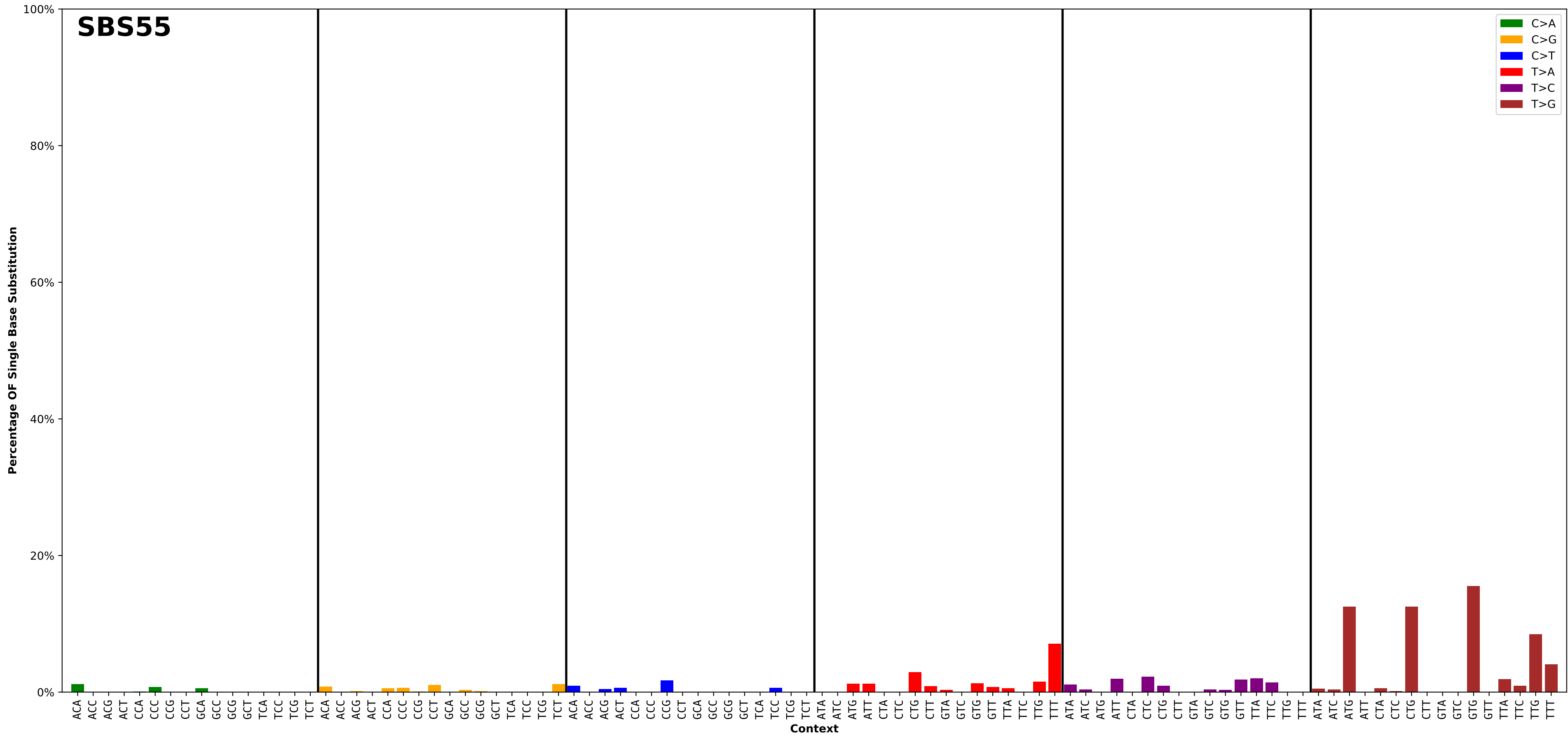
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ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT
ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT
ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT
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Context

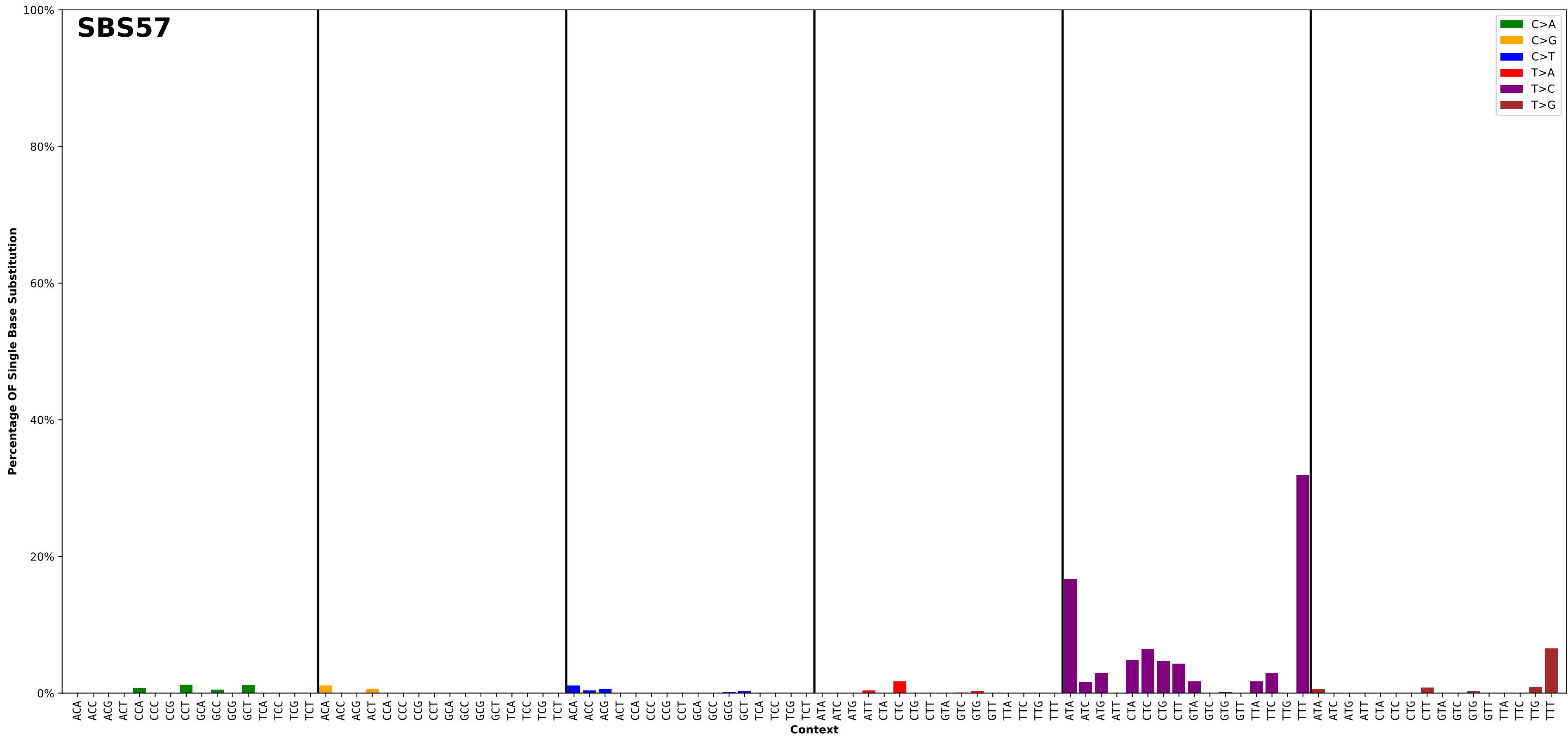
T>G



T>G



T>G



C>A

C>G

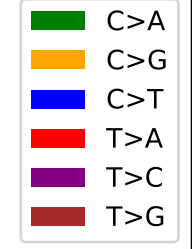
C>T

T>A

T>C

T>G

SBS58



Percentage OF Single Base Substitution

100%
80%
60%
40%
20%
0%

Context

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

SBS84



Percentage OF Single Base Substitution

100%
80%
60%
40%
20%
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

Context

C>A

C>G

C>T

T>A

T>C

T>G

SBS86



Percentage OF Single Base Substitution

100%
80%
60%
40%
20%
0%

Context

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

C>A

C>G

C>T

T>A

T>C

T>G

SBS87

Percentage OF Single Base Substitution



100%
80%
60%
40%
20%
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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Context

C > A

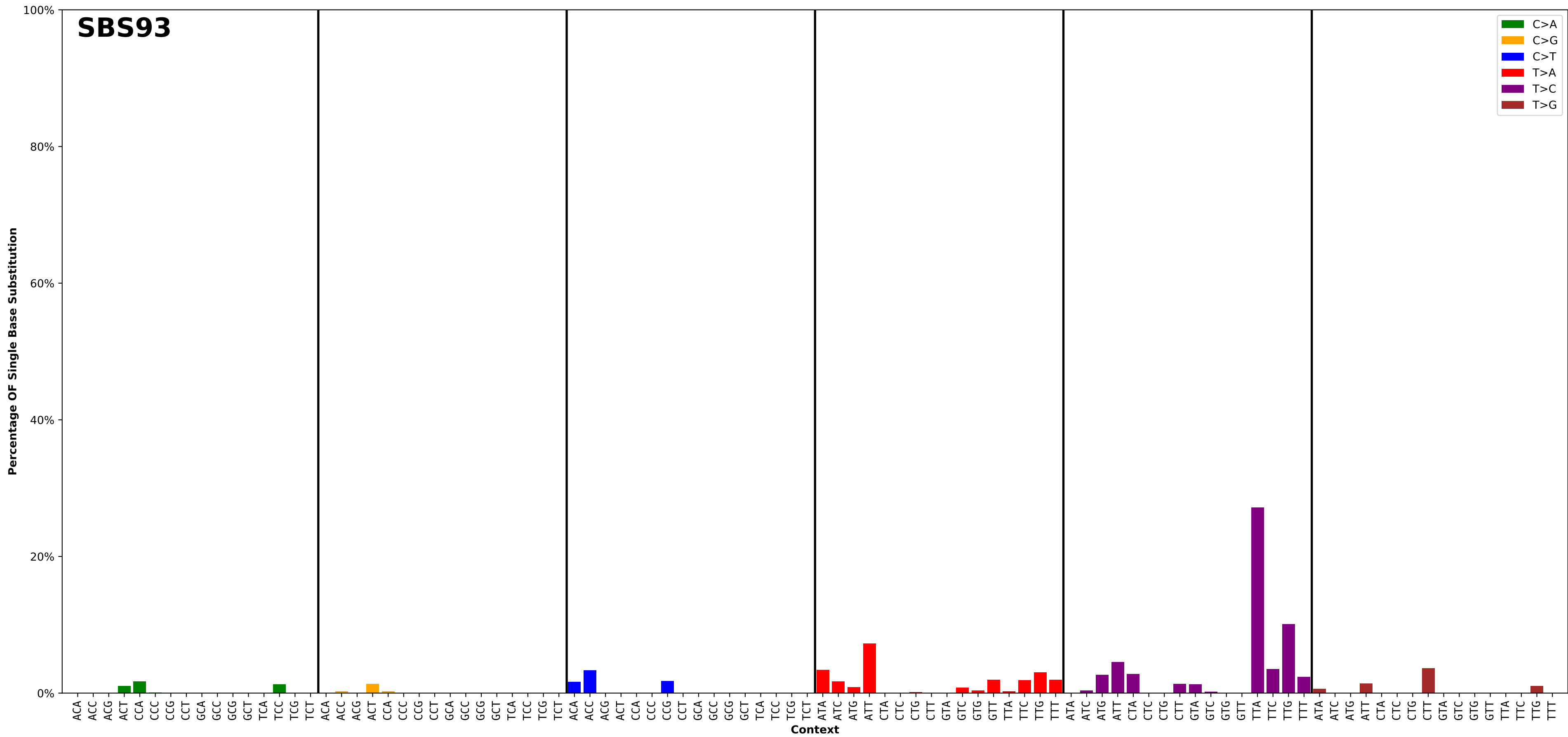
C>G

C>T

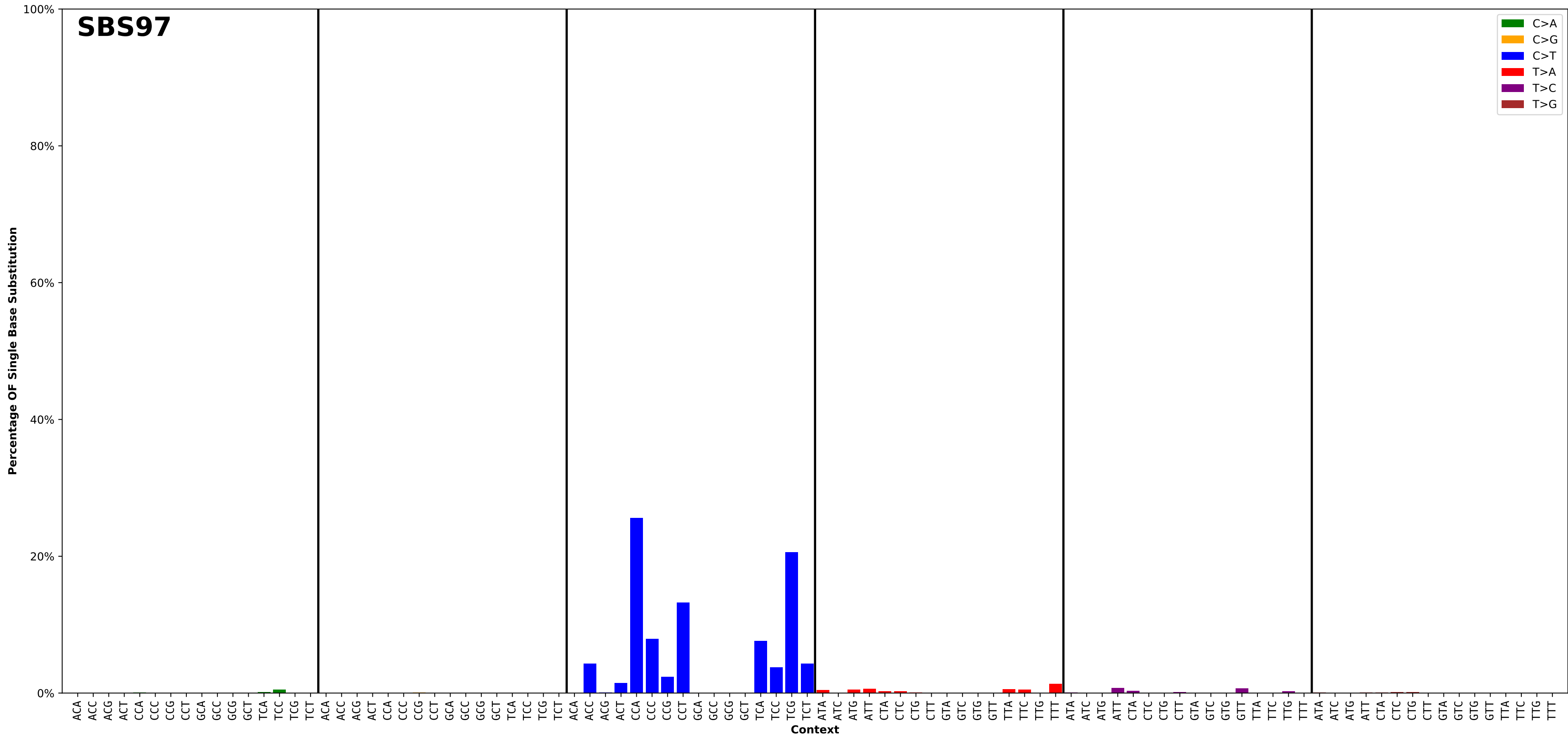
T>A

T>C

T>G



T>G



T>G

| | |
|---|---------|
|  | $C > A$ |
|  | $C > C$ |
|  | $C > T$ |
|  | $T > A$ |
|  | $T > C$ |
|  | $T > T$ |

Context