



# SBS2

**C > A**

C > G

$C > T$

**T > A**

$T > C$

T>G

# Mutation probability

0.3

0.2

o

0

[illegible]

# SBS3

C>A

C>G

C>T

T>A

T>C

T>G

Mutation probability

0.05

0.00

ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT GTC TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT GTC TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT GTC 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

# SBS4

**C > A**

C > G

$C > T$

**T > A**

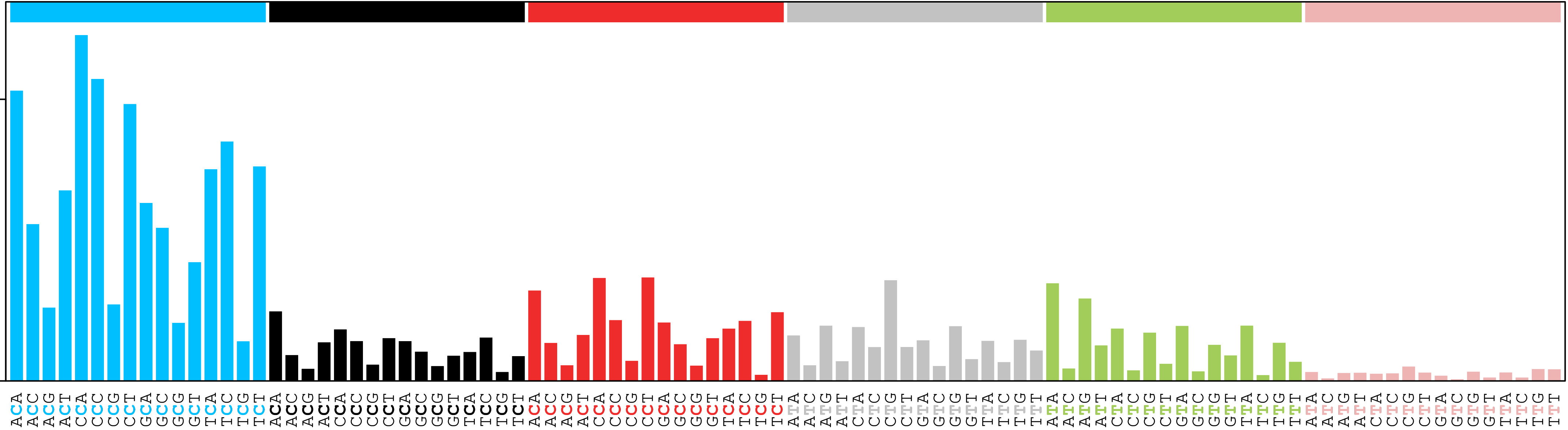
$T > C$

T>G

# Mutation probability

0.05

0.00



# SBS5







# SBS7c

C>A

C>G

C>T

T>A

T>C

T>G

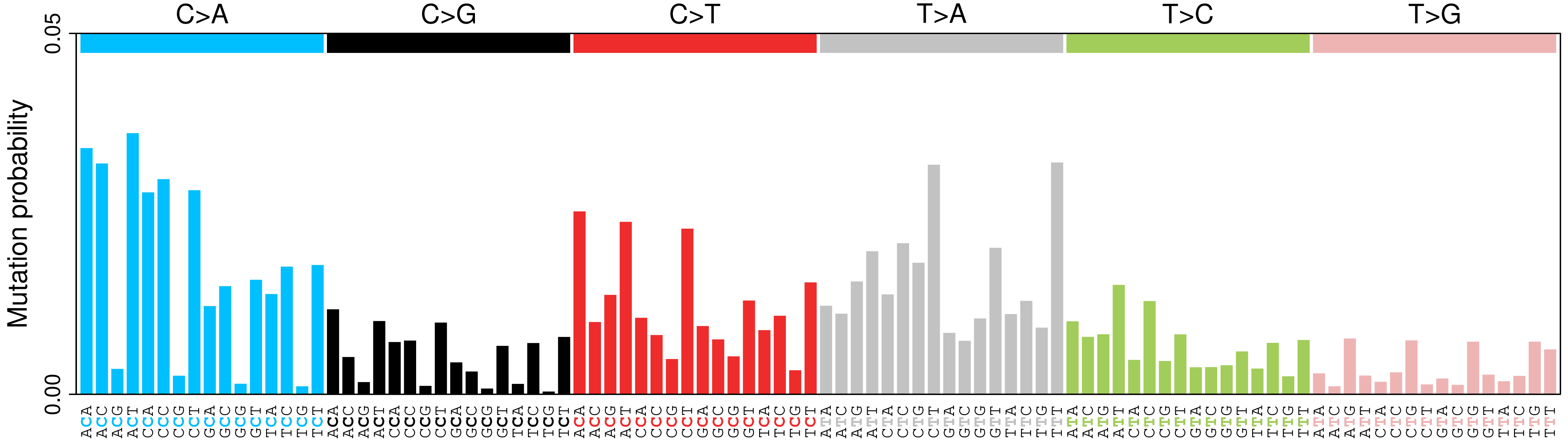
Mutation probability

0.20  
0.15  
0.10  
0.05  
0.00

ACA ACC AGC ATT CCA CCC CCG CCT CTA GCA GCC GGT GTC TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT GTC 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 GCA GCC GGT GTC TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GCA GCC GGT GTC TTA TTC TTG TTT



# SBS8



# SBS9

**C > A**

C > G

$$C > T$$

**T > A**

$T > C$

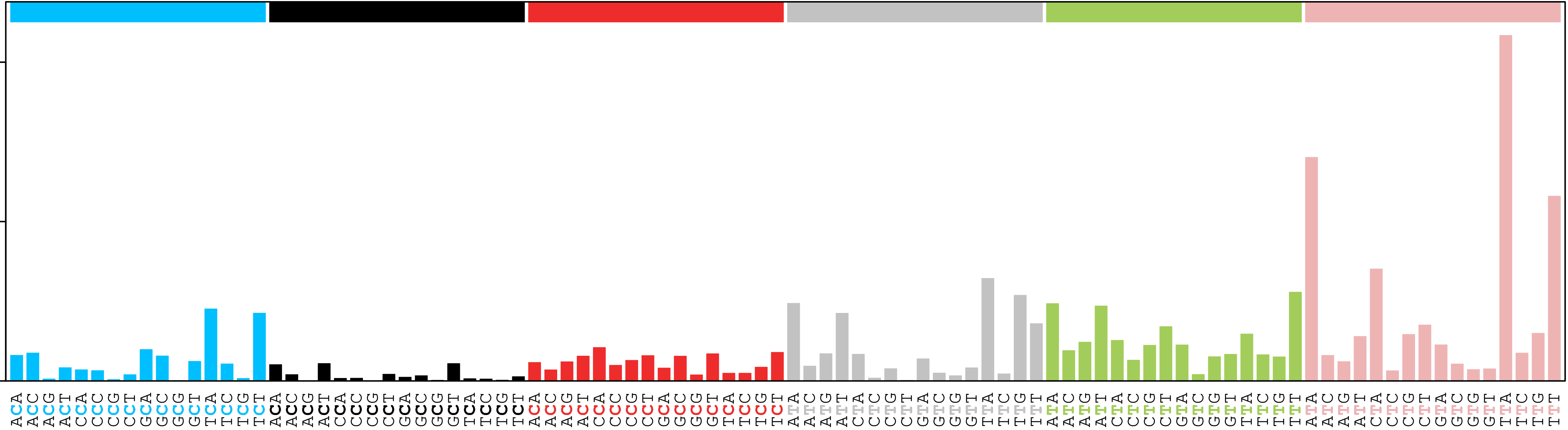
T>G

# Mutation probability

0.10

50

0.00





# SBS10d

C>A

C>G

C>T

T>A

T>C

T>G

Mutation probability

0.20  
0.15  
0.10  
0.05  
0.00

ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT 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 GCA GCC GGT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT



# SBS12

C>A

C>G

C>T

T>A

T>C

T>G

Mutation probability

0.05

0.00

ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT 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

# SBS13

C>A

C>G

C>T

T>A

T>C

T>G

Mutation probability

0.20  
0.15  
0.10  
0.05  
0.00

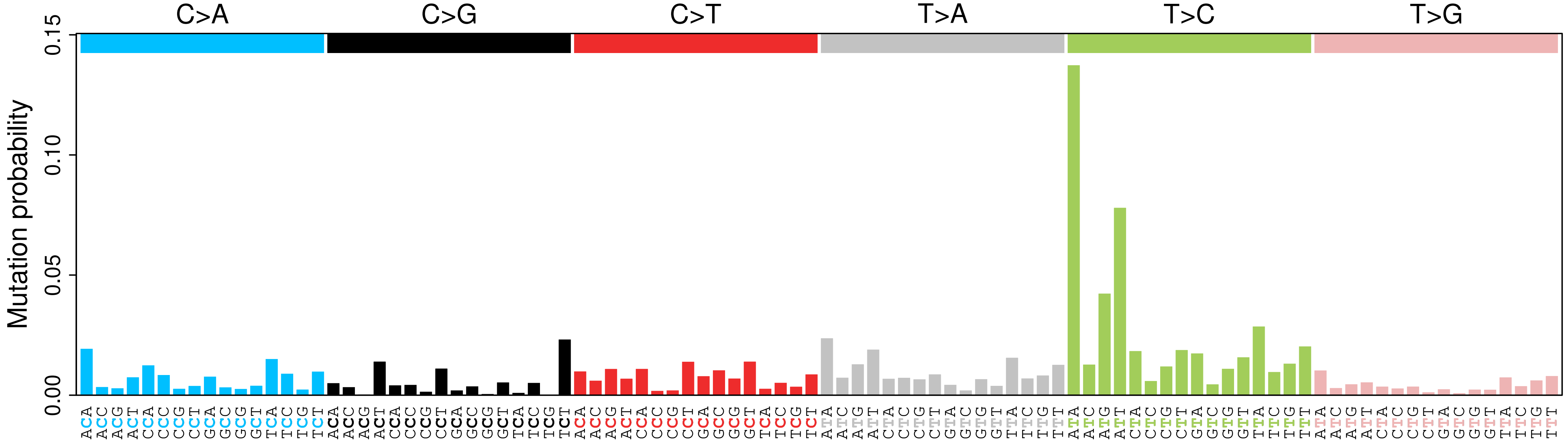
ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGG GGT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGG GGT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGG GGT TCA TCC TCG TCT ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT GTA GTC GTG GTT TTA TTC TTG TTT







# SBS16



# SBS17

C>A

C>G

C>T

T>A

T>C

T>G

Mutation probability

0.20  
0.15  
0.10  
0.05  
0.00





# SBS18

C>A

C>G

C>T

T>A

T>C

T>G

Mutation probability

0.10

0.05

0.00

ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGG GGT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGG GGT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGG GGT 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

# SBS19

**C > A**

C > G

$C > T$

**T > A**

$T > C$

T>G

# Mutation probability

## 0.2

0.1

0

[illegible]

# SBS20







# SBS23



# SBS24

C>A

C>G

C>T

T>A

T>C

T>G

Mutation probability

0.15

0.10

0.05

0.00

ACA ACC AGT ACA CCC CGT GGA GCC GGG GGT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GGT TCA TCC TCG TCT ACA ACC ACG AAT CTA CTC CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTT CTT GTA GTC GTG GTT TTA TTC TTG TTT ATA ATC ATG AAT CTA CTC CTT CTT GTA GTC GTG GTT TTA TTC TTG TTT



# SBS28





# SBS31

C>A

C>G

C>T

T>A

T>C

T>G

Mutation probability

0.15  
0.10  
0.05  
0.00

ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT GGC GTT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT GTT 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



# SBS33

C>A

C>G

C>T

T>A

T>C

T>G

Mutation probability

0.2  
0.1  
0.0





# SBS35



# SBS38

$C > A$

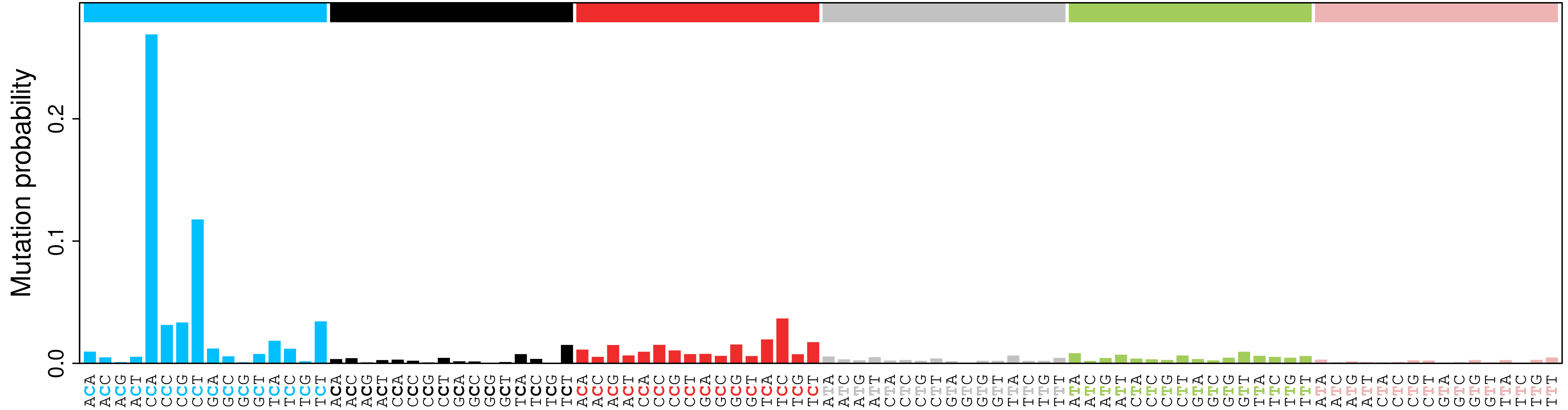
C > G

$C > T$

**T > A**

$$T > C$$

T > G







# SBS53

C>A

C>G

C>T

T>A

T>C

T>G

Mutation probability

0.10

0.05

0.00

ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT GTC TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT 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

# SBS57

C>A

C>G

C>T

T>A

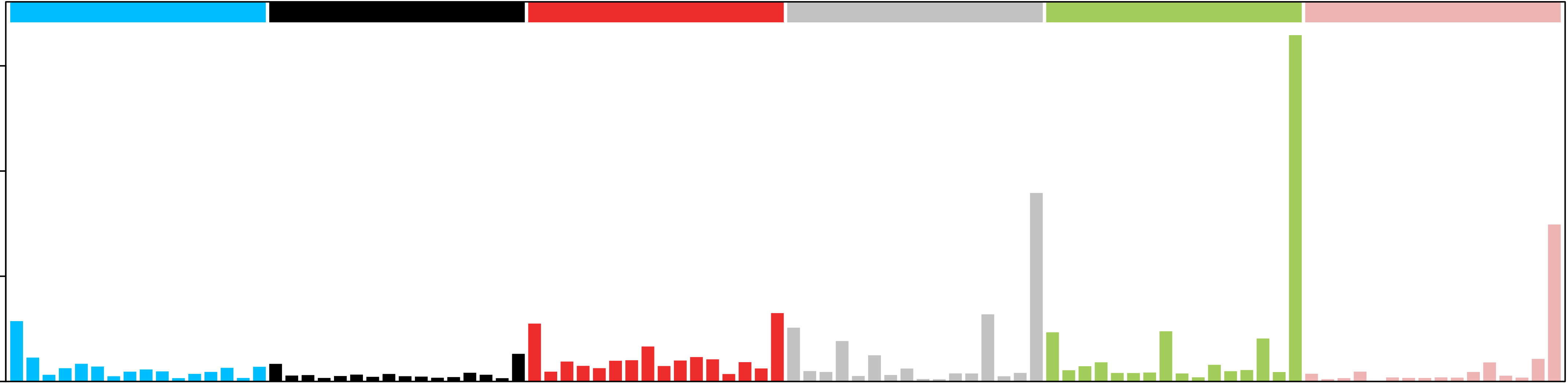
T>C

T>G

Mutation probability

0.15  
0.10  
0.05  
0.00

ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT GTC TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT GTC TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT GTC 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









# SBS88

C>A

C>G

C>T

T>A

T>C

T>G

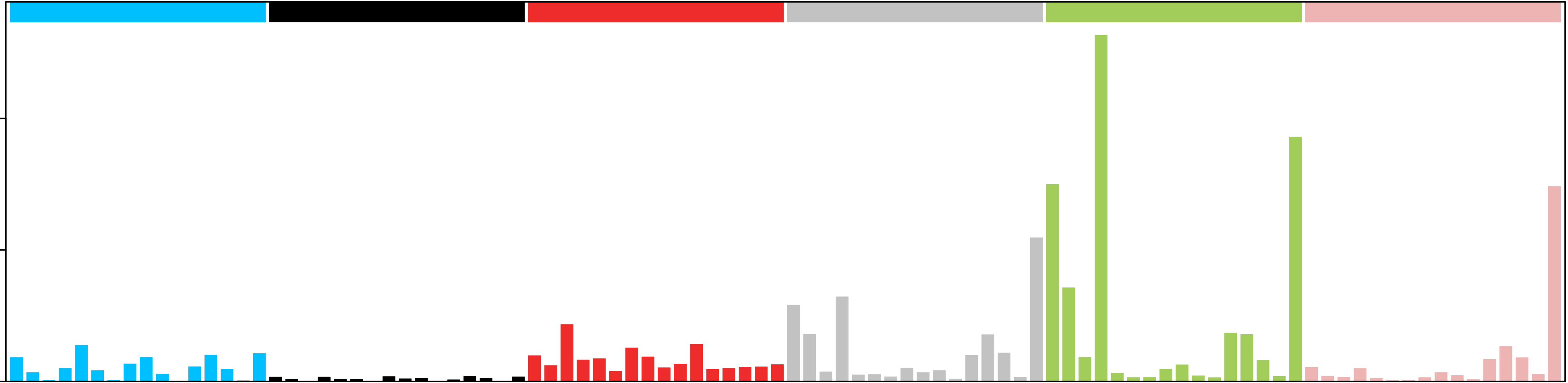
Mutation probability

0.10

0.05

0.00

ACA ACC AGC ACT CCA CCC CCG CCT GCA GCC GGT GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT 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



# SBS90

**C > A**

C > G

$C > T$

**T > A**

$T > C$

T>G

# Mutation probability

0.00 0.05 0.10 0.15 0.20

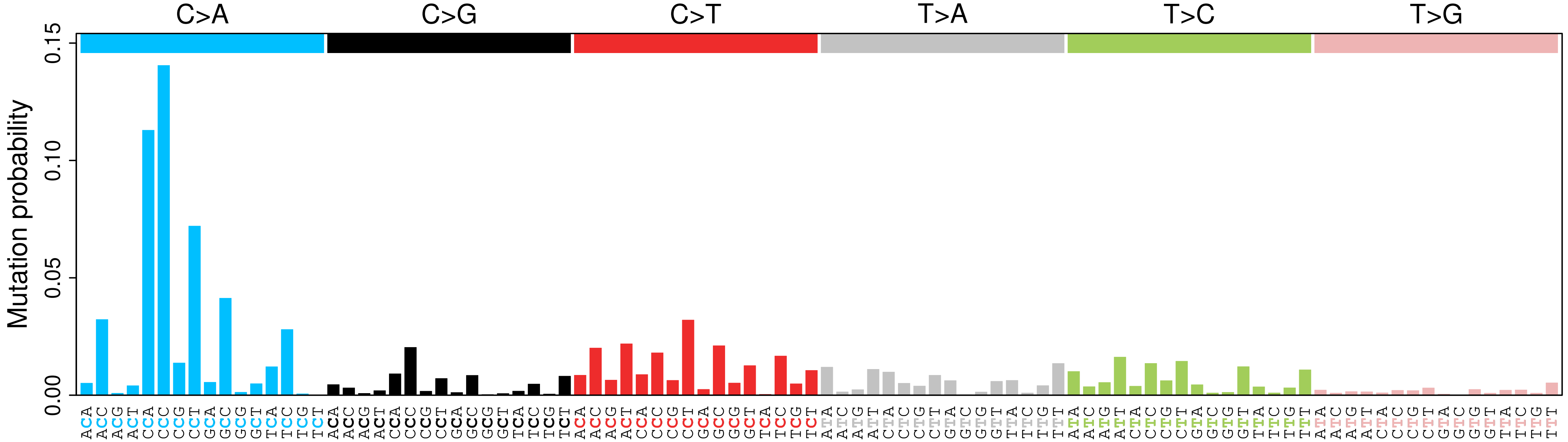




# SBS93



# SBS94



# SBS95

C>A

C>G

C>T

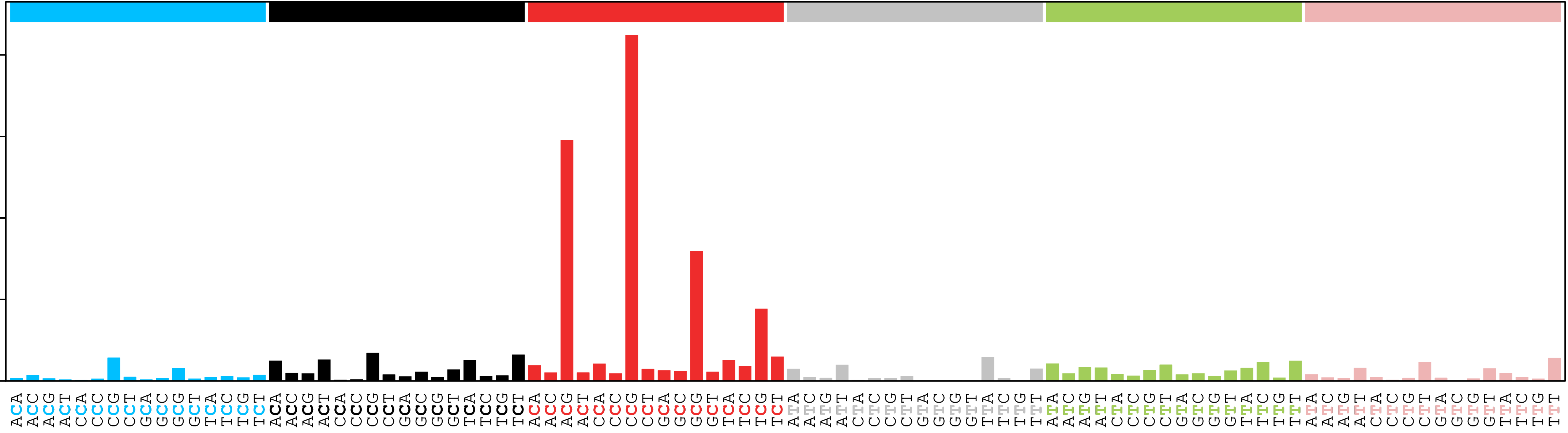
T>A

T>C

T>G

Mutation probability

0.20  
0.15  
0.10  
0.05  
0.00









# SBS98



# SBS99

C>A

C>G

C>T

T>A

T>C

T>G

Mutation probability

0.05

0.00

ACA ACC ACG ACT CCA CCC CCT CCA GCC GCG GGT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCT CCA GCC GCG GGT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCT CCA GCC GCG GGT 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



# SBS101

C>A

C>G

C>T

T>A

T>C

T>G

Mutation probability

0.05

0.00

ACA ACC ACG ACT CCA CCC CGC CTC TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CGC CTC GCA GCC GCG GGT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CGC CTC GCA GCC GCG GGT 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

# SBS102

C>A

C>G

C>T

T>A

T>C

T>G

Mutation probability

0.05

0.00

ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT GTC TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT GTC 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



# SBS103





# SBS105





# SBS106

C>A

C>G

C>T

T>A

T>C

T>G

Mutation probability

0.15  
0.10  
0.05  
0.00

ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT TCA TCC TCG TTC TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT TCA TCC TCG TTC TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT TCA TCC TCG TTC 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

# SBS107

**C > A**

C > G

$C > T$

**T > A**

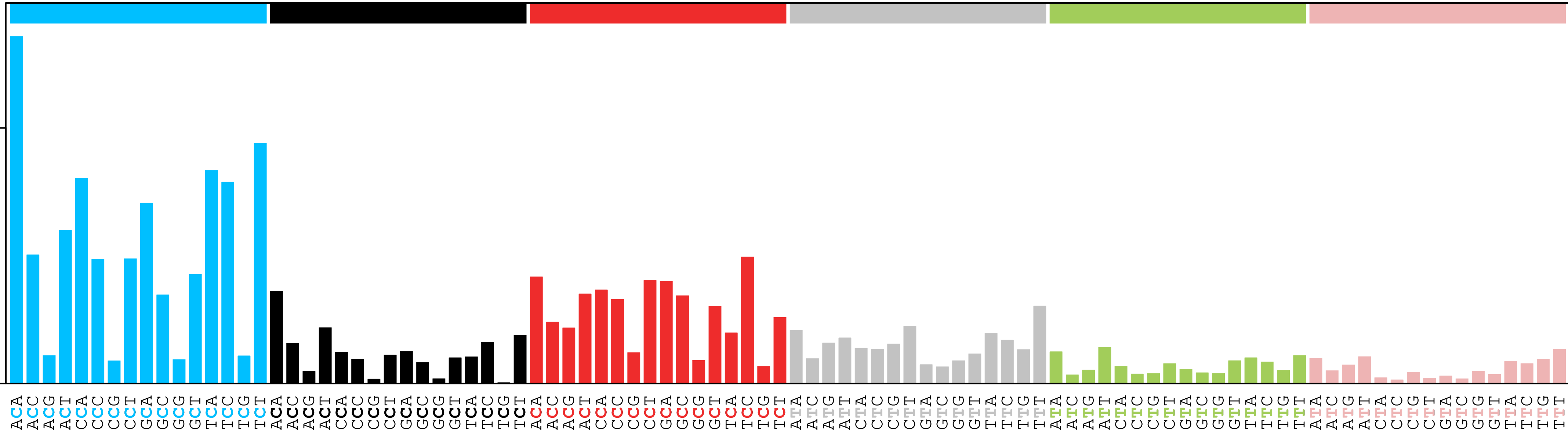
$$T > C$$

T>G

# Mutation probability

0.05

0.00



# SBS108

C>A

C>G

C>T

T>A

T>C

T>G

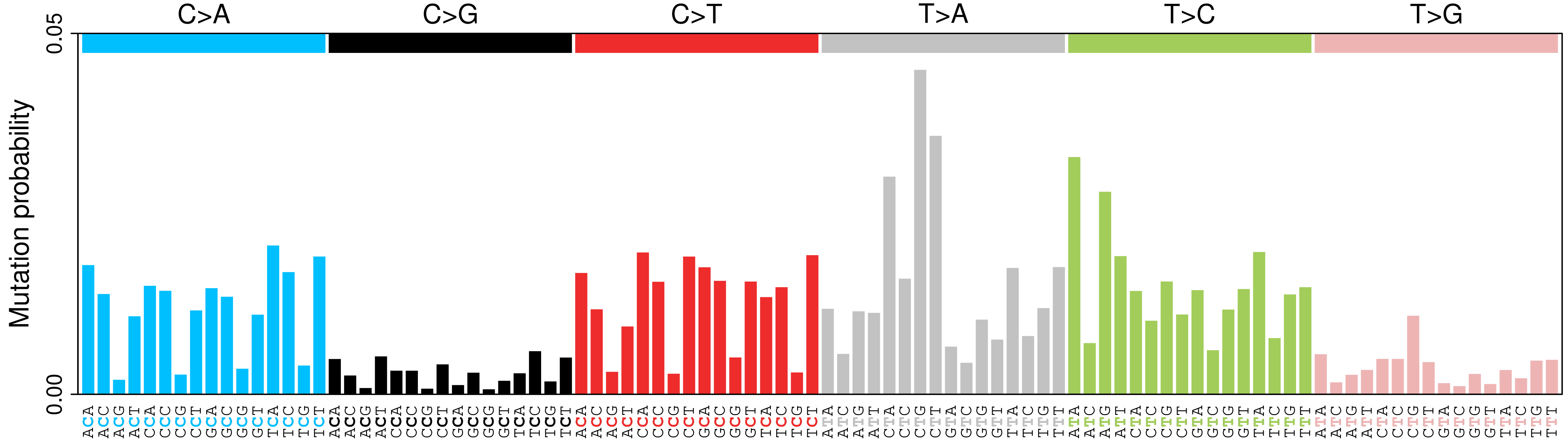
Mutation probability

0.15  
0.10  
0.05  
0.00

ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT GCA GGC GGT GCA GGC GGT GCA GGC GGT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GGC GGT GCA GGC GGT 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



# SBS110



# SBS111

C>A

C>G

C>T

T>A

T>C

T>G

Mutation probability

0.05

0.00

ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GGT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GGT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GCG GGT 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

# SBS112

$C > A$

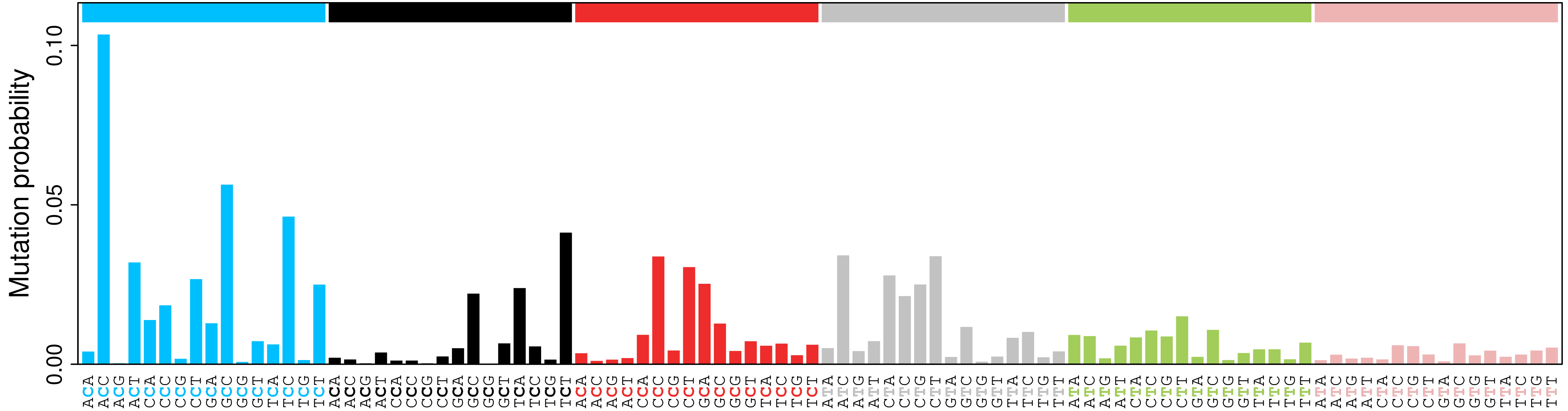
C > G

C>T

**T > A**

$$T > C$$

T>G



# SBS113

**C > A**

C > G

$C > T$

**T > A**

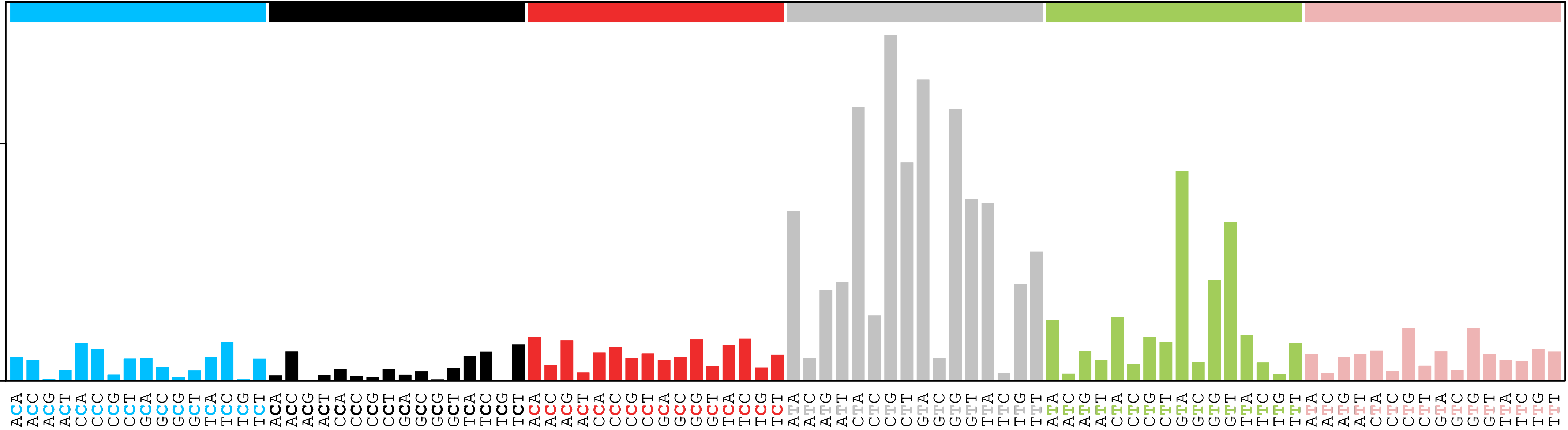
$T > C$

T>G

# Mutation probability

0.05

0.00.





# SBS114

**C > A**

C > G

$C > T$

**T > A**

$T > C$

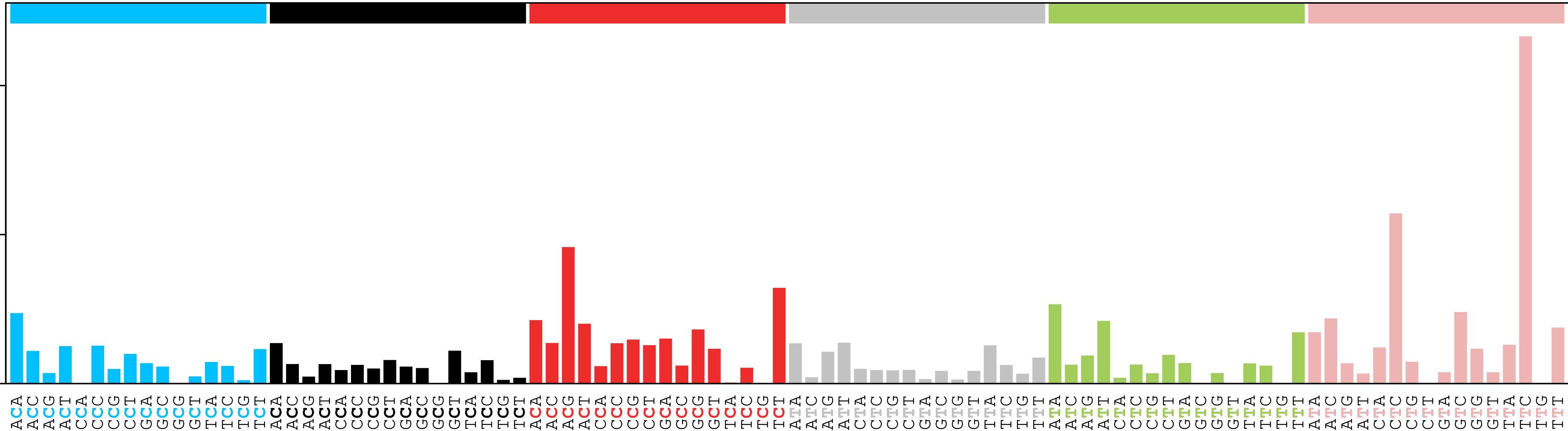
T>G

# Mutation probability

0.10

0.05

0.00





# SBS116



# SBS117

$C > A$

C>G

$$C > T$$

**T > A**

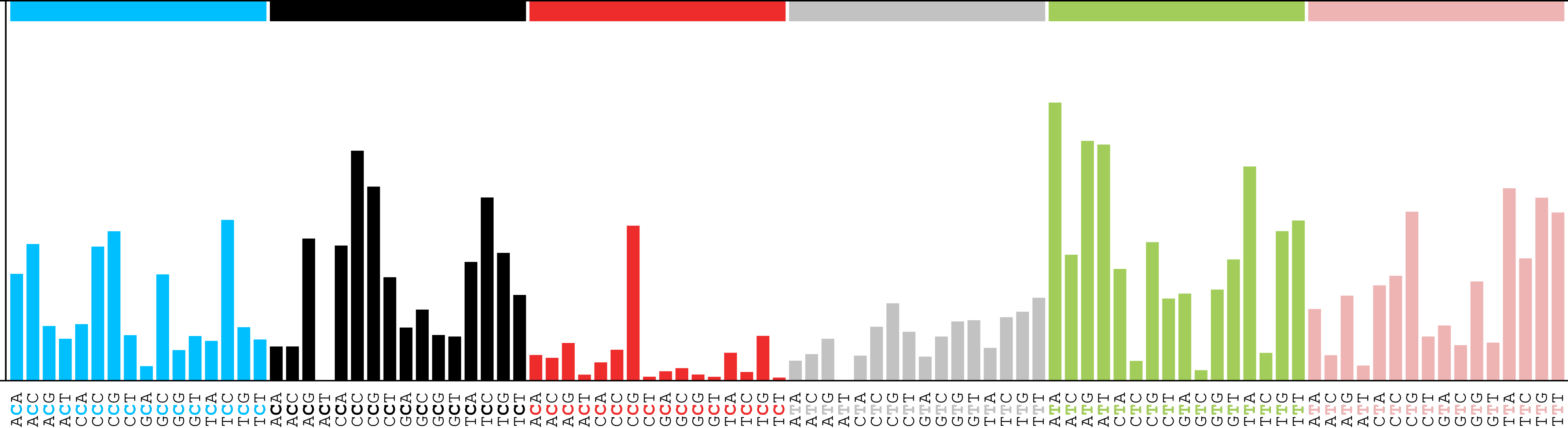
$$T > C$$

T>G

0.05

# Mutation probability

0.00



# SBS118

C>A

C>G

C>T

T>A

T>C

T>G

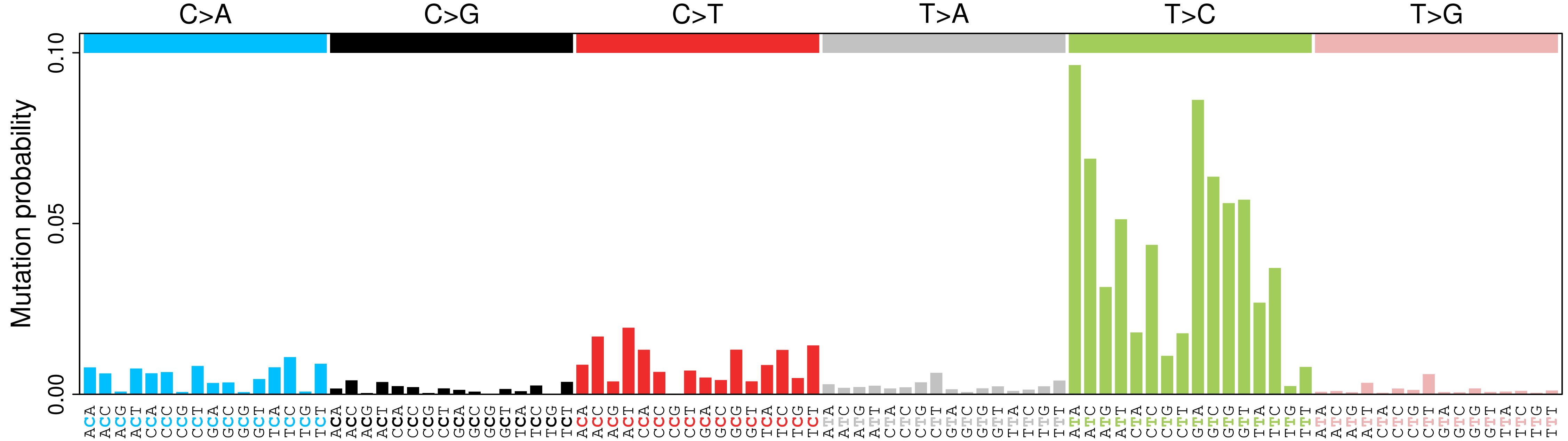
Mutation probability

0.05

0.00

ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT GCT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT TCA TCC TCG TCT ACA ACC ACG ACT CCA CCC CCG CCT GCA GCC GGT 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

# SBS119



# SBS120

$C > A$

C > G

$$C > T$$

**T>A**

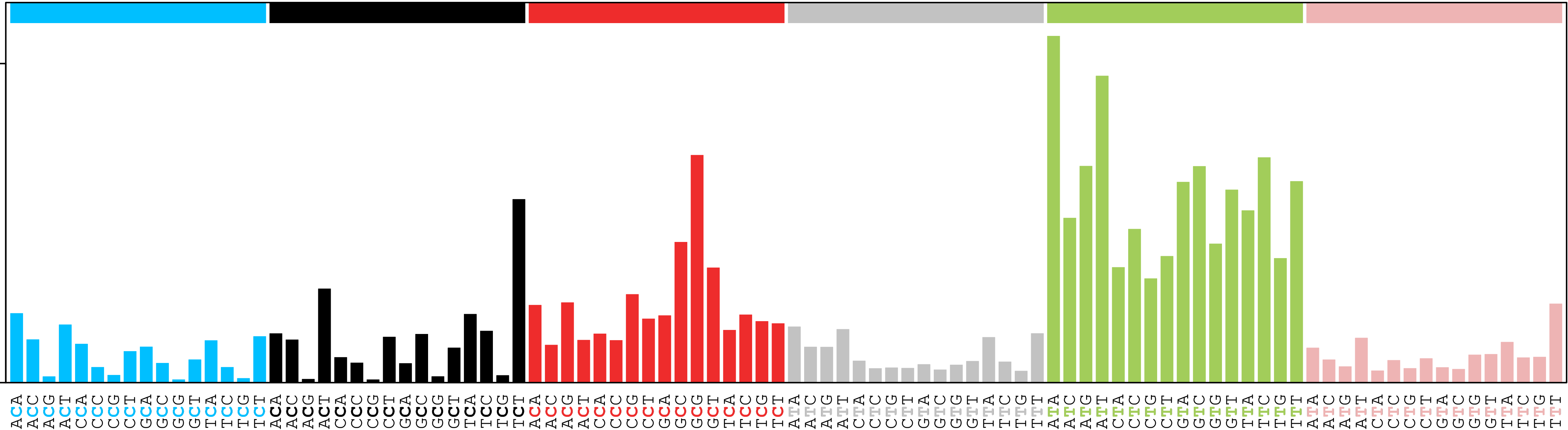
$T > C$

T>G

# Mutation probability

0.05

0.00



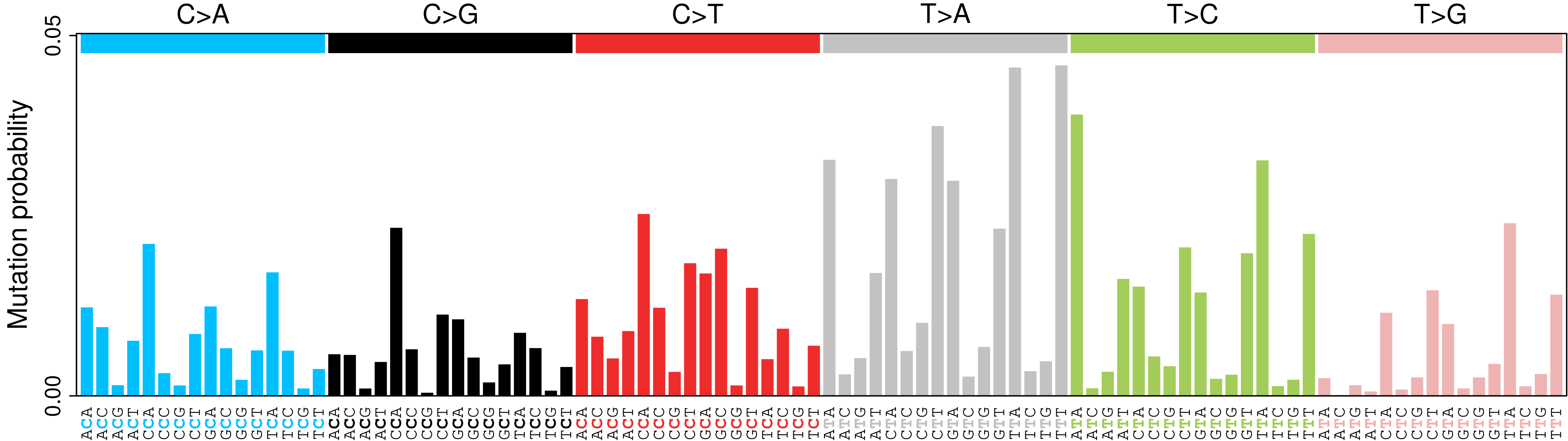








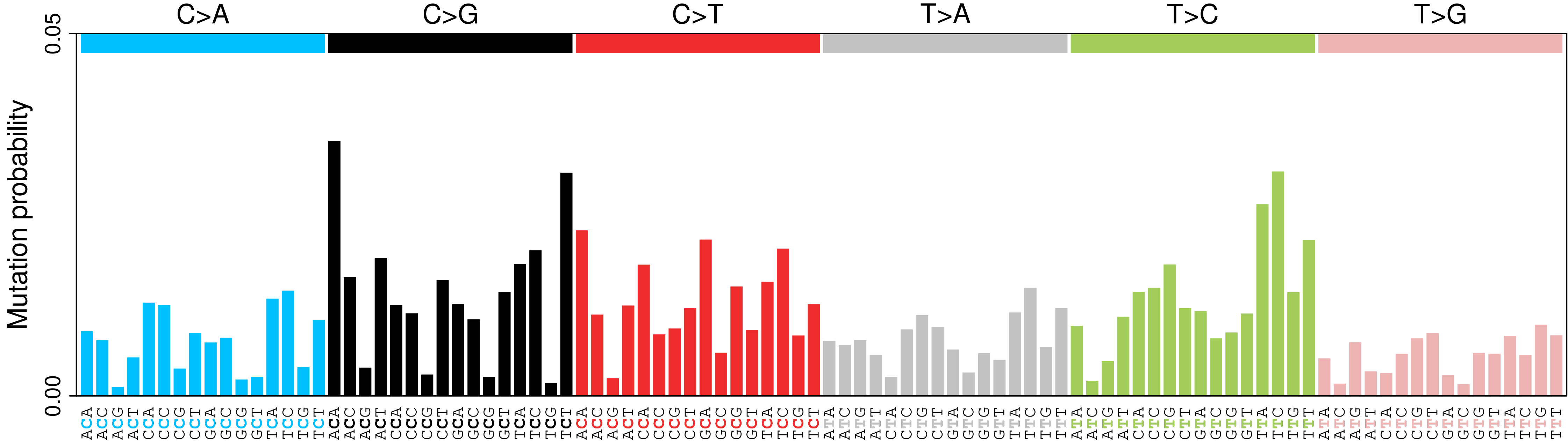
# SBS124



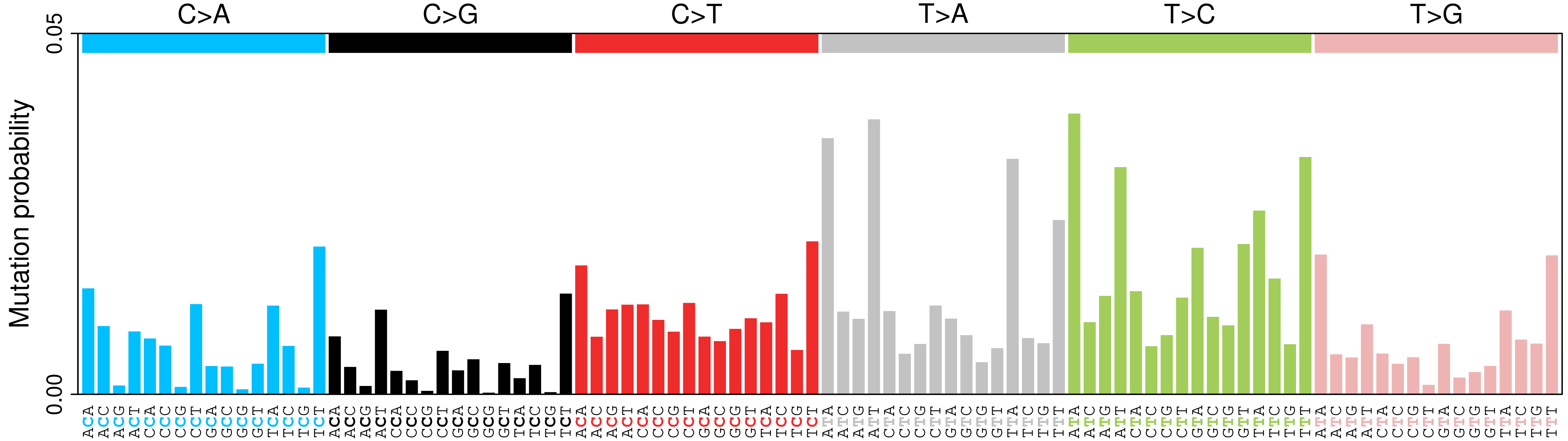
# SBS125



# SBS126



# SBS127



# SBS128

$C > A$

C > G

C>T

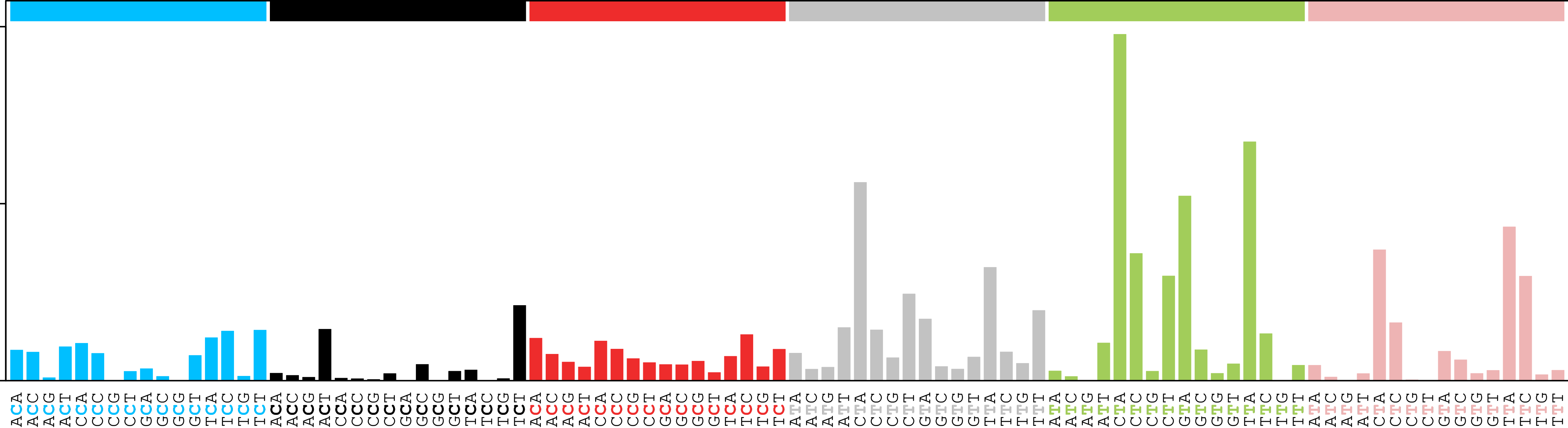
**T > A**

$$T > C$$

T>G

0.10

0.00









# SBS131

$C > A$

C > G

$C > T$

**T > A**

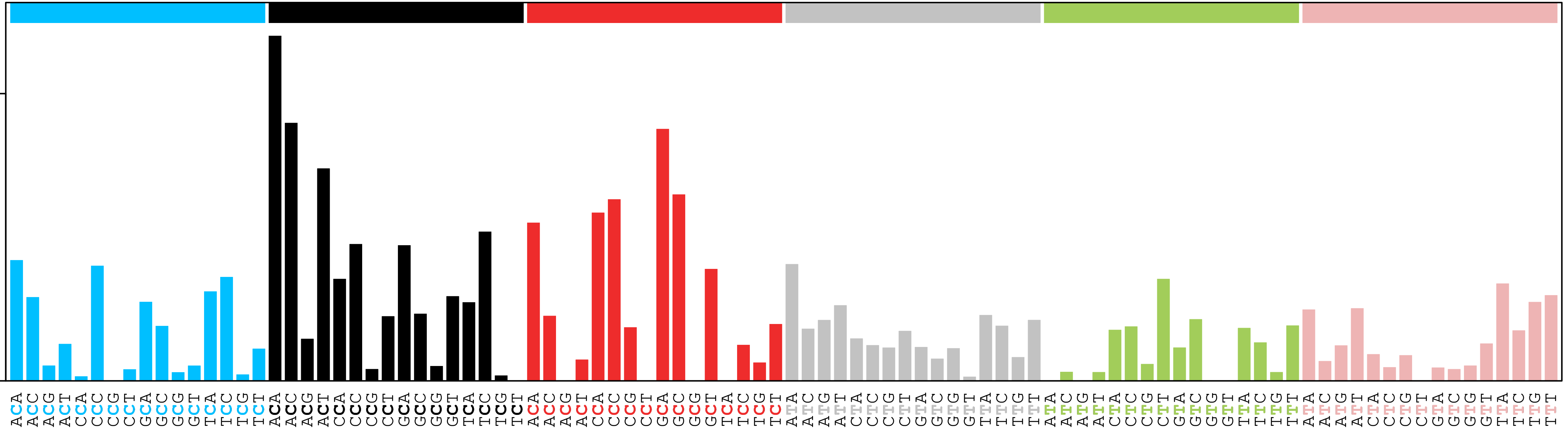
$$T > C$$

T>G

# Mutation probability

0.05

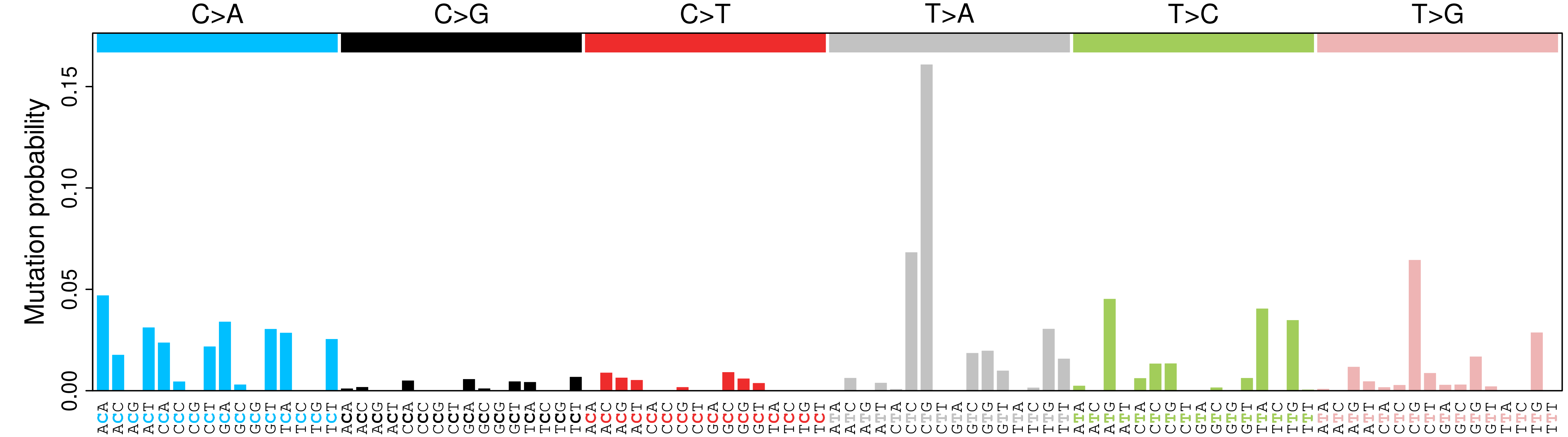
0.00



SBS132

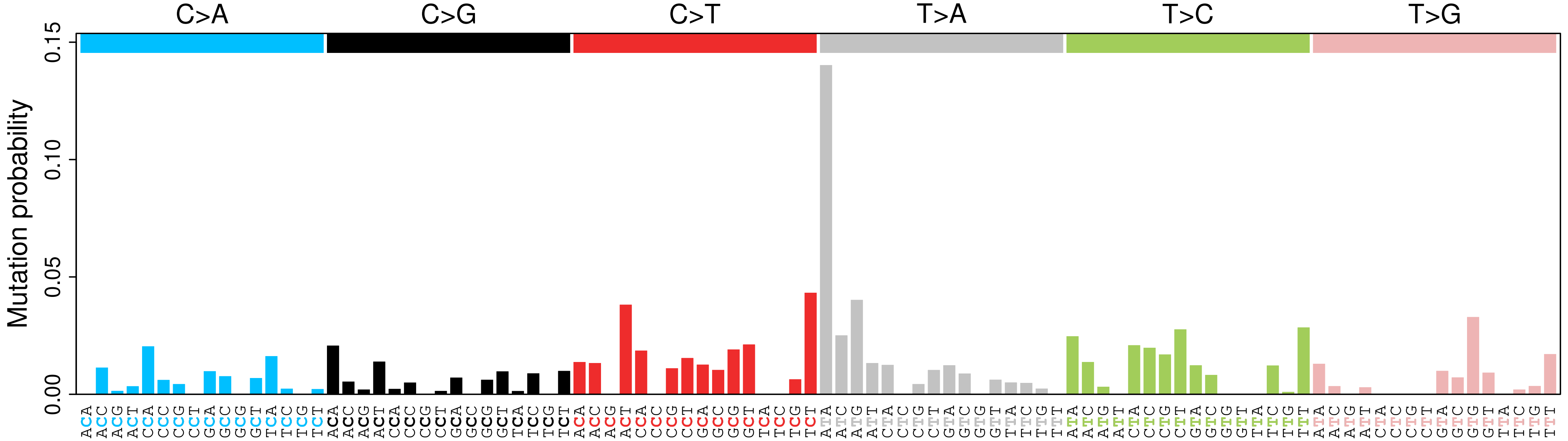


# SBS133



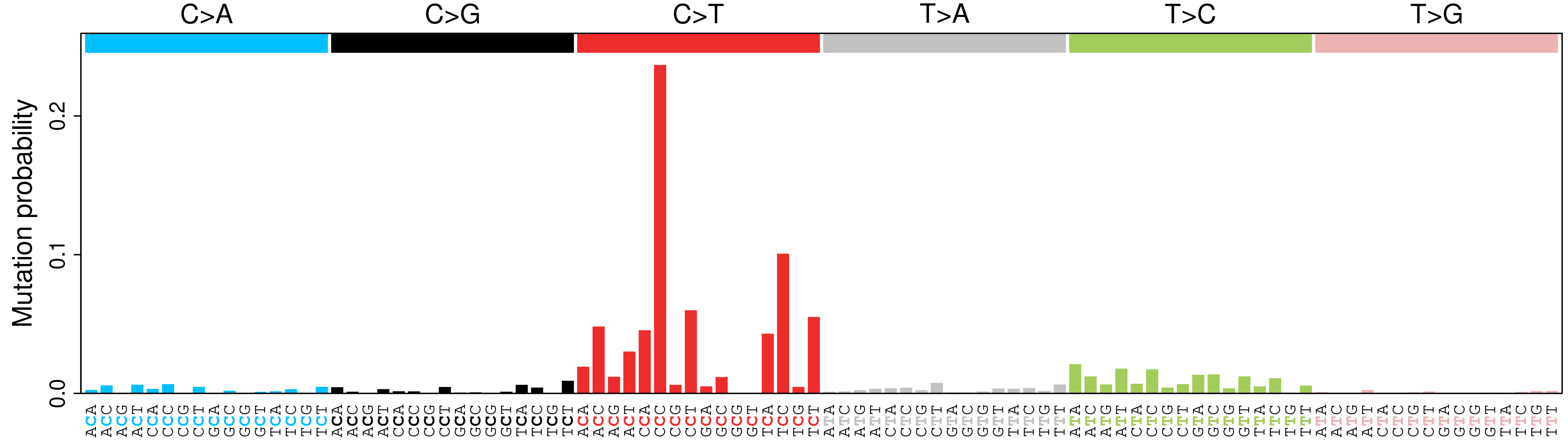


# SBS135





# SBS137



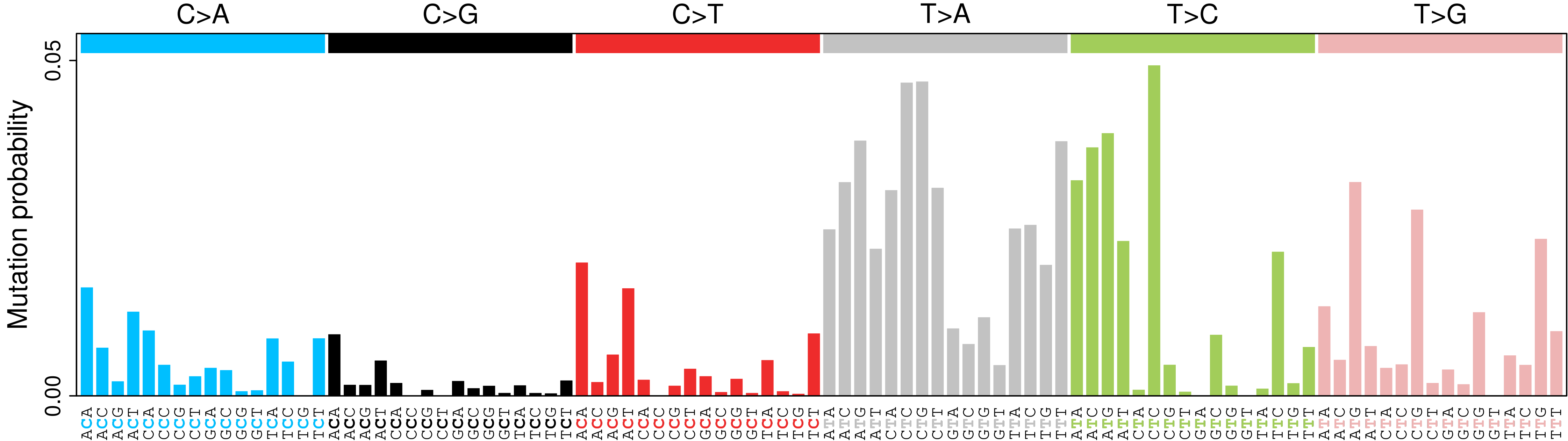








# SBS141



# SBS142

C>A

C>G

C>T

T>A

T>C

T>G

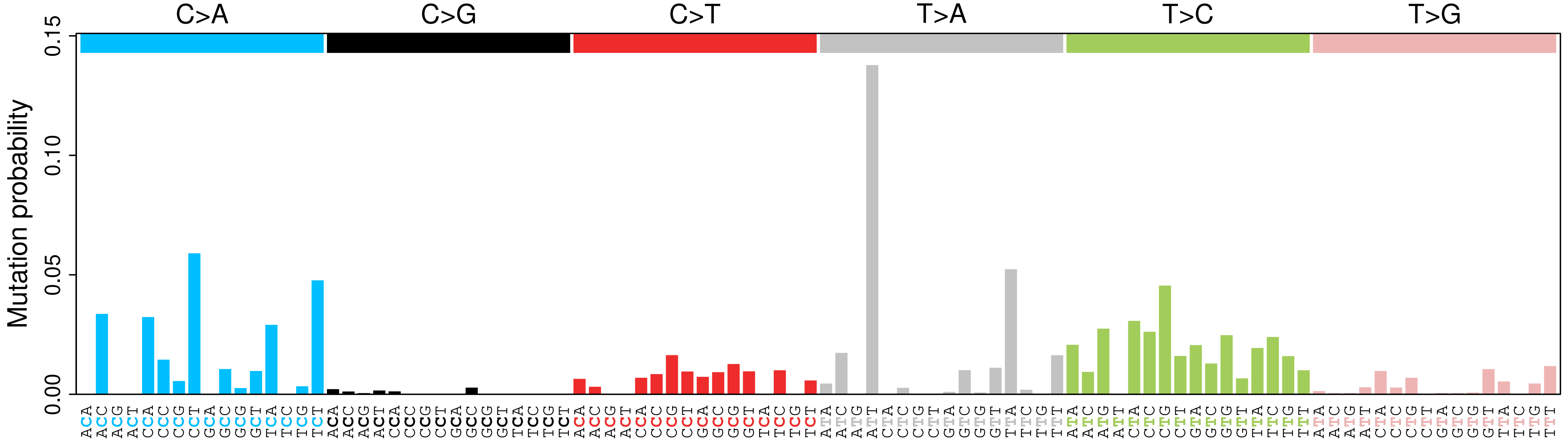
Mutation probability

0.05

0.00

ACA ACC ACG ACT CCA CCC CCG CCT GCA GCG GGT GCT TCA TCC TCG TCT TTA TAC TAT TAA TGA TGC TGT 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 TTA TTC TTG TTT ATA ATC ATG ATT CTA CTC CTG CTT TTA TTC TTG TTT

# SBS143



# SBS144

**C > A**

C > G

$$C > T$$

**T > A**

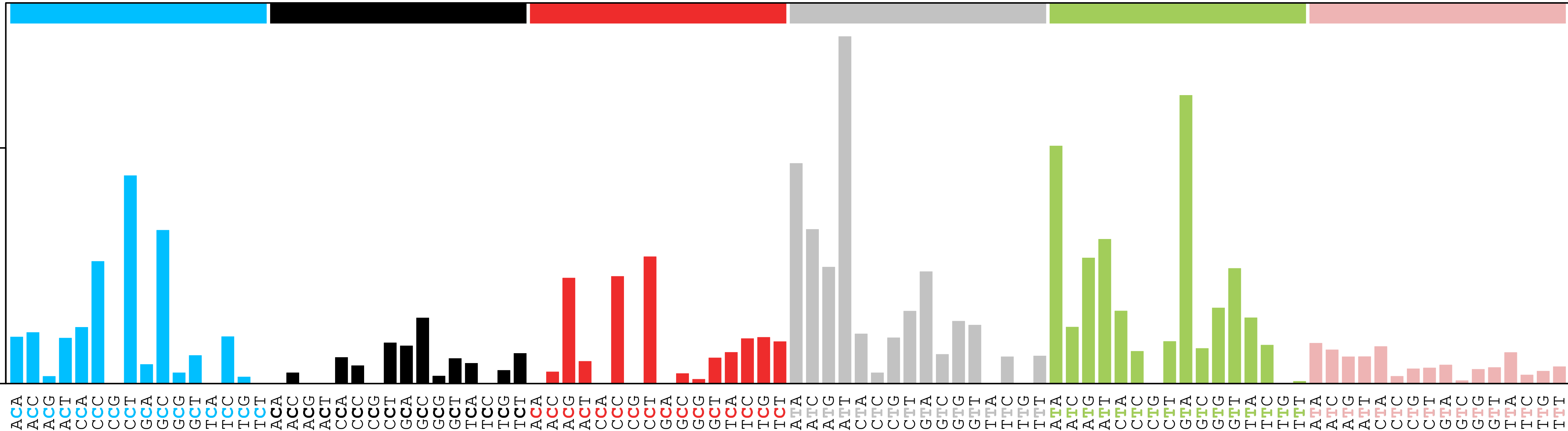
$T > C$

T>G

# Mutation probability

0.05

0.00

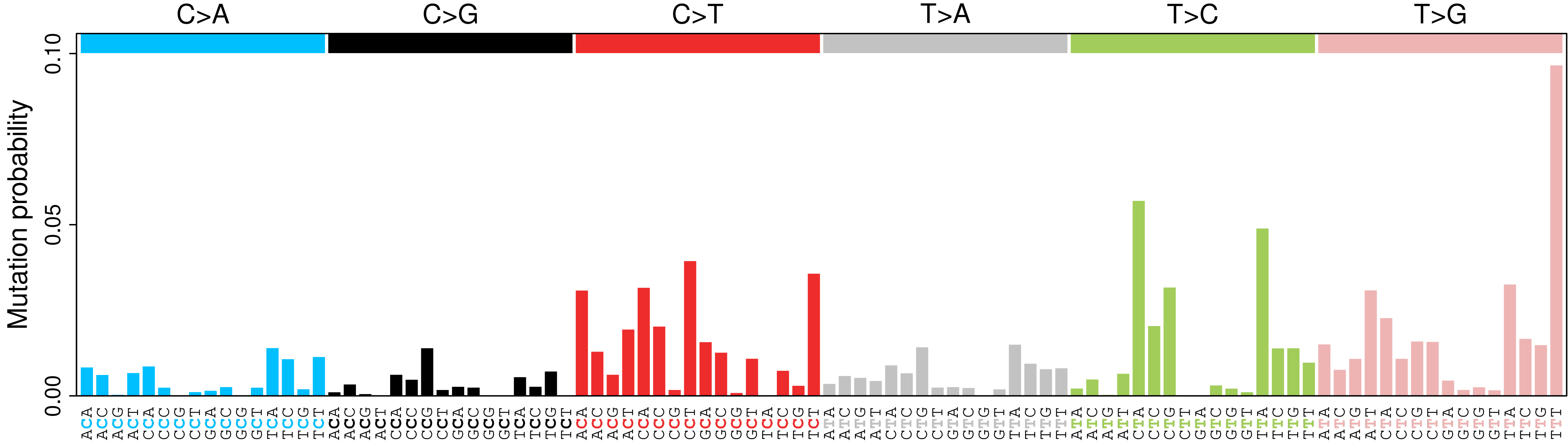








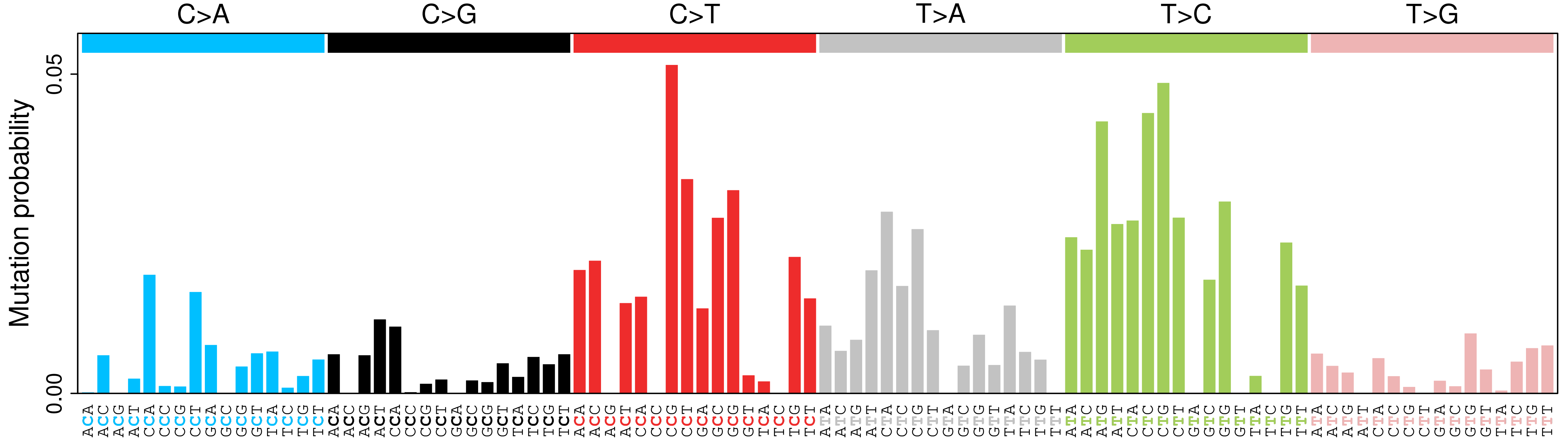
# SBS147







SBS150



# SBS151

$C > A$

C > G

C>T

**T > A**

$T > C$

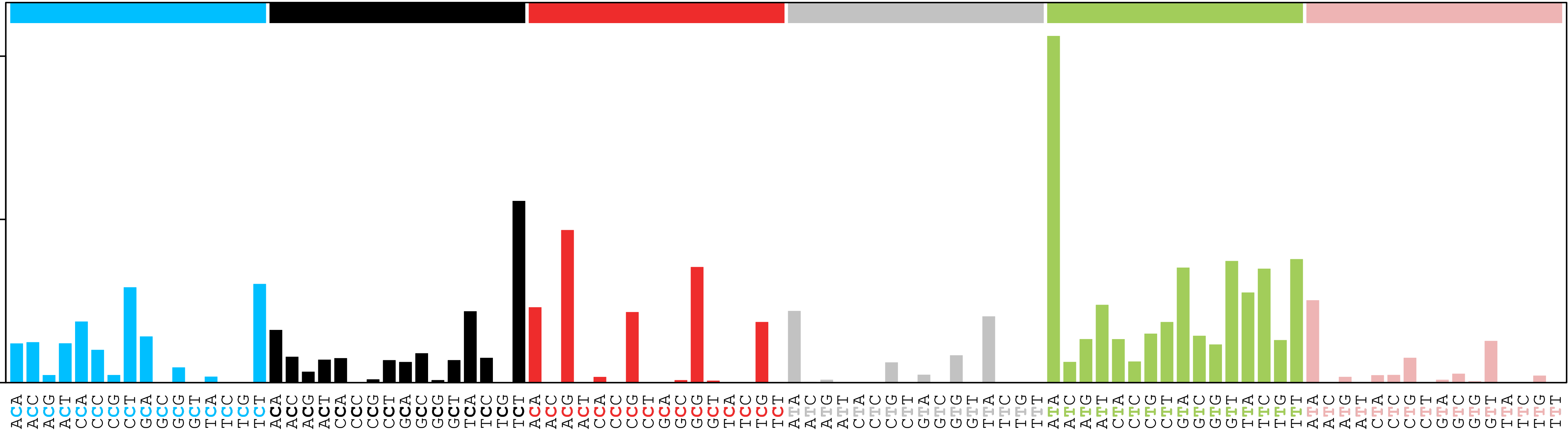
T>G

# Mutation probability

0.10

0.05

0.00



# SBS152

$C > A$

C > G

$C > T$

**T>A**

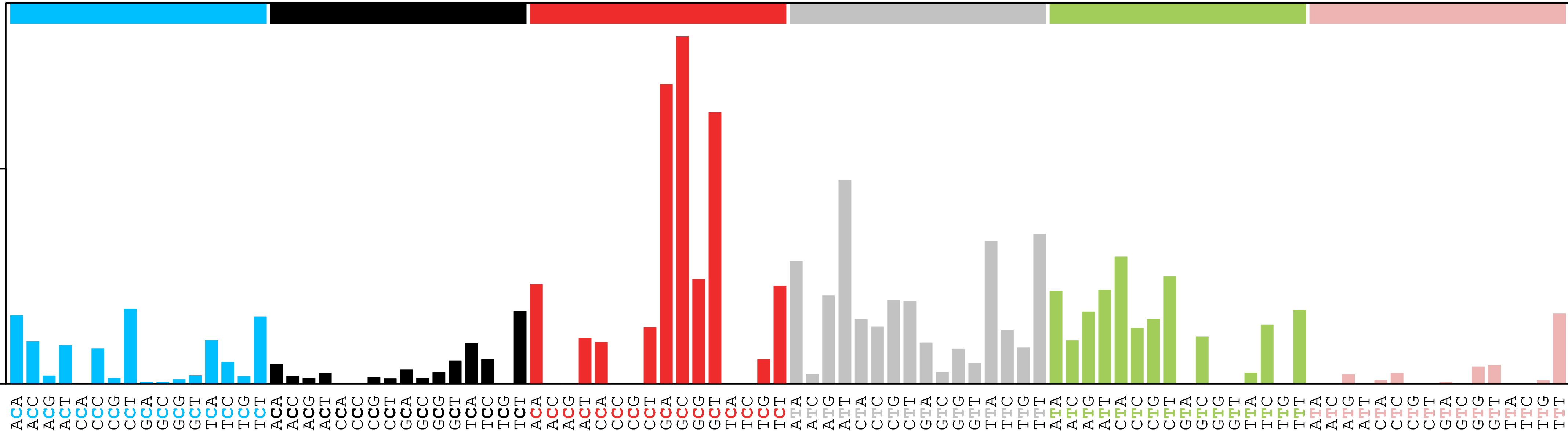
 $T > C$ 

T>G

# Mutation probability

0.05

0.00



# SBS153

**C > A**

C > G

$C > T$

**T > A**

$T > C$

T > G

# Mutation probability

0.05

0.00

[illegible]



# SBS154





# SBS156

**C > A**

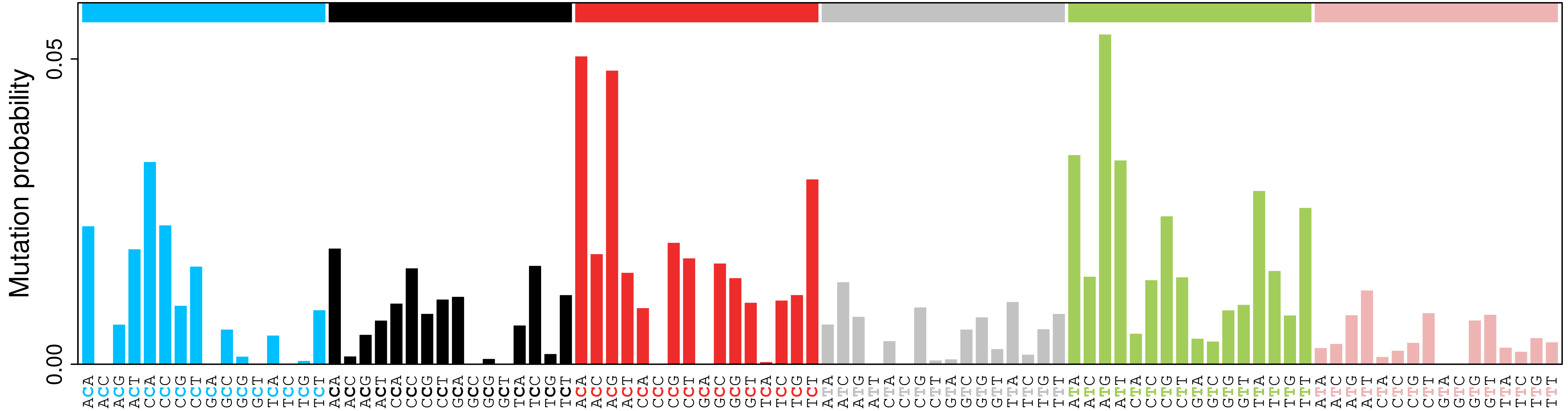
C > G

$C > T$

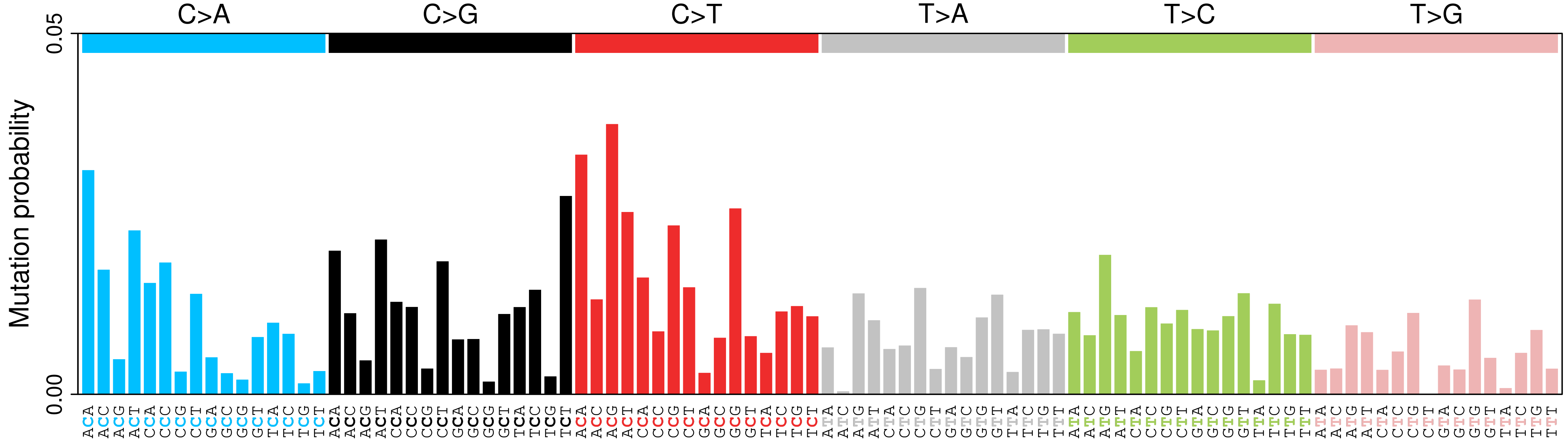
**T > A**

$T > C$

T>G



# SBS157



# SBS158

**C > A**

C > G

$$C > T$$

**T > A**

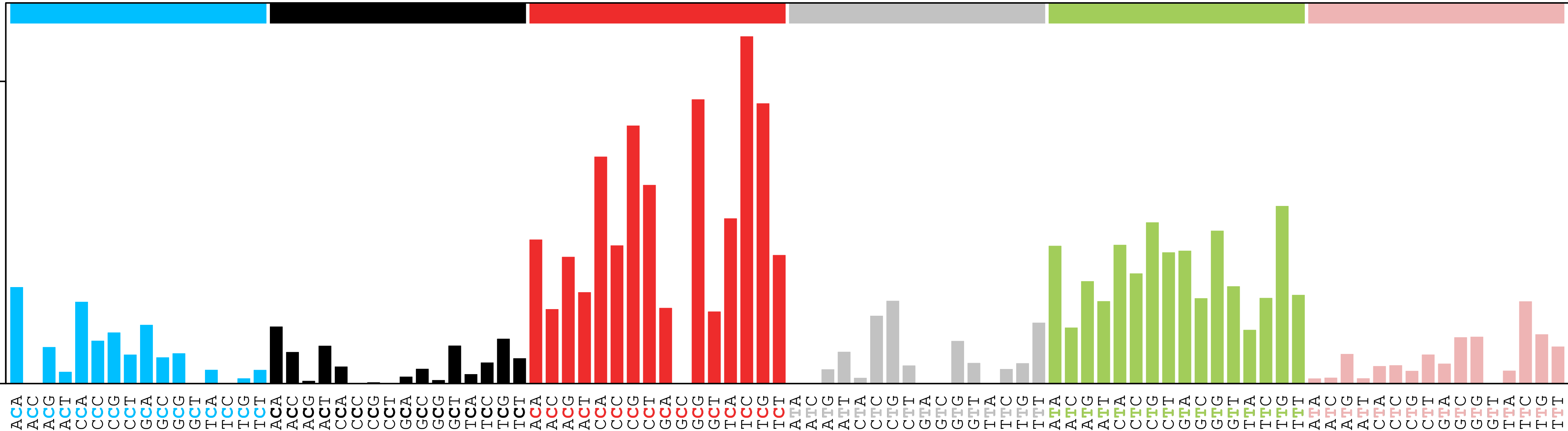
$$T > C$$

T > G

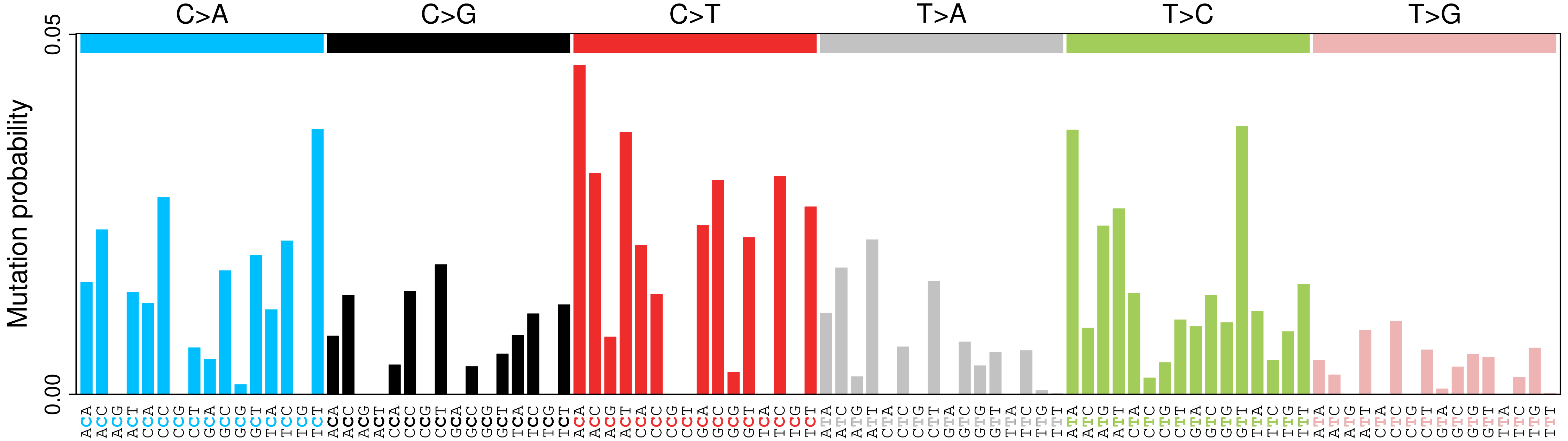
# Mutation probability

0.05

0.00



# SBS159





# SBS161

$C > A$

C > G

$C > T$

**T > A**

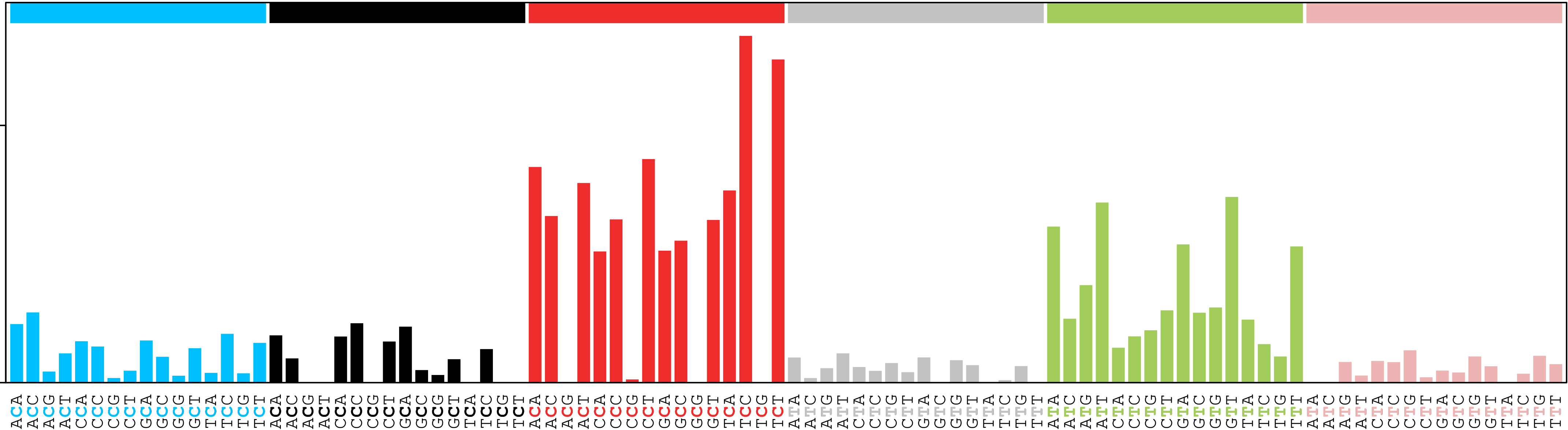
$T > C$

T>G

# Mutation probability

0.05

0.00





# SBS162

$C > A$

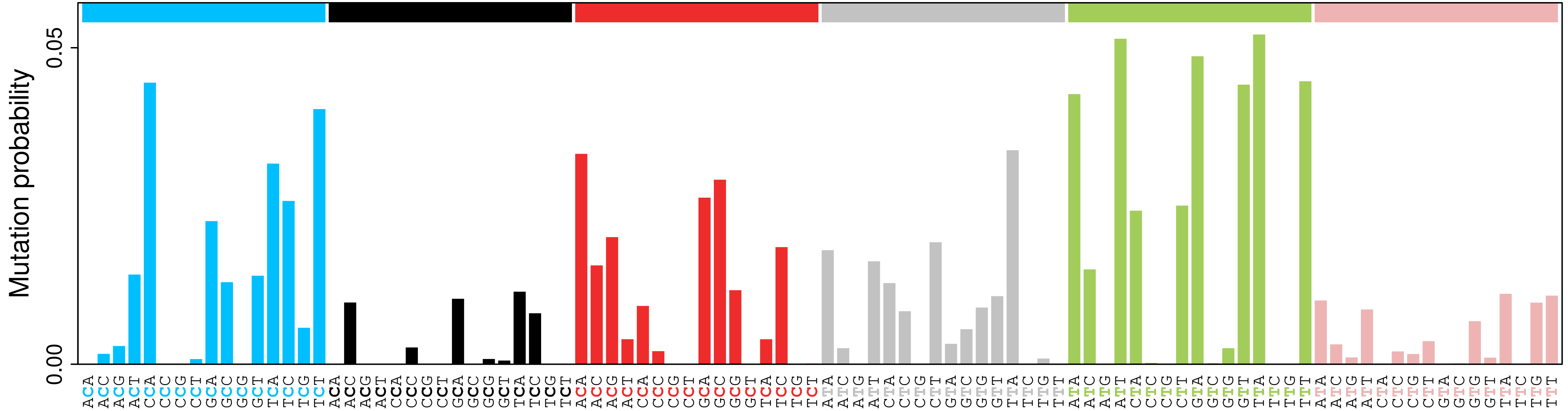
C > G

$C > T$

**T > A**

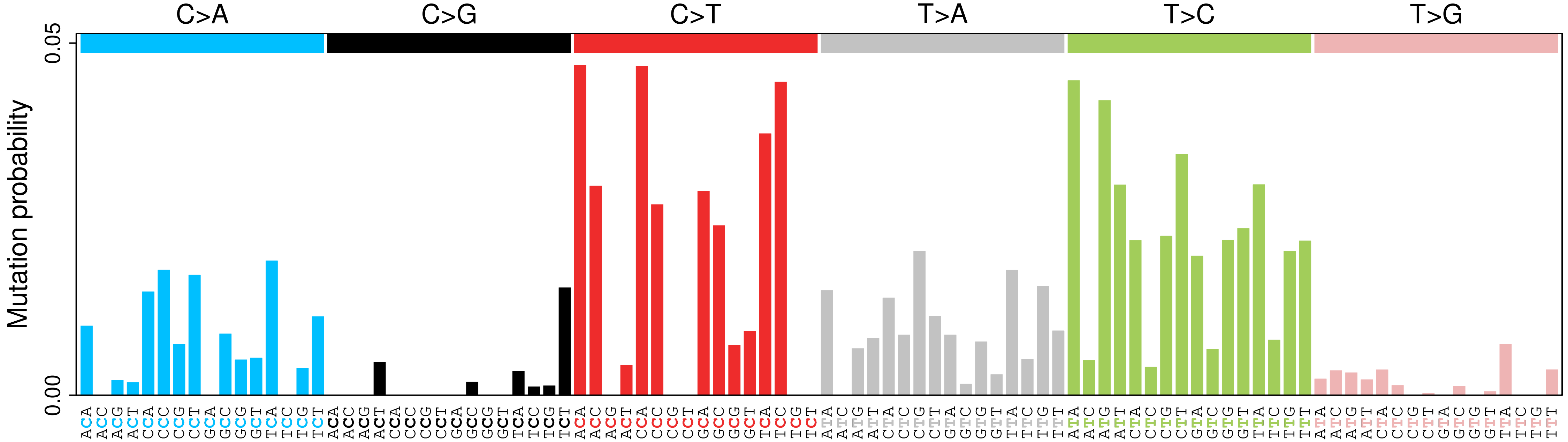
$T > C$

T > G





# SBS164





# SBS166

**C > A**

C > G

$C > T$

**T > A**

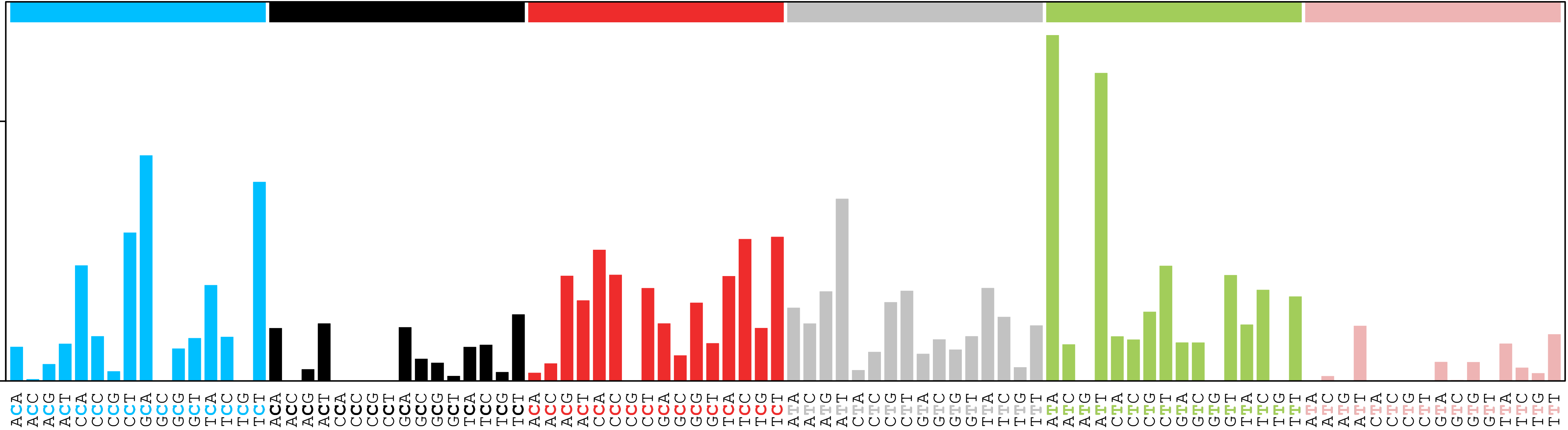
$T > C$

T>G

# Mutation probability

0.05

0.00



# SBS167

$C > A$

C > G

$C > T$

**T > A**

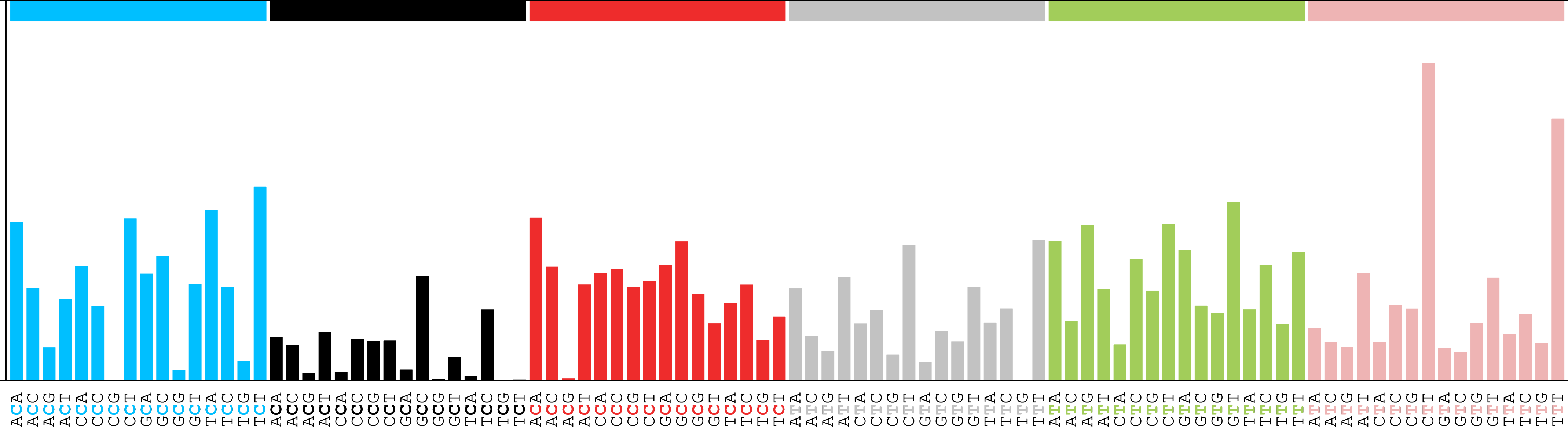
$$T > C$$

**T>G**

0.05

# Mutation probability

0.00





# SBS169

