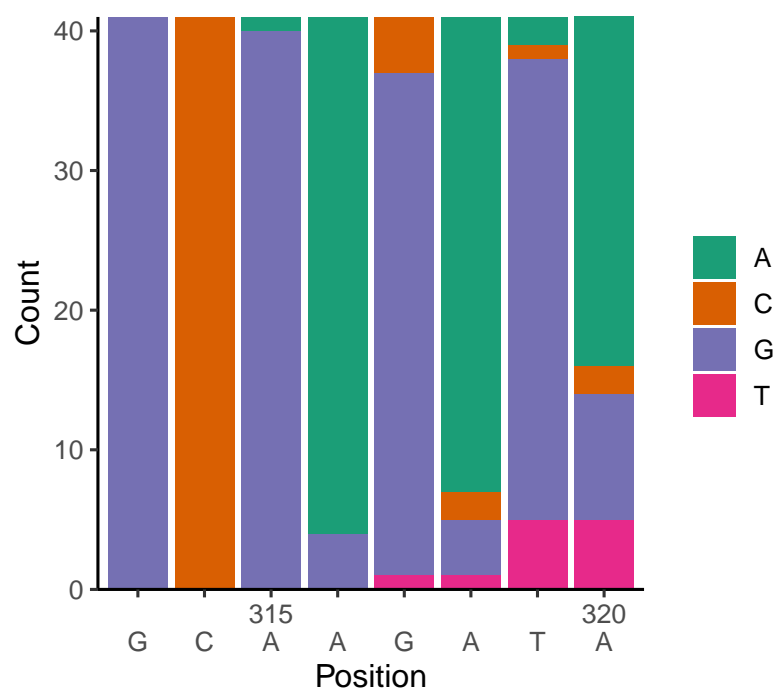
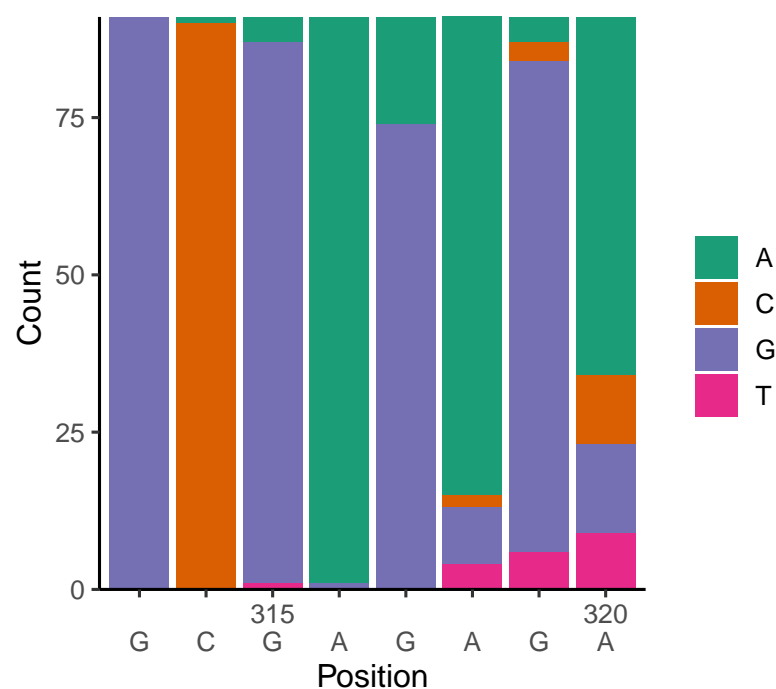


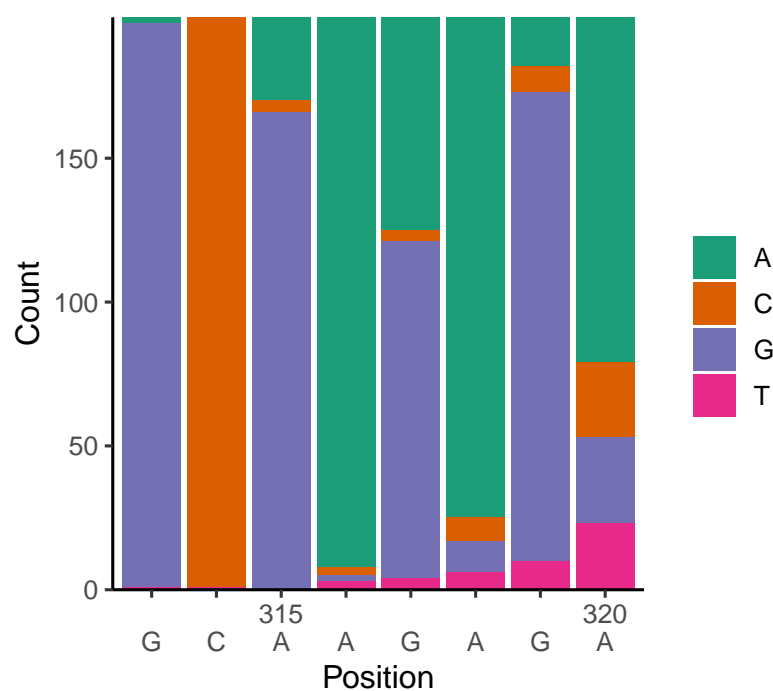
Gene IGHV1-45\*02\_A297G\_A301G



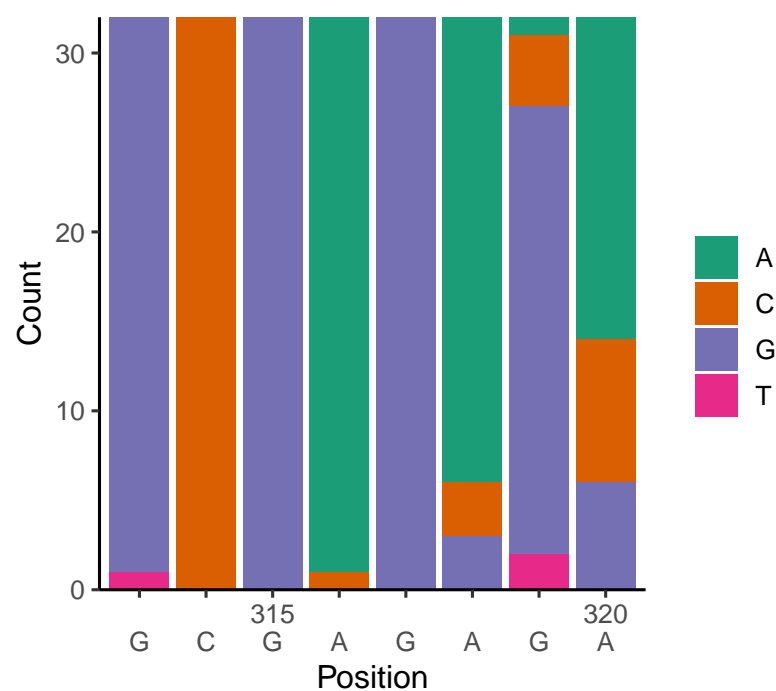
Gene IGHV3-20\*04\_T279C\_C300T\_T301



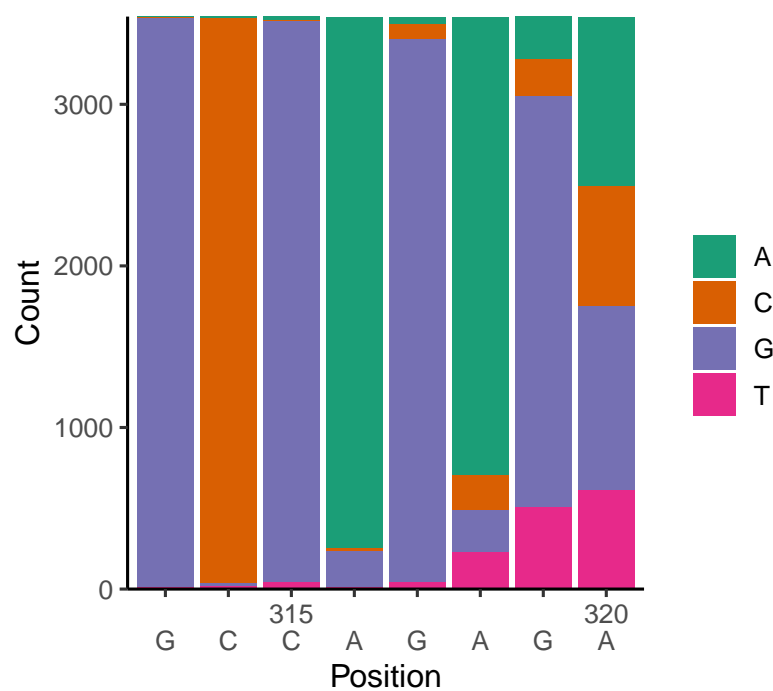
Gene IGHV3-13\*01\_G290A



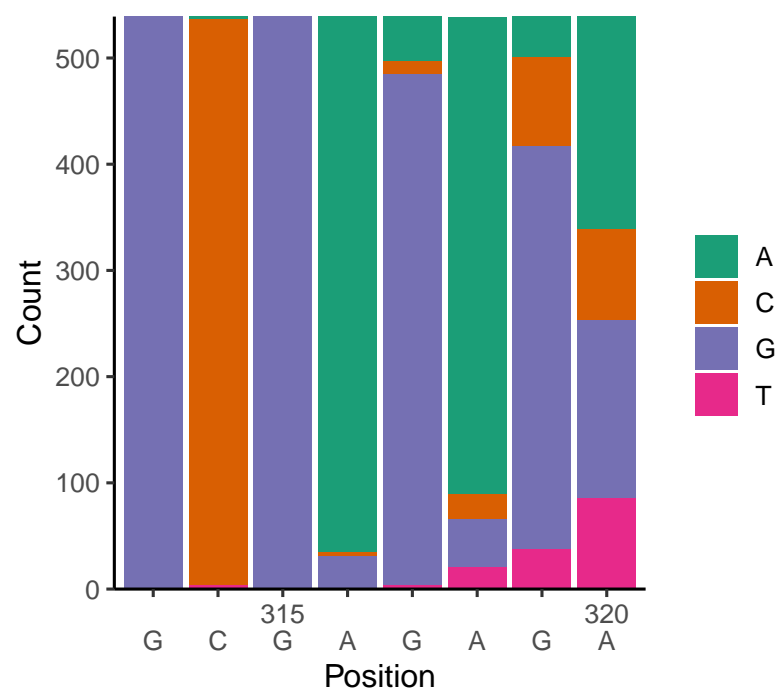
Gene IGHV3-20\*04\_C258A\_T279C\_C300



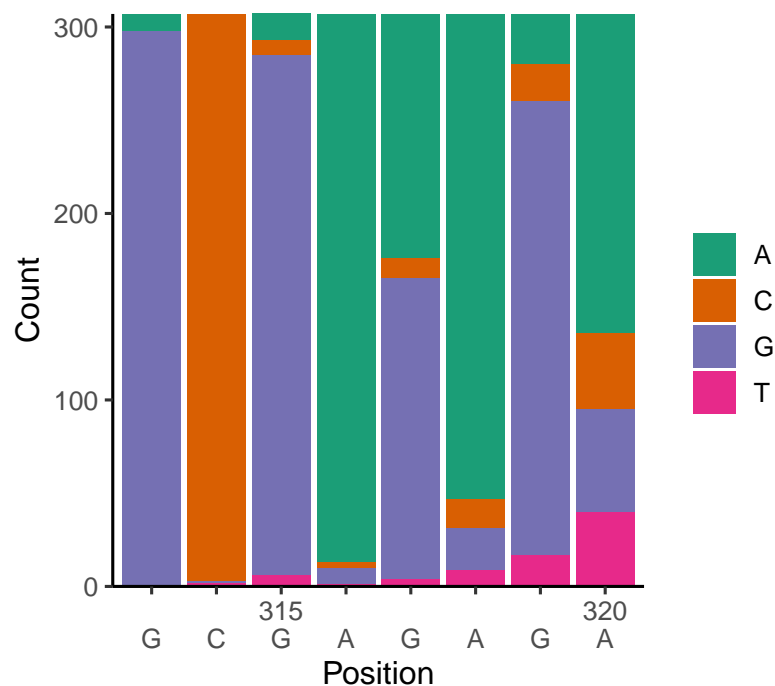
Gene IGHV4-30-2\*01\_C285T



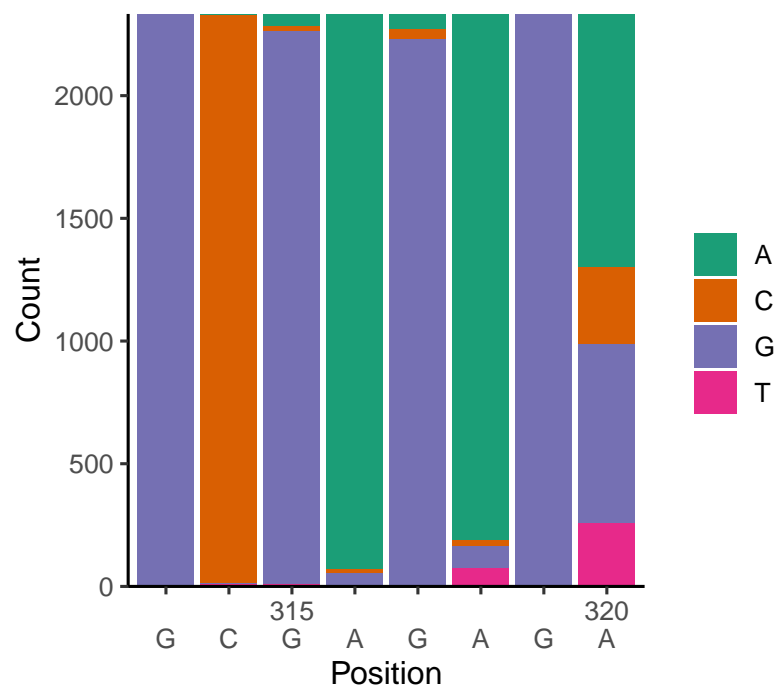
Gene IGHV6-1\*01\_A315G



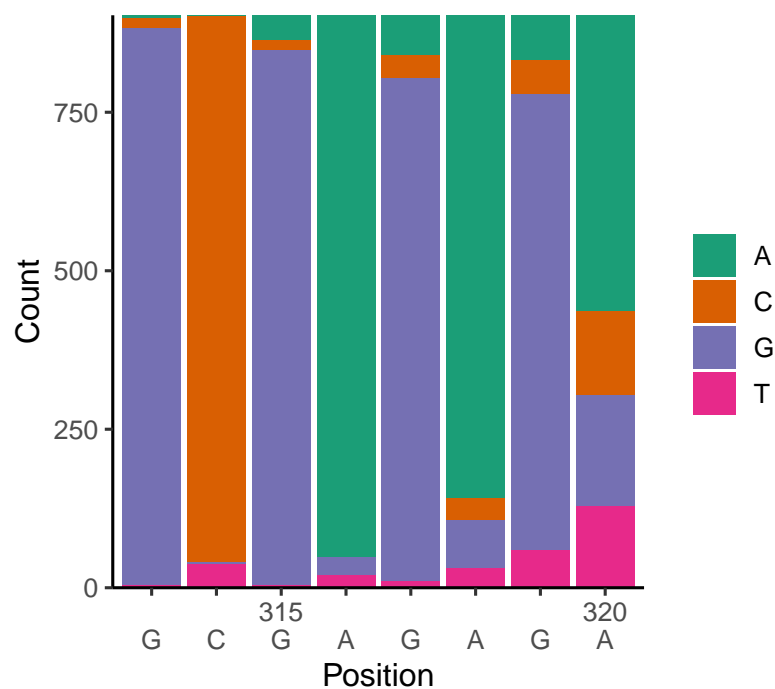
Gene IGHV3-64\*04\_A210C\_T288C



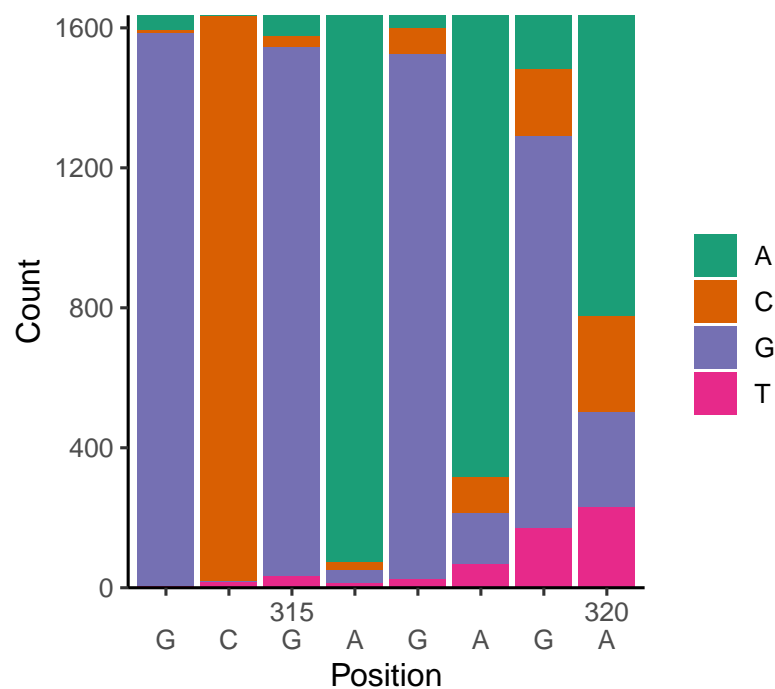
Gene IGHV4-39\*02\_C258G



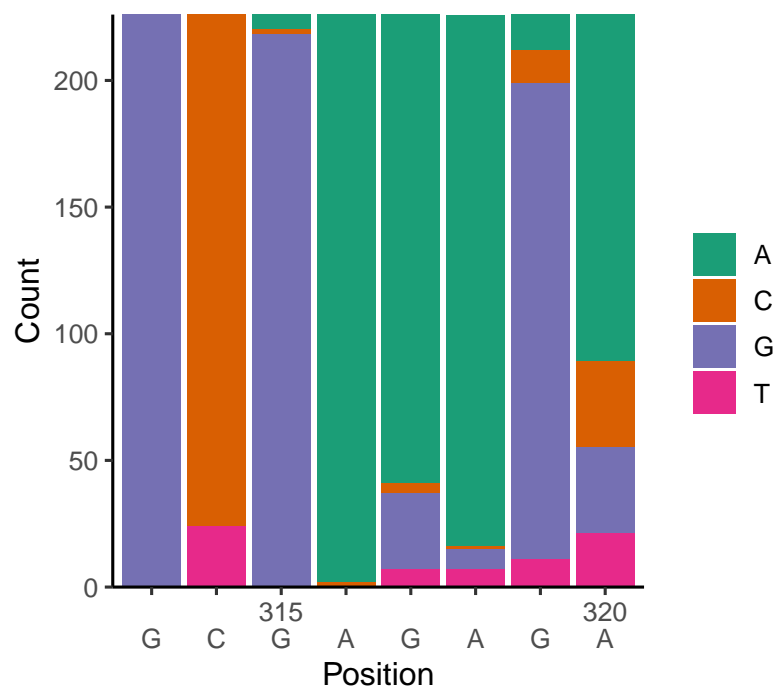
Gene IGHV3-66\*01\_G13T\_C39A\_A223C



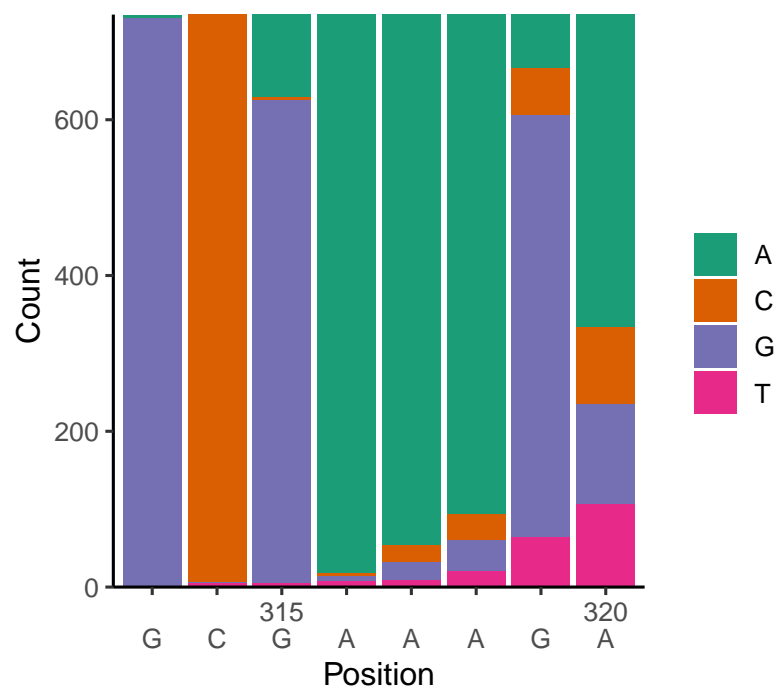
Gene IGHV3-30\*03\_T288C



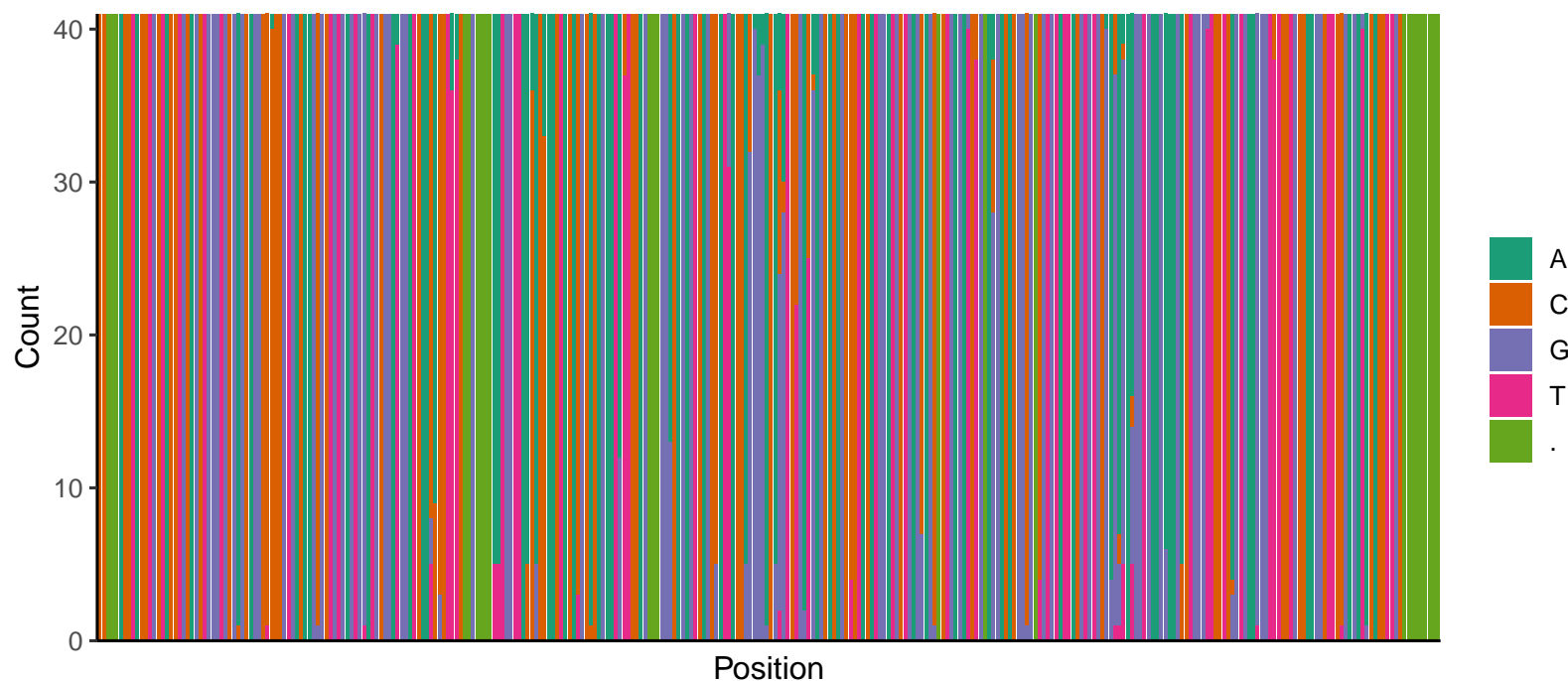
Gene IGHV3-66\*03\_T175G



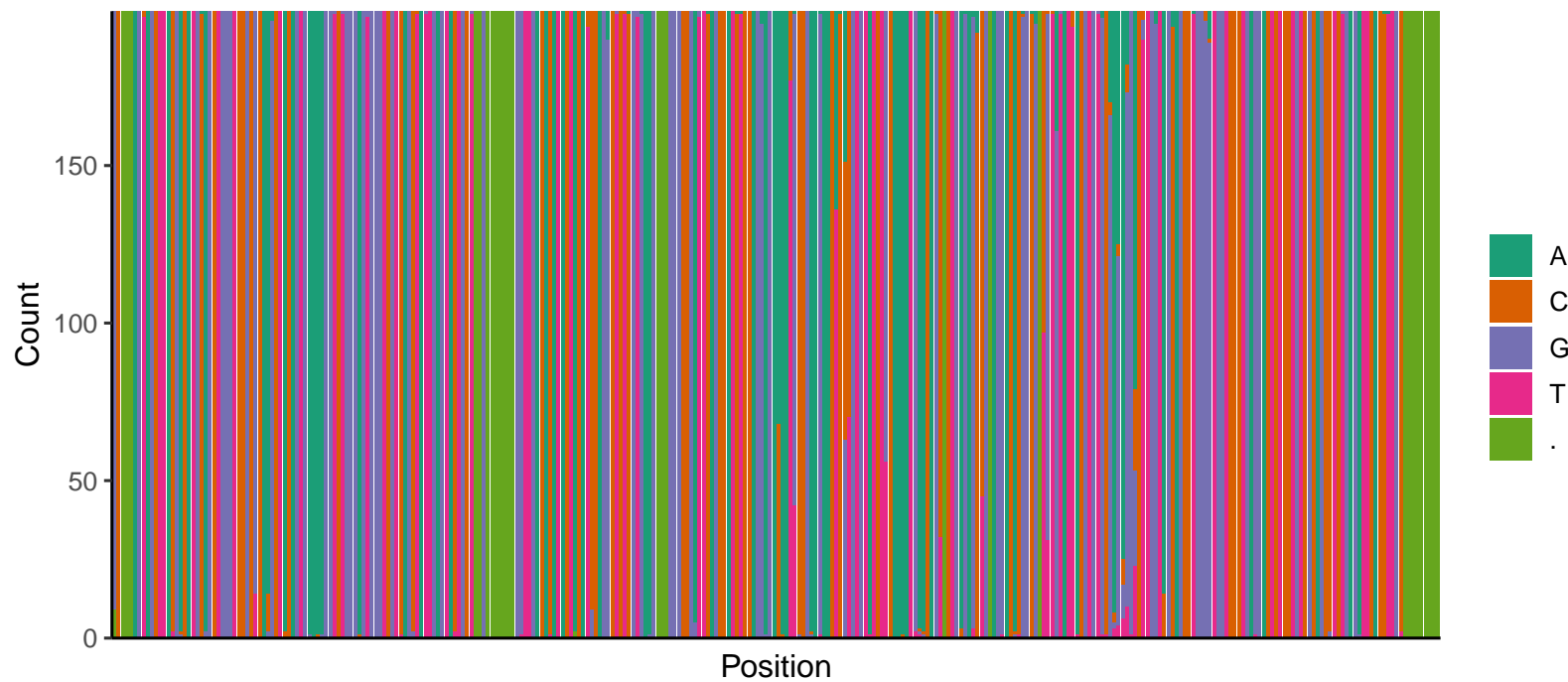
Gene IGHV3-33\*06\_T300C\_G303A



Gene IGHV1-45\*02\_A297G\_A301G



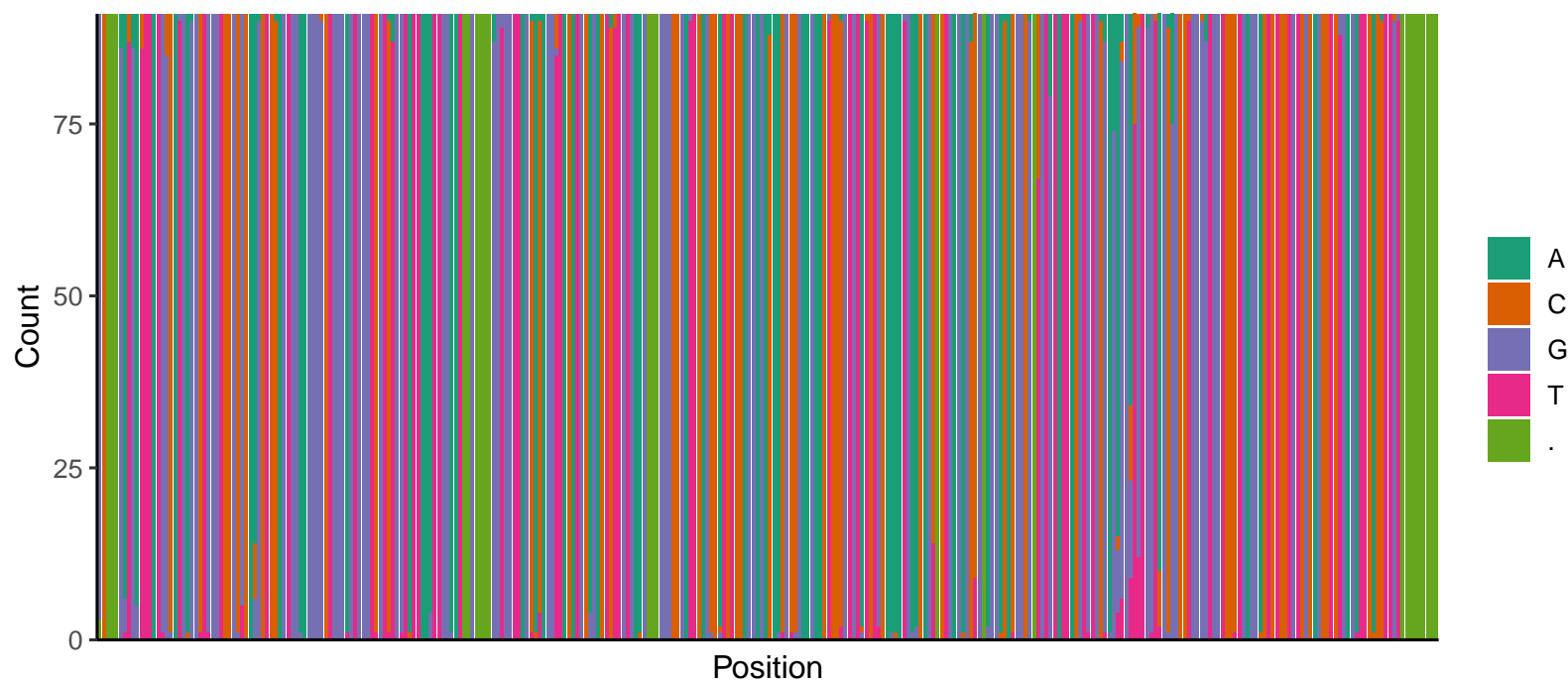
Gene IGHV3-13\*01\_G290A



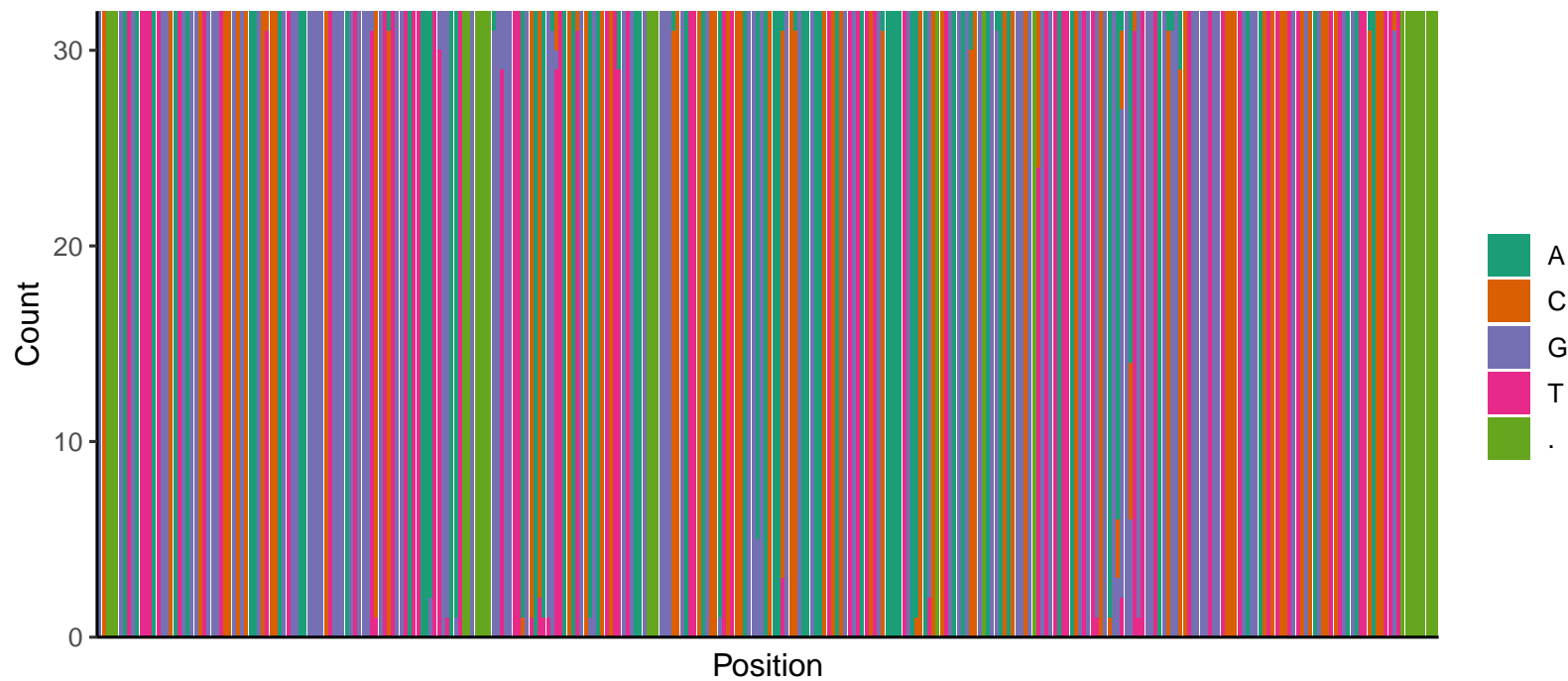
Gene IGHV4-30-2\*01\_C285T



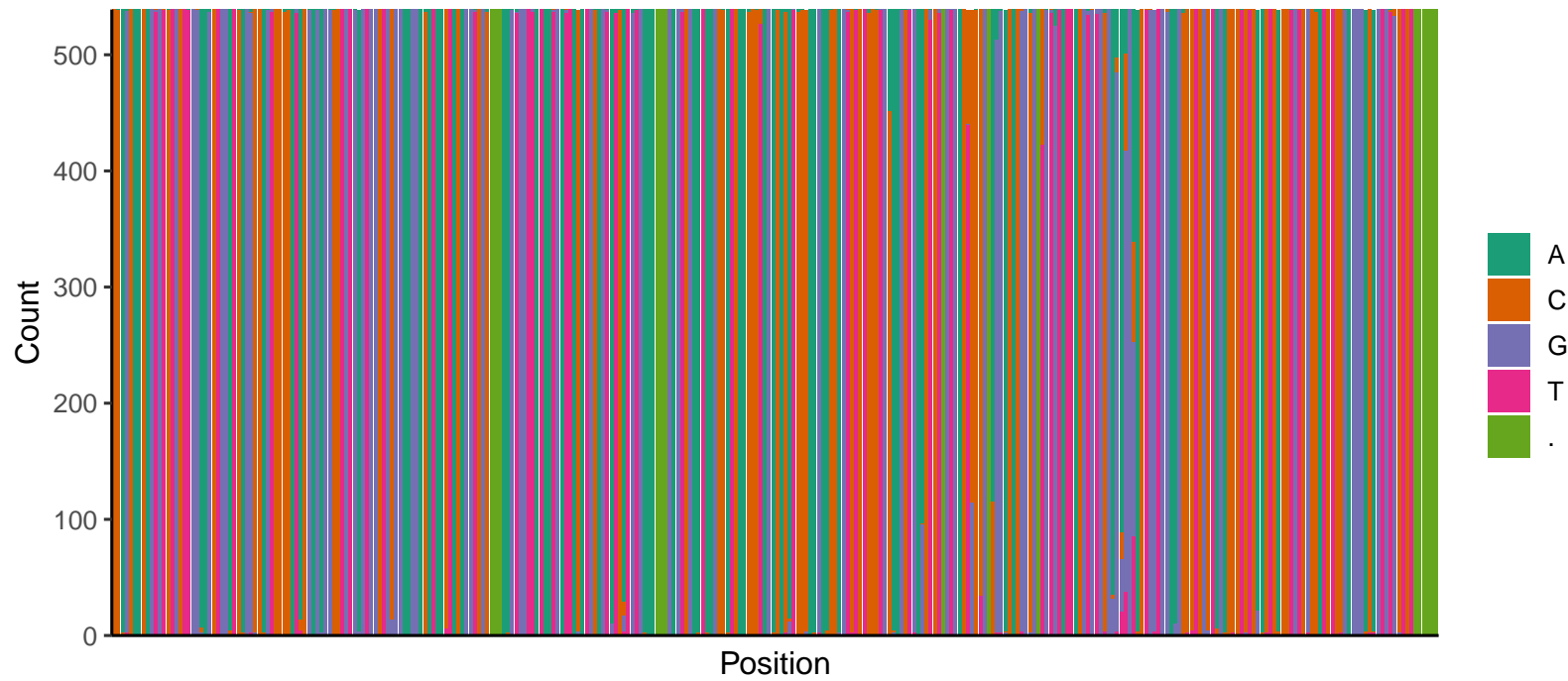
Gene IGHV3-20\*04\_T279C\_C300T\_T301G



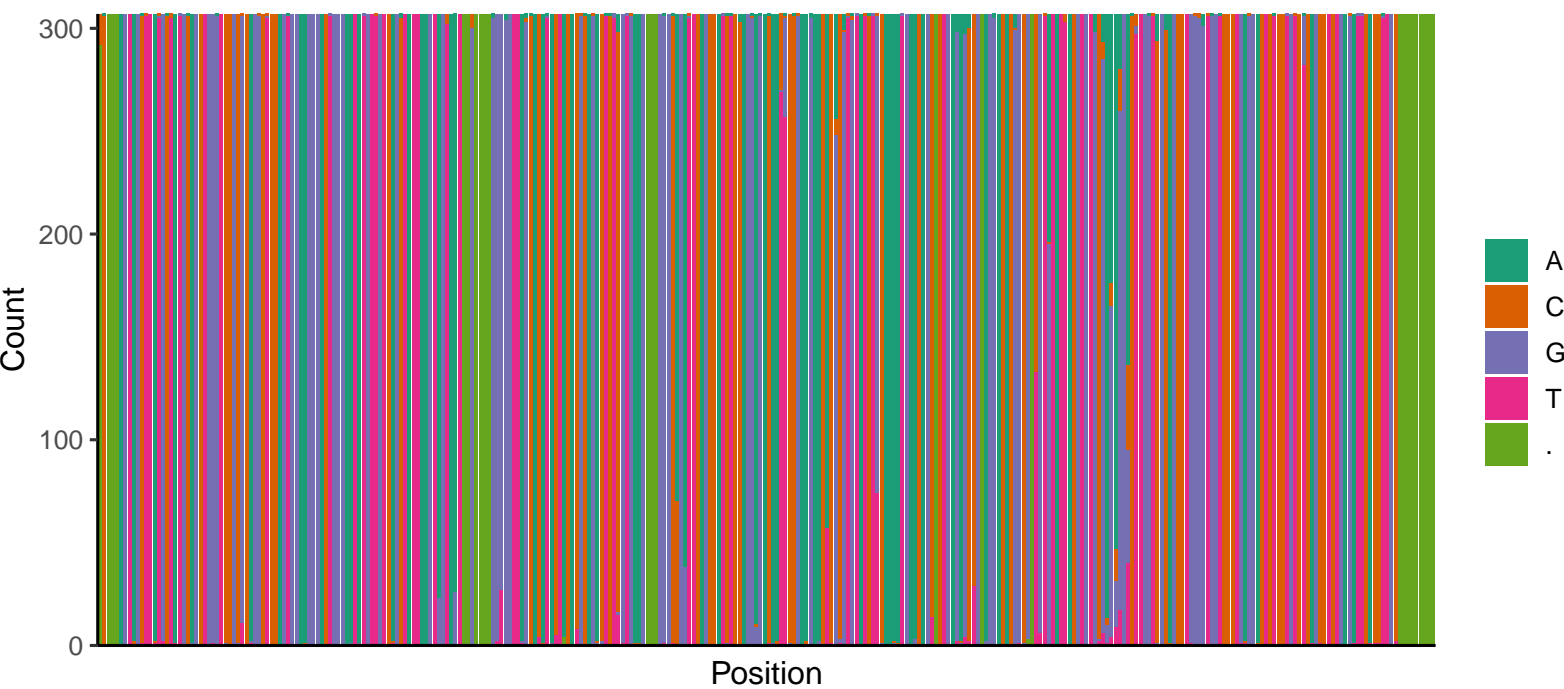
Gene IGHV3-20\*04\_C258A\_T279C\_C300T\_T301G



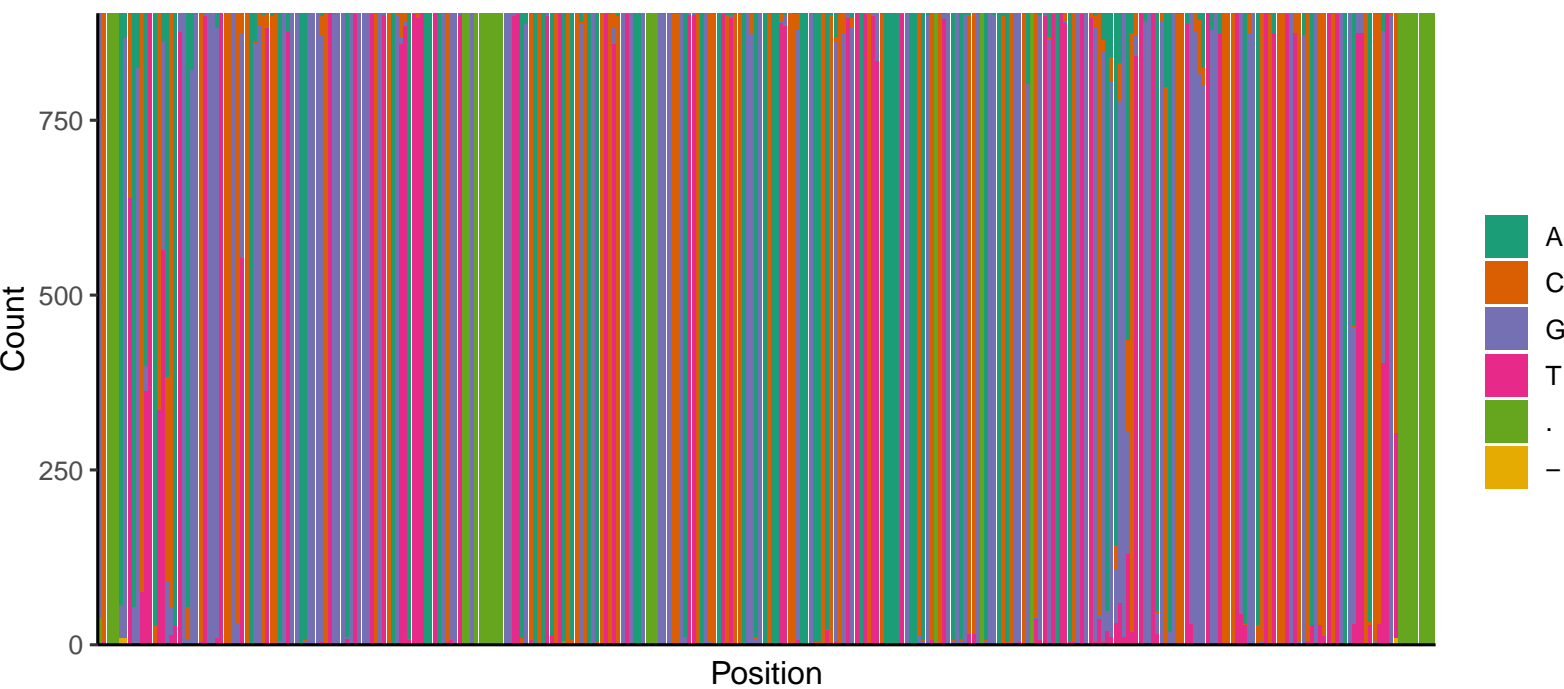
Gene IGHV6-1\*01\_A315G



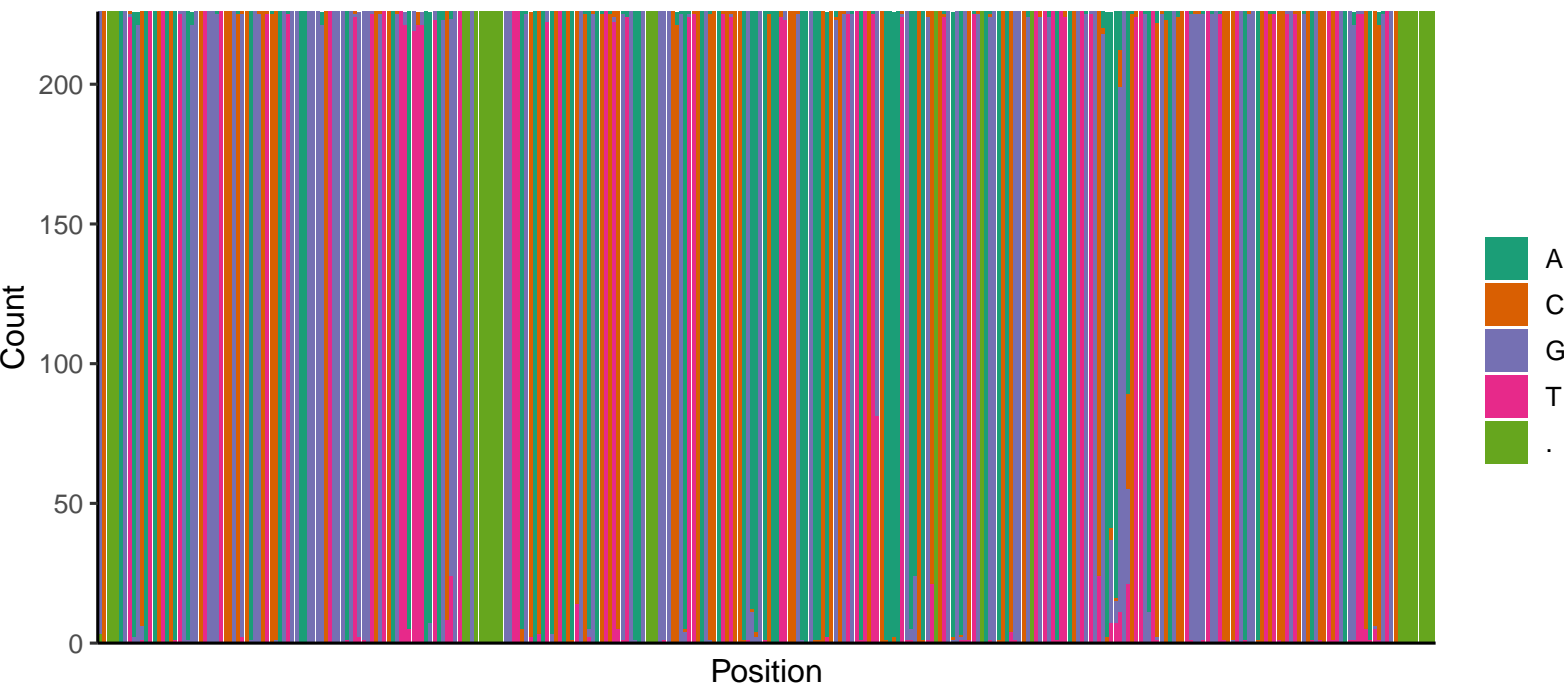
Gene IGHV3-64\*04\_A210C\_T288C



Gene IGHV3-66\*01\_G13T\_C39A\_A223C\_T300C



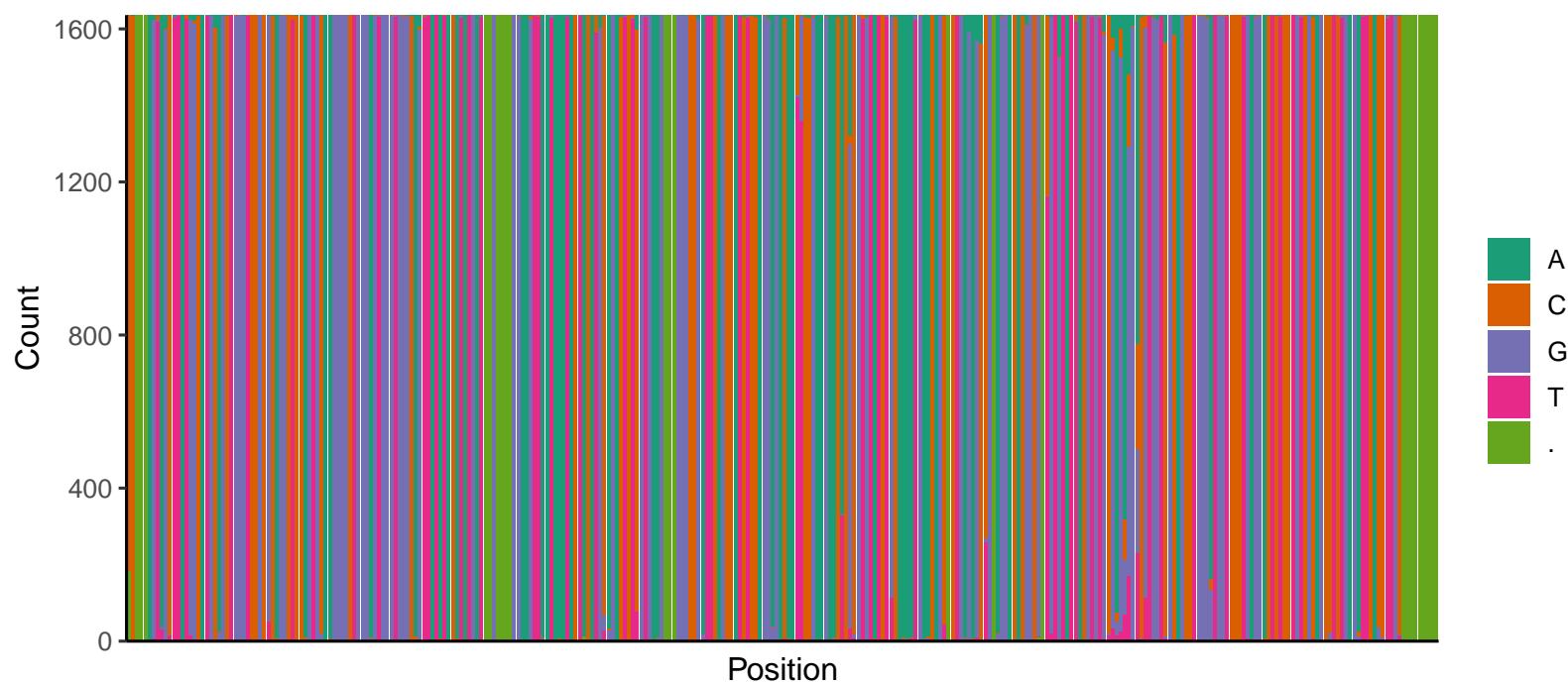
Gene IGHV3-66\*03\_T175G



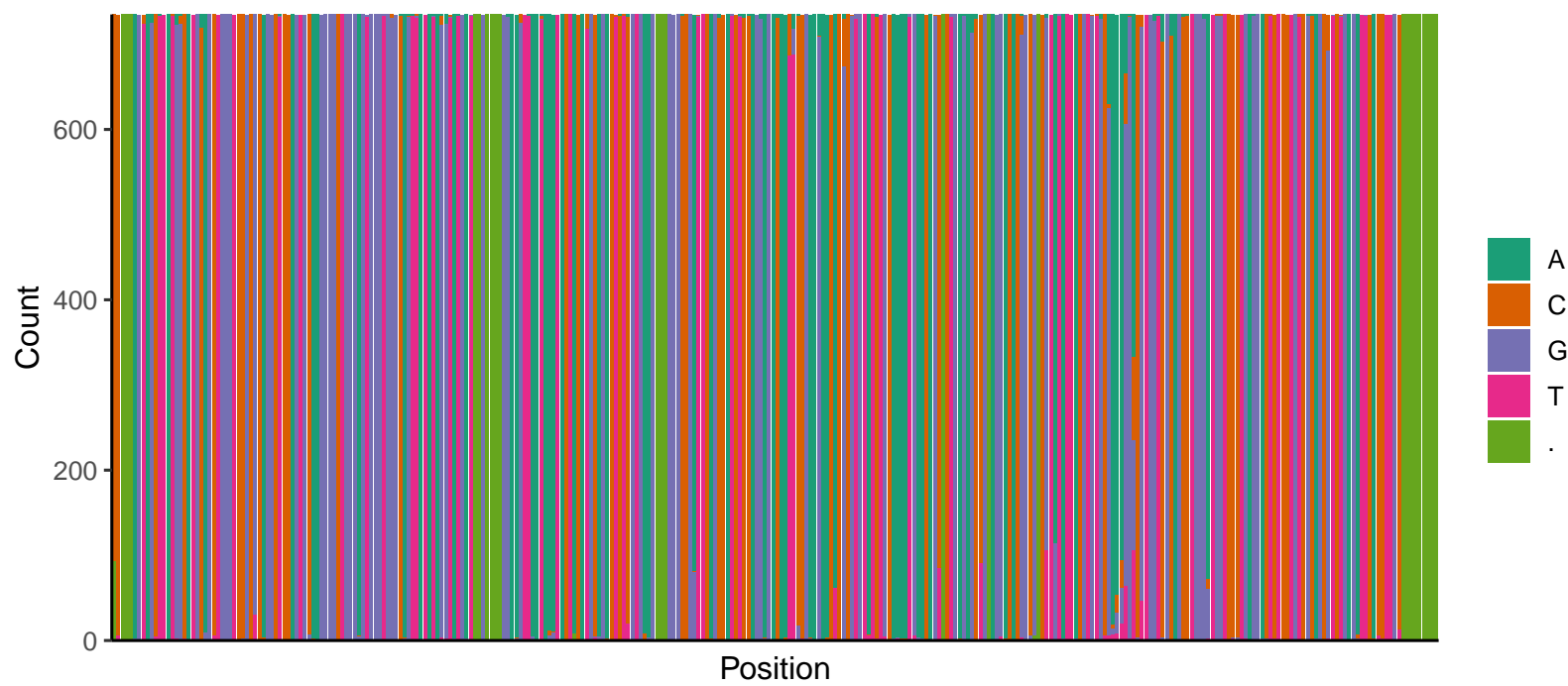
Gene IGHV4-39\*02\_C258G



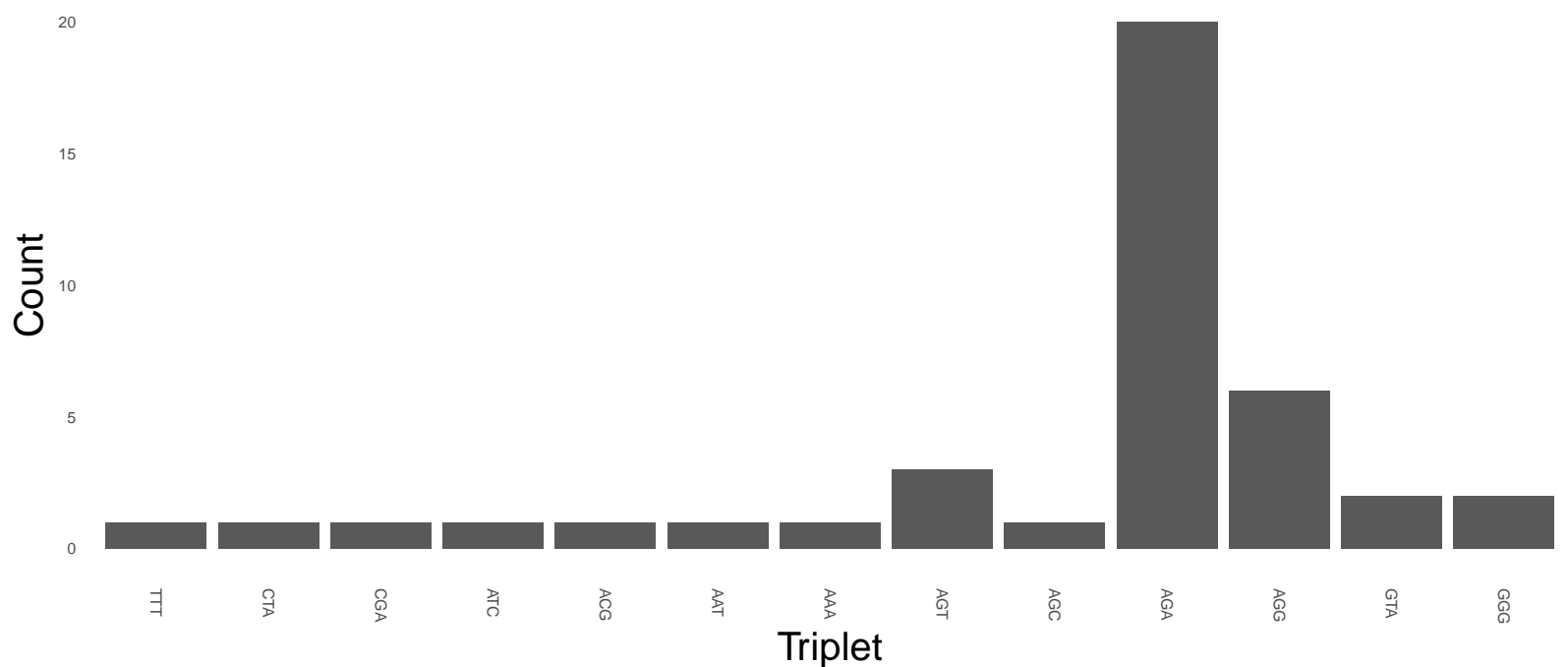
Gene IGHV3-30\*03\_T288C



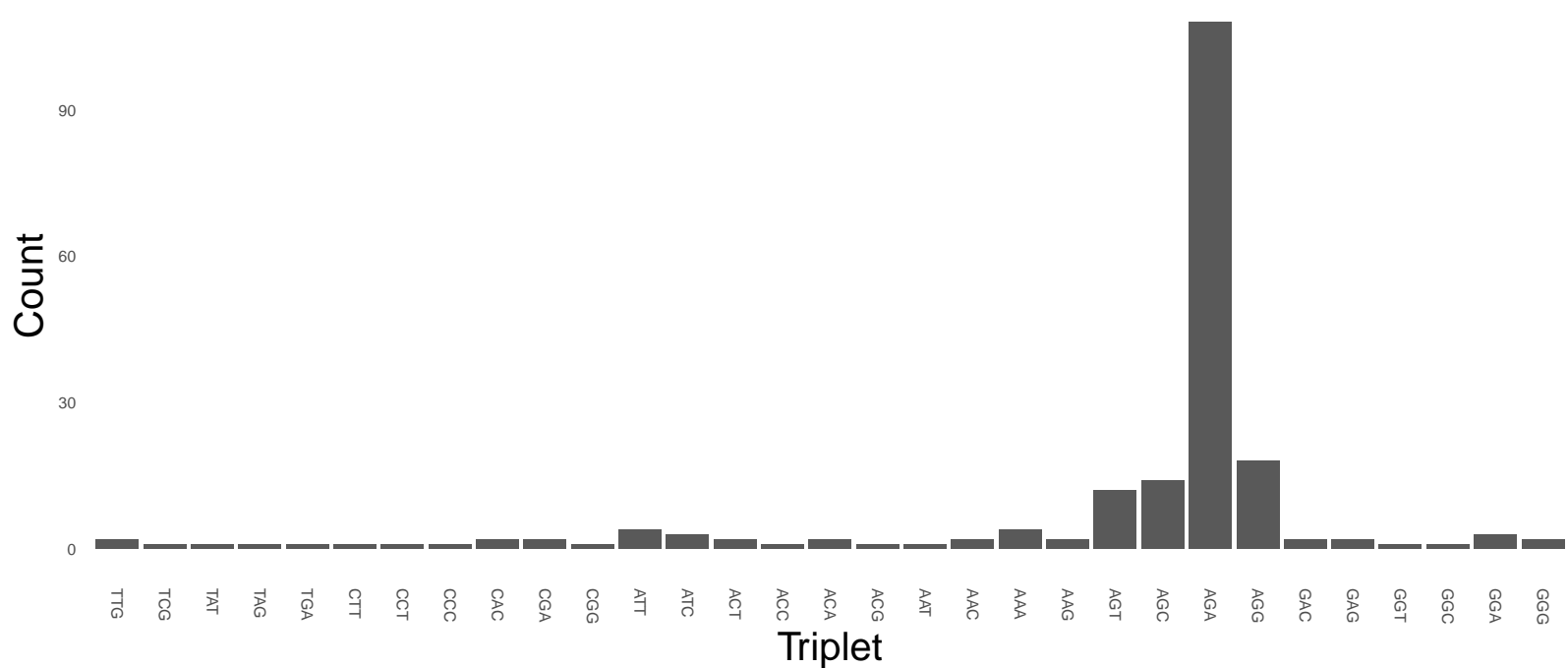
Gene IGHV3-33\*06\_T300C\_G303A



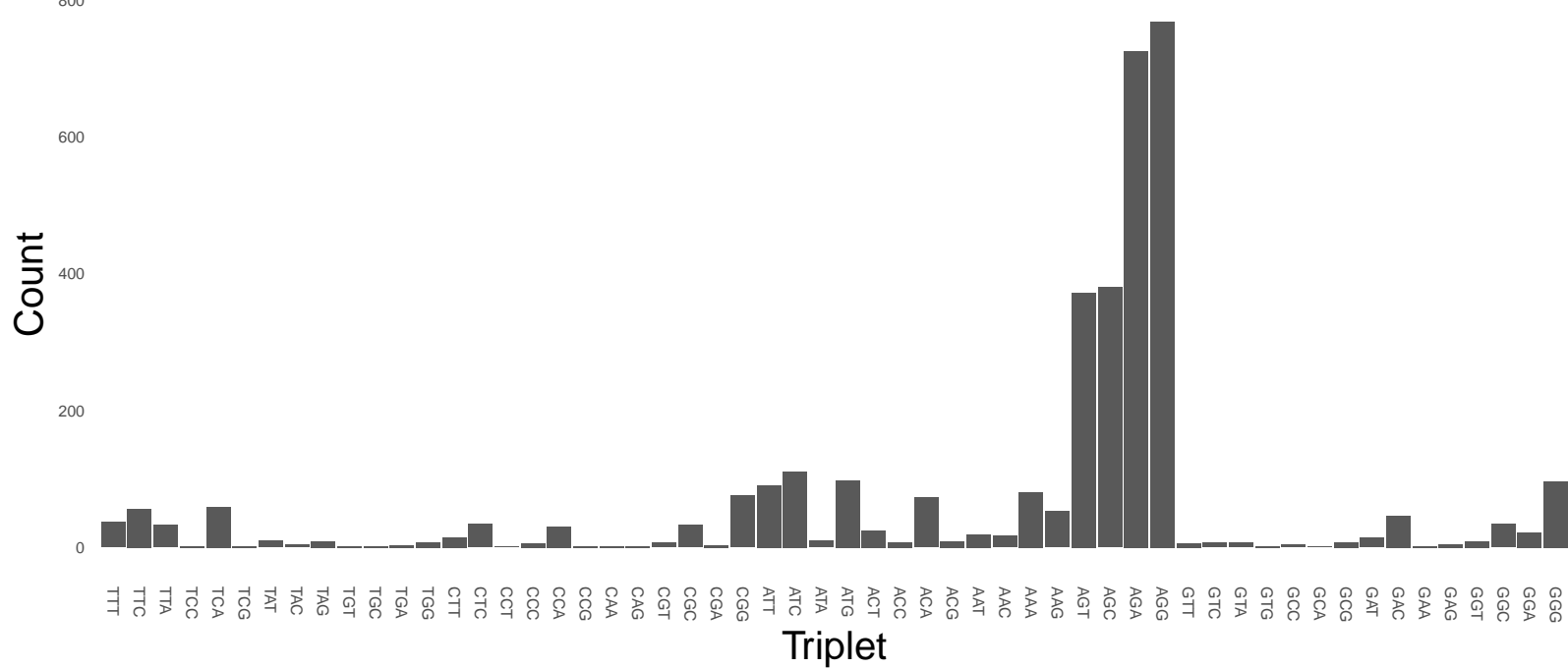
IGHV1-45\*02\_A297G\_A301G- Final 3 nucleotides as a triplet



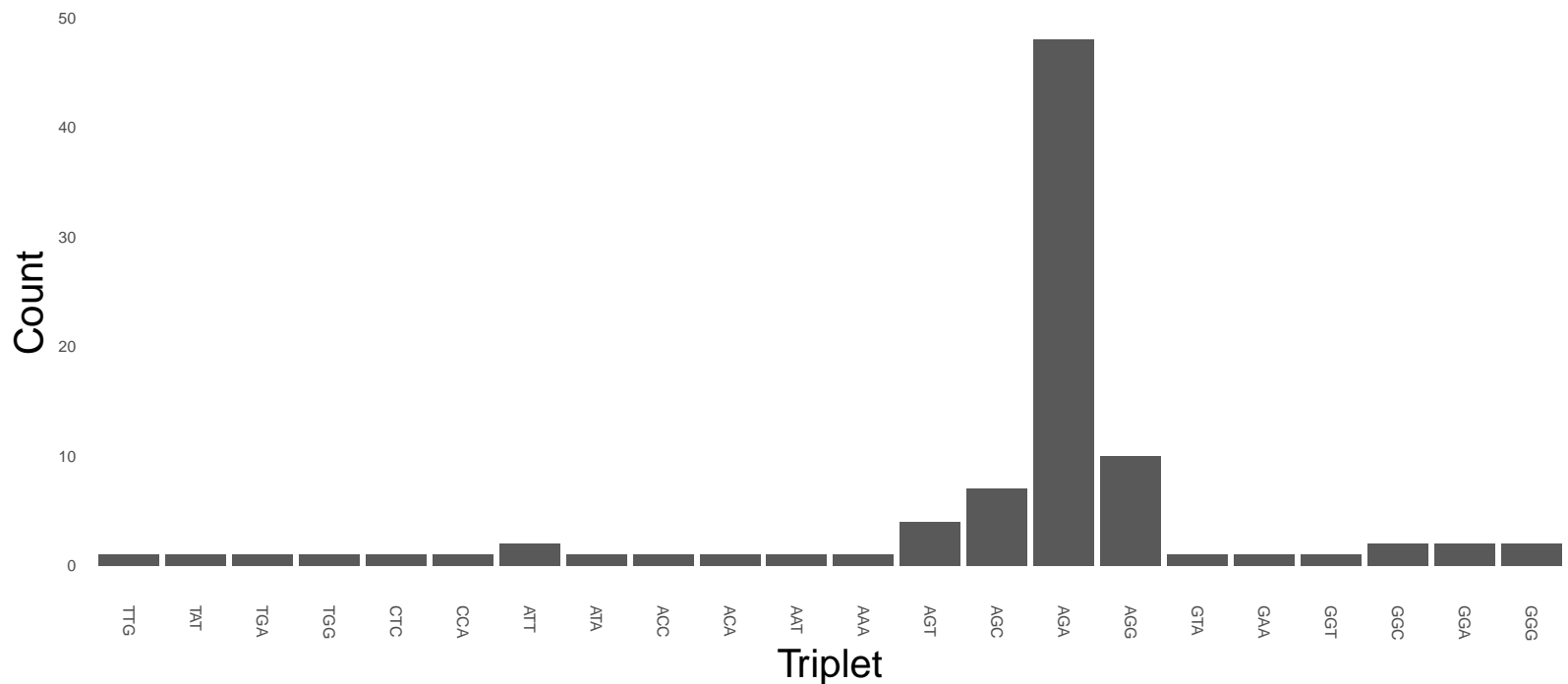
IGHV3-13\*01\_G290A- Final 3 nucleotides as a triplet



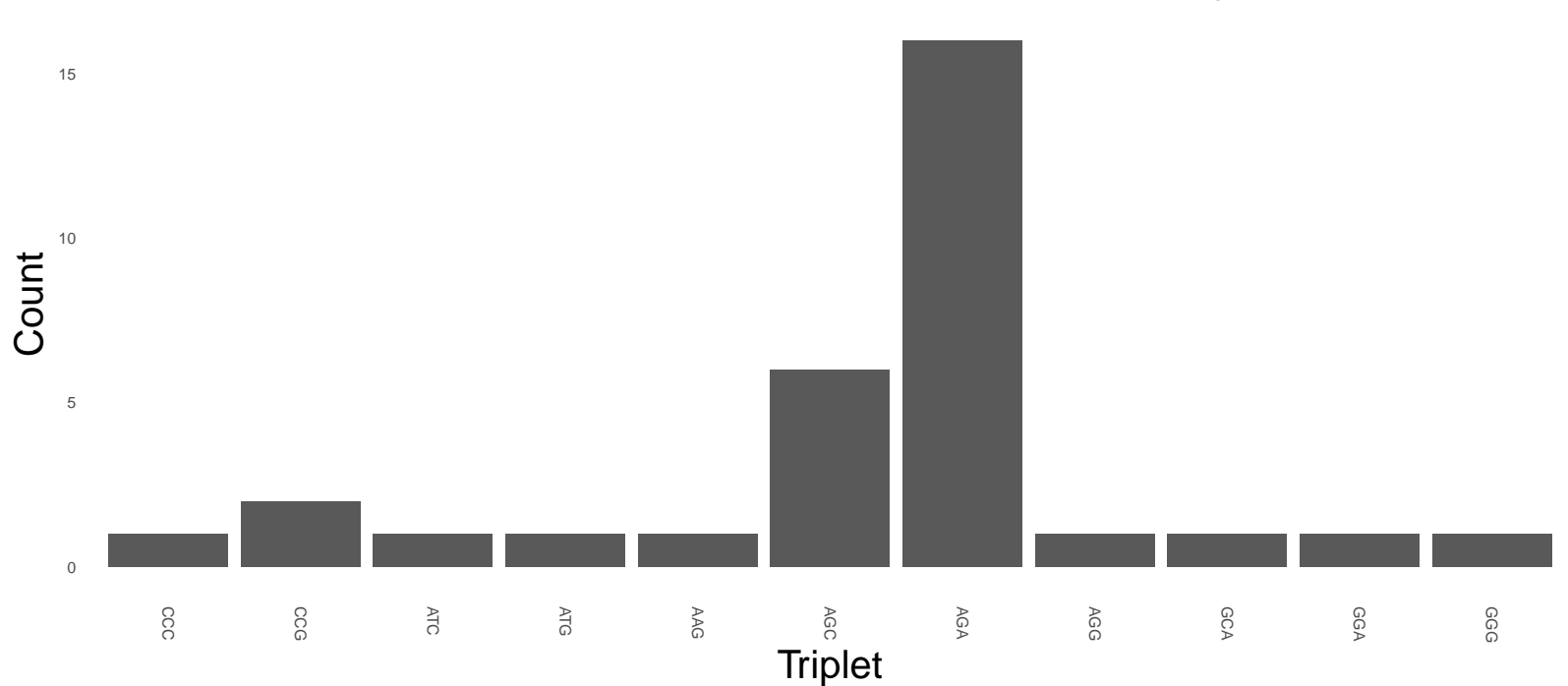
IGHV4-30-2\*01\_C285T- Final 3 nucleotides as a triplet



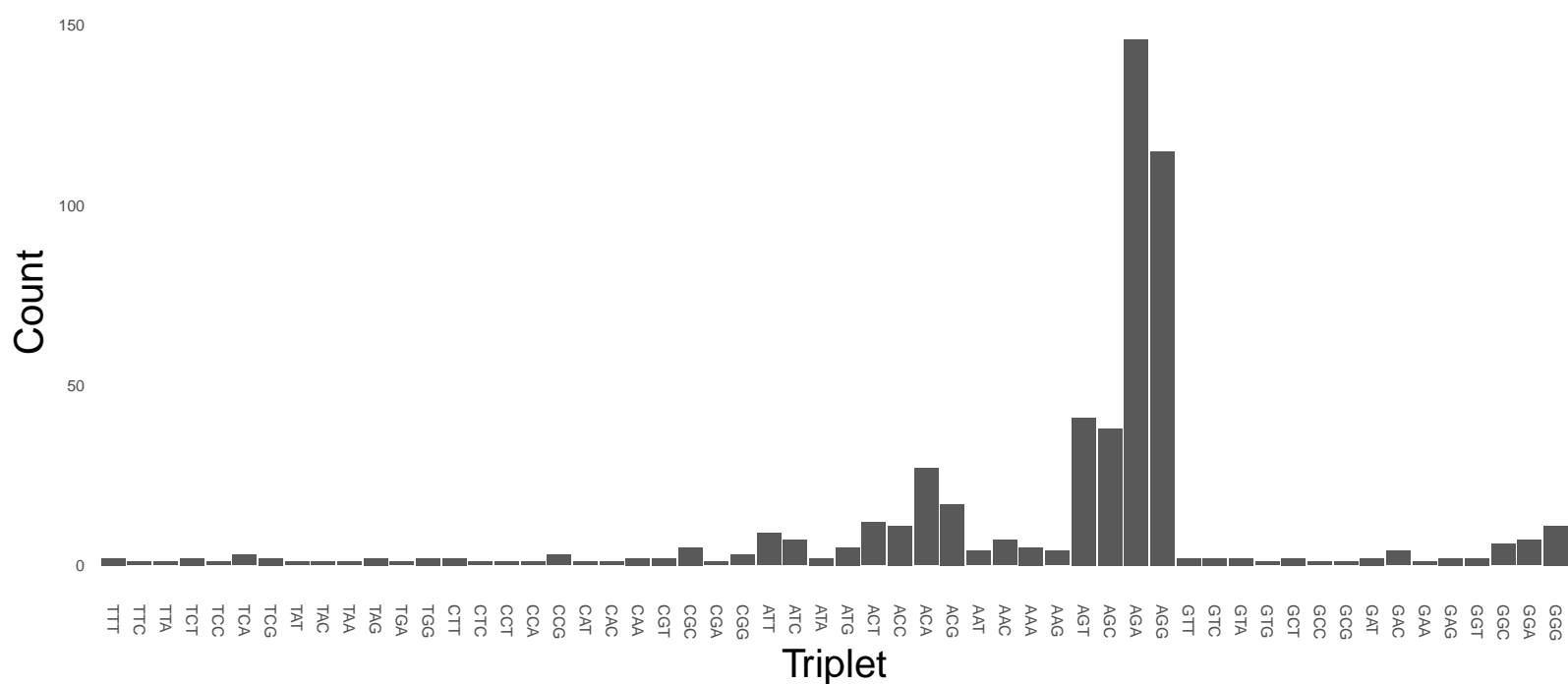
IGHV3-20\*04\_T279C\_C300T\_T301G- Final 3 nucleotides as a triplet



IGHV3-20\*04\_C258A\_T279C\_C300T\_T301G- Final 3 nucleotides as a triplet

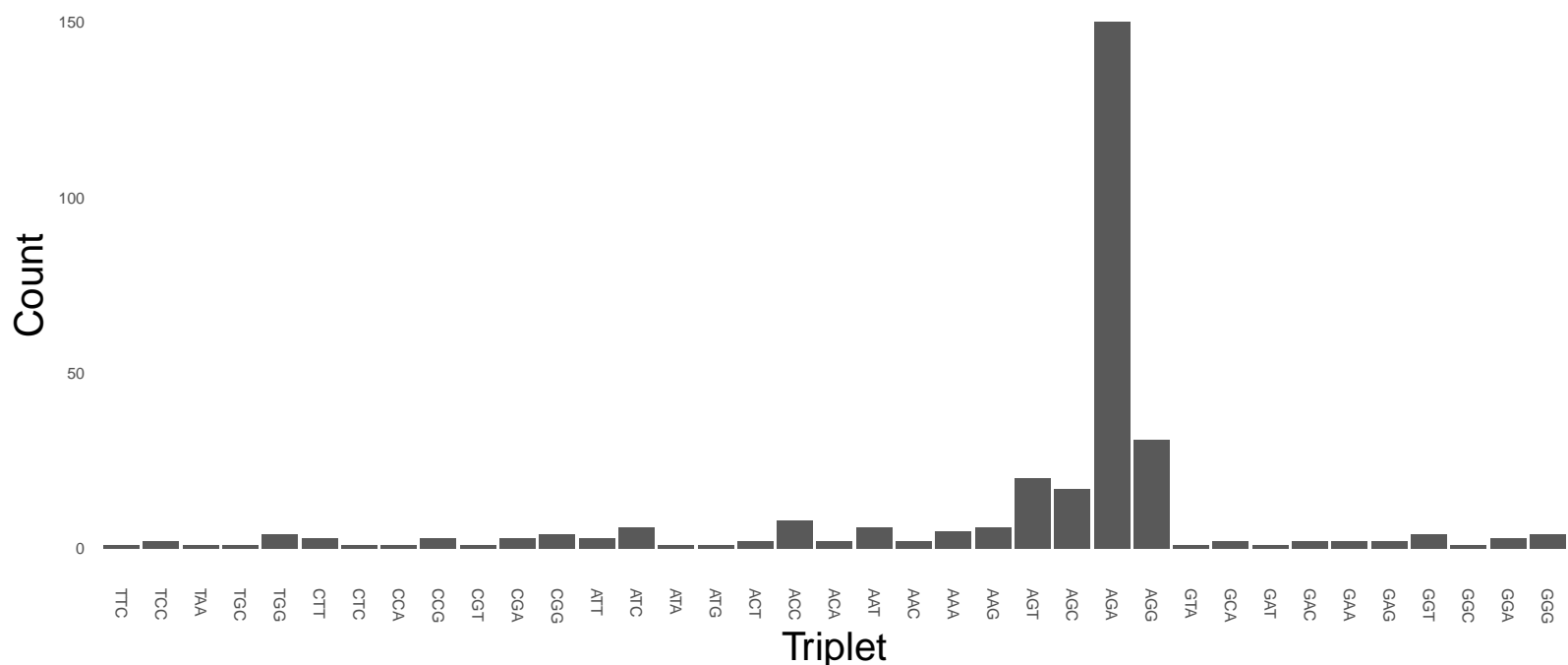


IGHV6-1\*01\_A315G- Final 3 nucleotides as a triplet

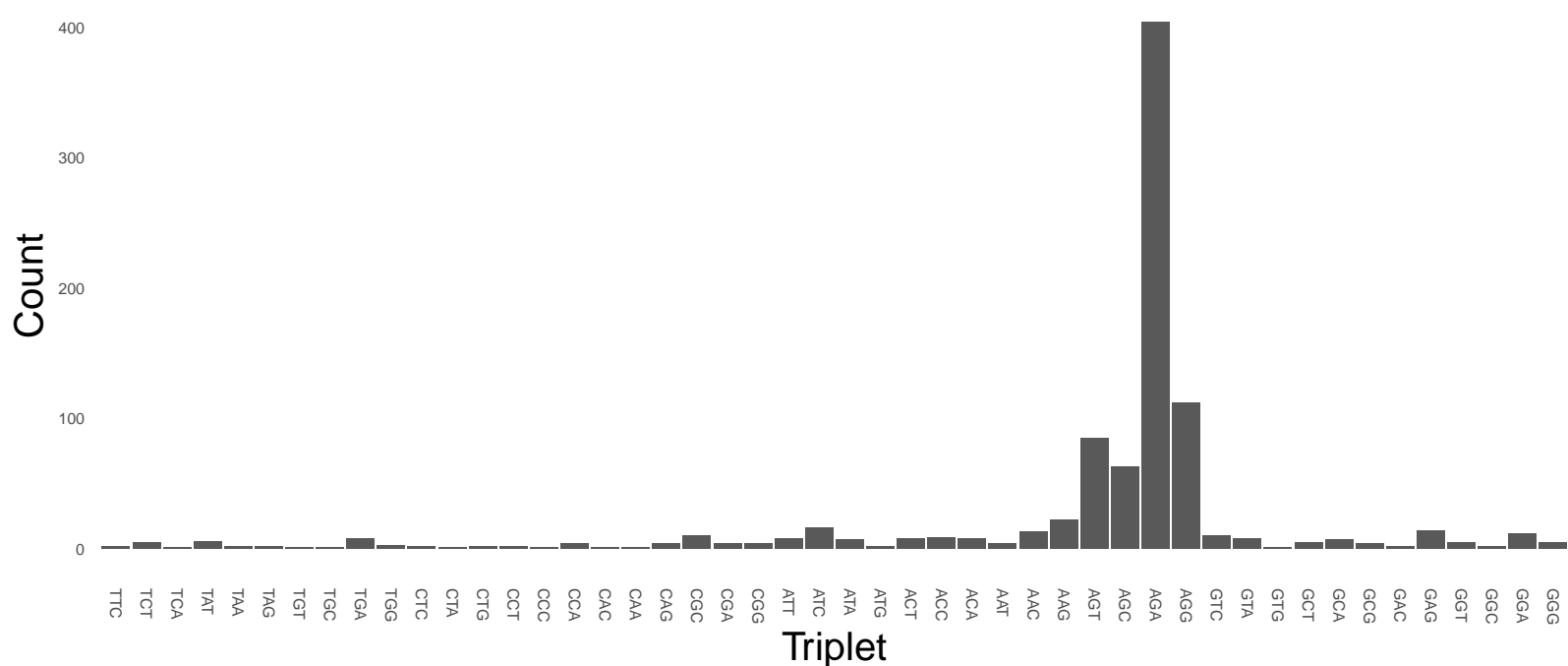




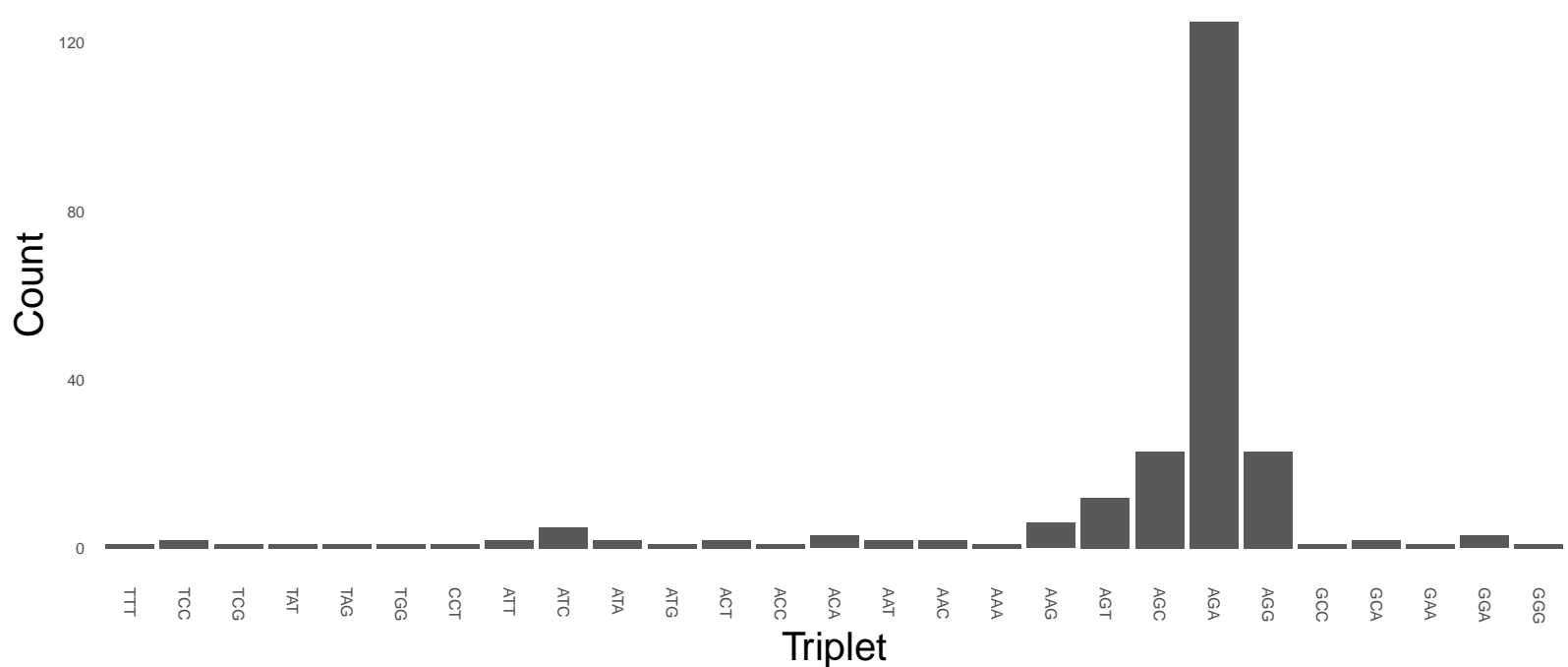
IGHV3-64\*04\_A210C\_T288C- Final 3 nucleotides as a triplet



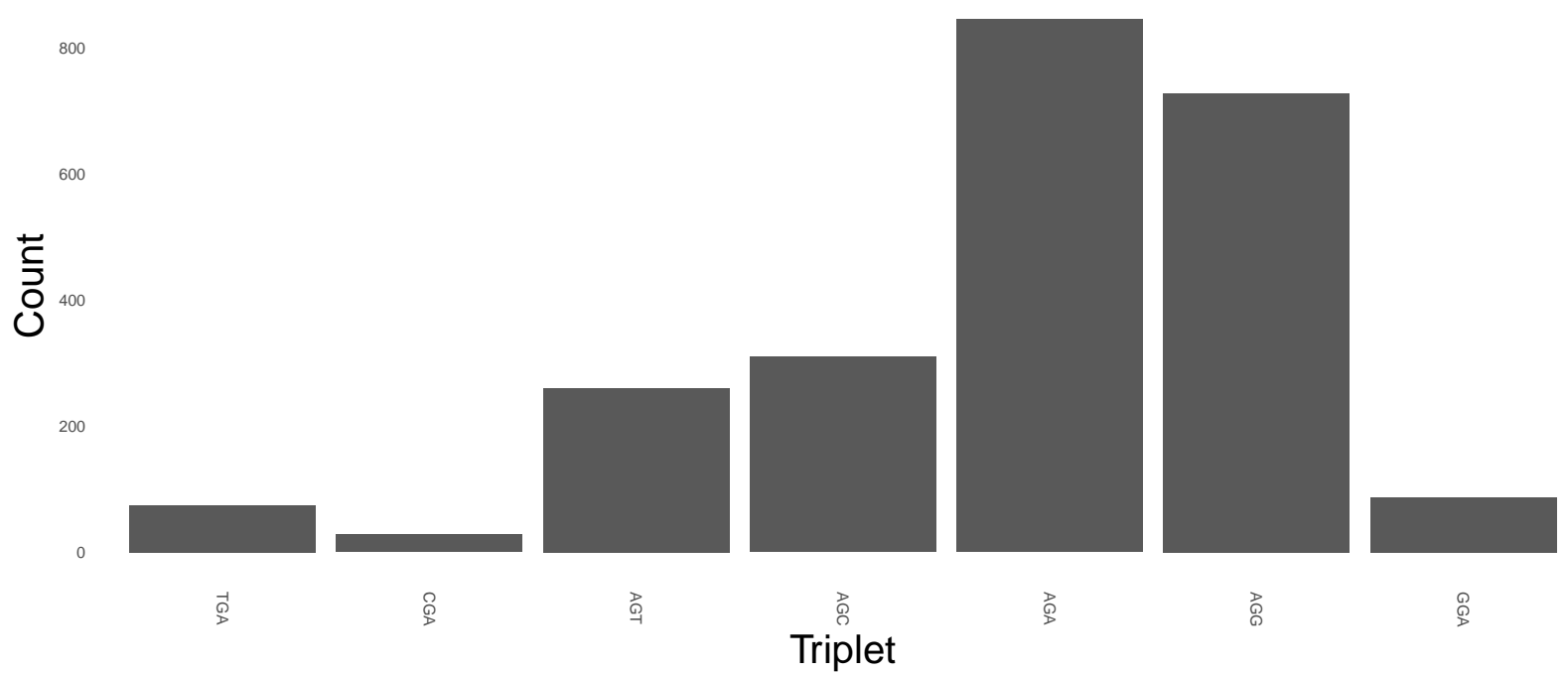
IGHV3-66\*01\_G13T\_C39A\_A223C\_T300C- Final 3 nucleotides as a triplet



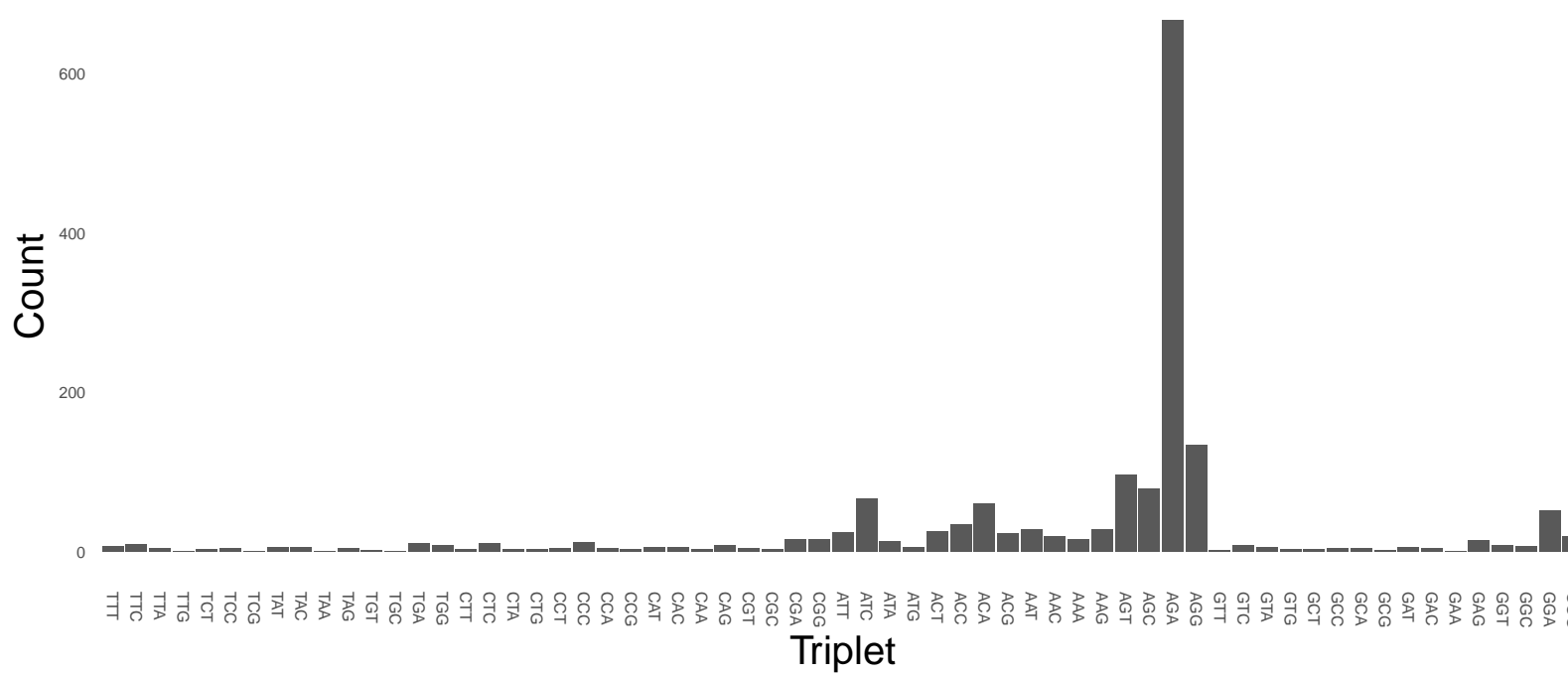
IGHV3-66\*03\_T175G- Final 3 nucleotides as a triplet



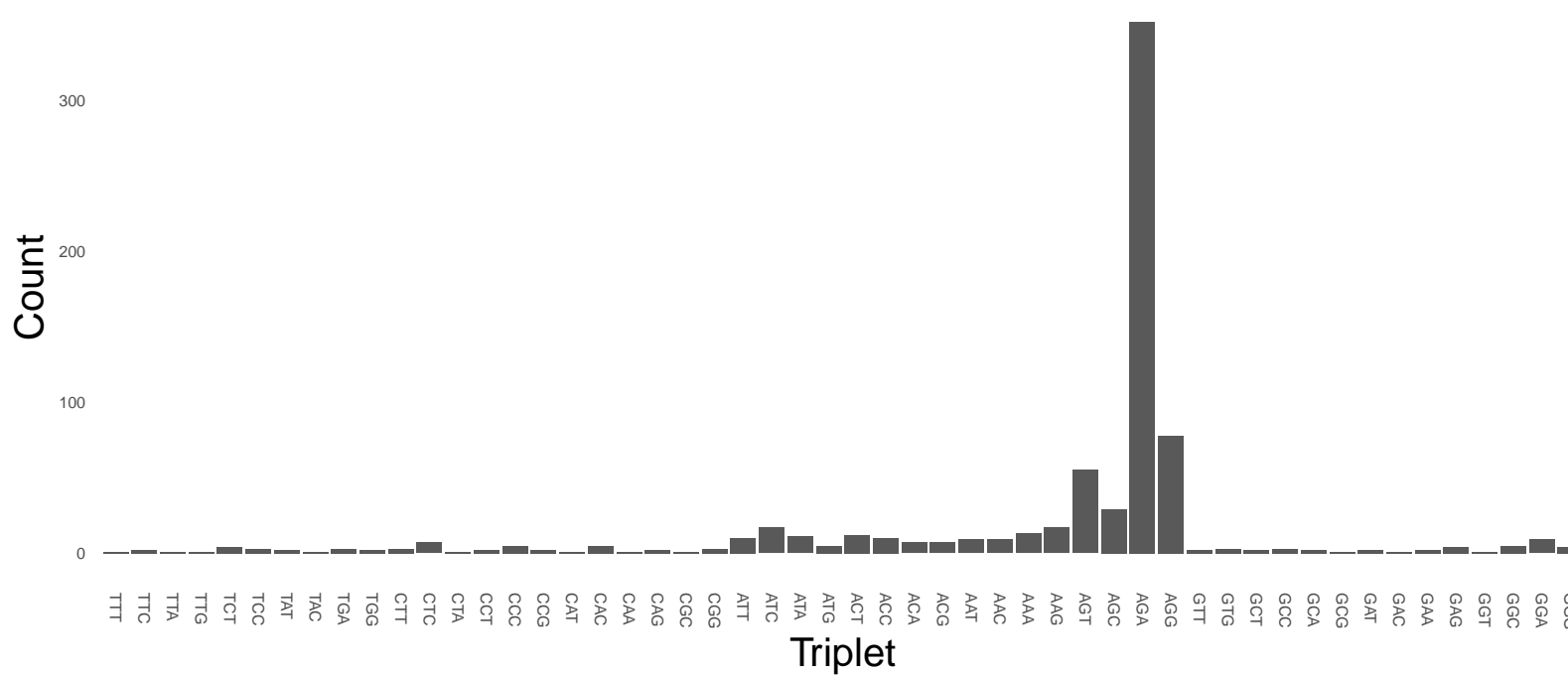
IGHV4-39\*02\_C258G- Final 3 nucleotides as a triplet



IGHV3-30\*03\_T288C- Final 3 nucleotides as a triplet

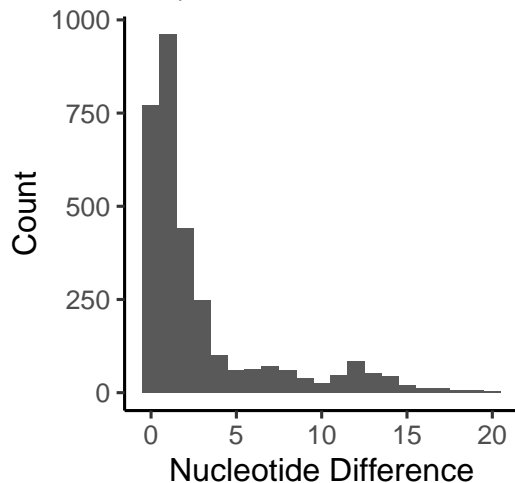


IGHV3-33\*06\_T300C\_G303A- Final 3 nucleotides as a triplet



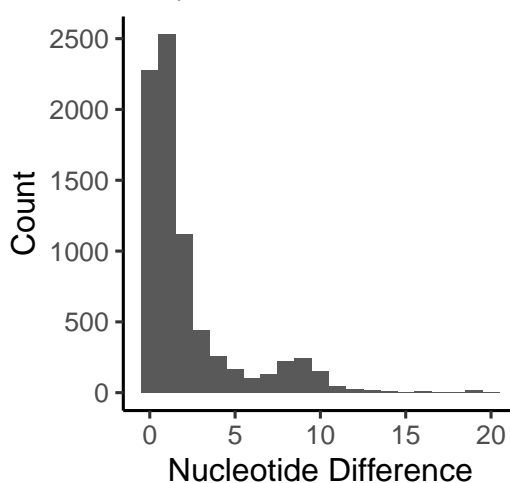
### IGHV1-2\*04

3145 sequences assigned  
770 (24.5%) exact matches, in which:  
661 unique CDR3  
6 unique J



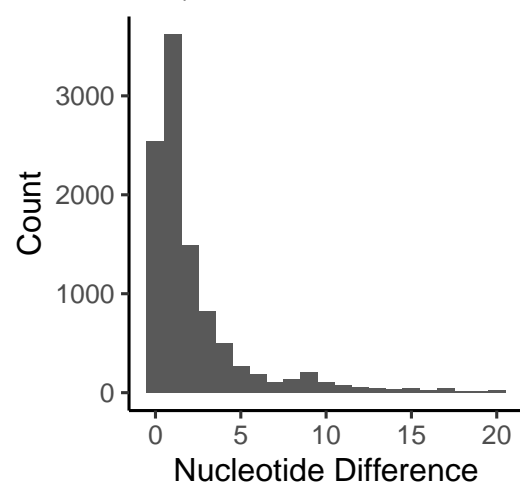
### IGHV1-8\*01

7799 sequences assigned  
2281 (29.2%) exact matches, in which:  
1966 unique CDR3  
6 unique J



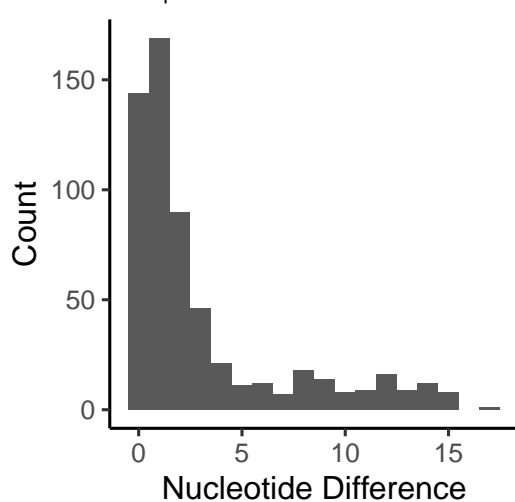
### IGHV1-24\*01

10645 sequences assigned  
2541 (23.9%) exact matches, in which:  
2165 unique CDR3  
6 unique J



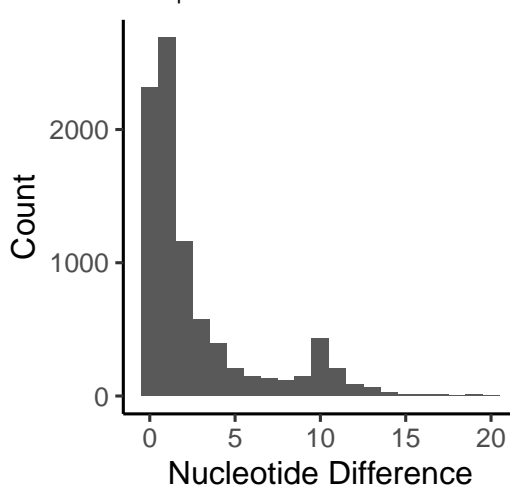
### IGHV1-2\*05

596 sequences assigned  
144 (24.2%) exact matches, in which:  
129 unique CDR3  
4 unique J



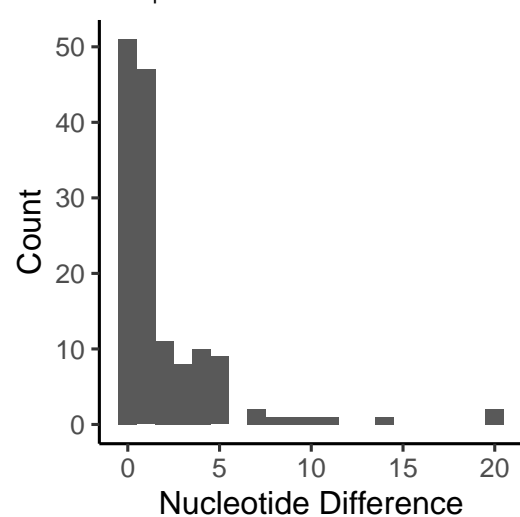
### IGHV1-18\*01

8774 sequences assigned  
2315 (26.4%) exact matches, in which:  
1998 unique CDR3  
6 unique J



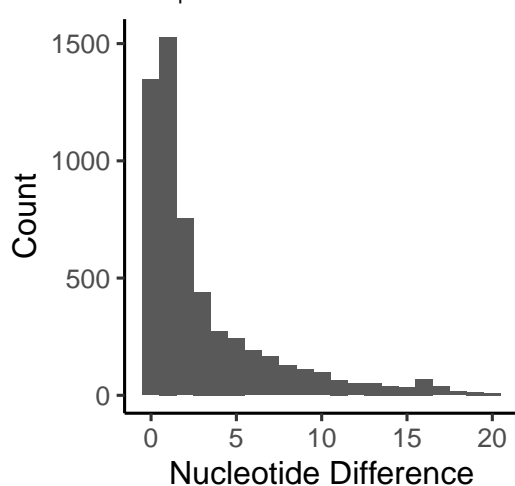
### IGHV1-45\*02

147 sequences assigned  
51 (34.7%) exact matches, in which:  
46 unique CDR3  
4 unique J



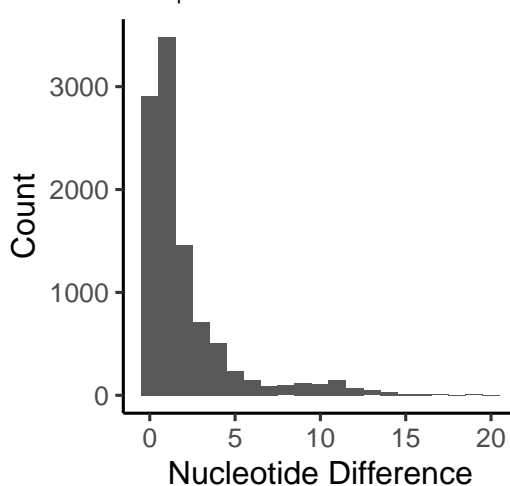
### IGHV1-3\*01

5704 sequences assigned  
1347 (23.6%) exact matches, in which:  
1199 unique CDR3  
6 unique J



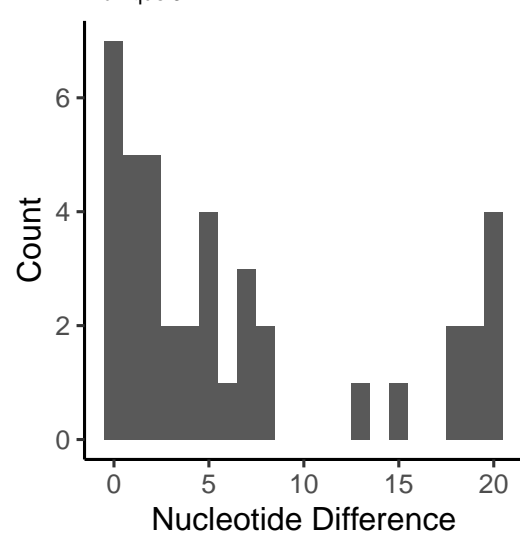
### IGHV1-18\*04

10252 sequences assigned  
2908 (28.4%) exact matches, in which:  
2487 unique CDR3  
6 unique J



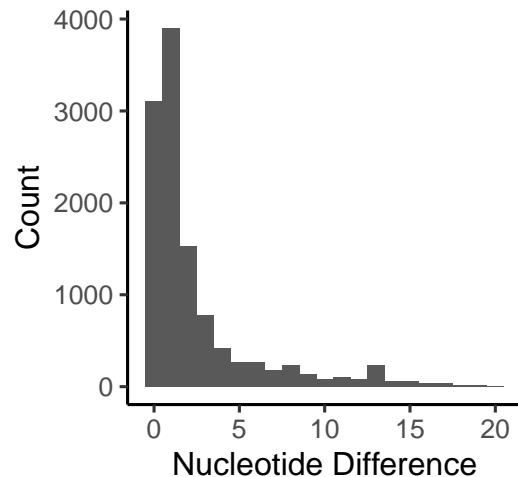
### IGHV1-45\*02\_A297G\_A300G

41 sequences assigned  
7 (17.1%) exact matches, in which:  
7 unique CDR3  
2 unique J



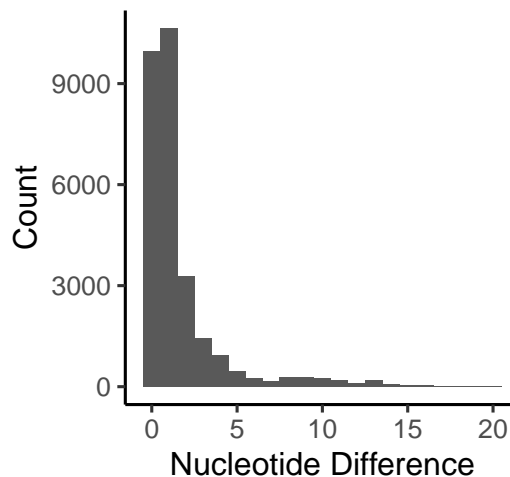
### IGHV1-46\*01

11640 sequences assigned  
3111 (26.7%) exact matches, in which:  
2684 unique CDR3  
6 unique J



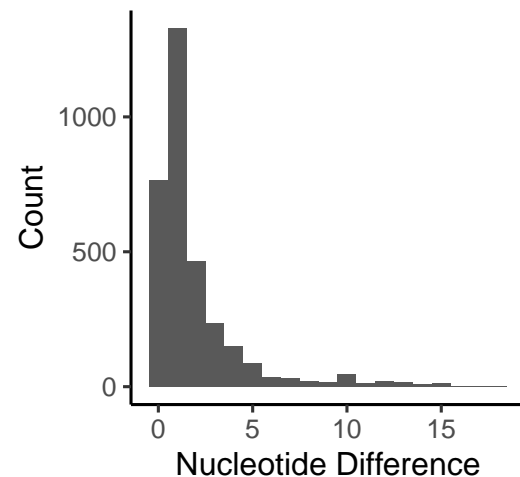
### IGHV1-69\*18

28833 sequences assigned  
9958 (34.5%) exact matches, in which:  
8407 unique CDR3  
6 unique J



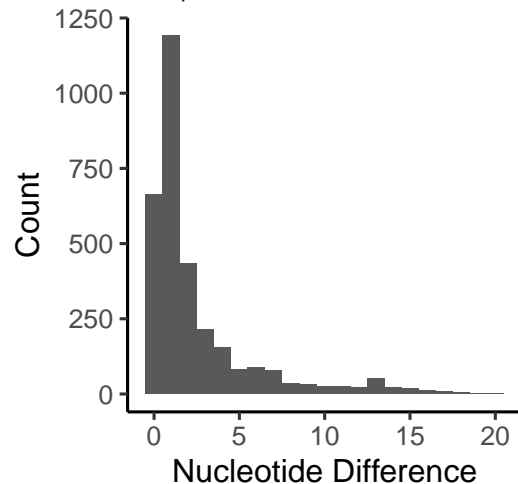
### IGHV2-26\*01

3331 sequences assigned  
766 (23%) exact matches, in which:  
626 unique CDR3  
6 unique J



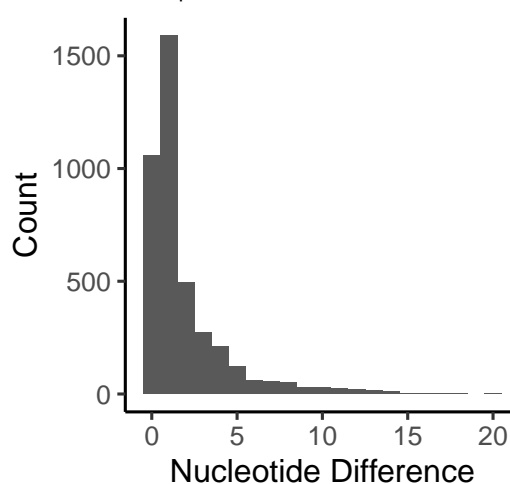
### IGHV1-46\*03

3173 sequences assigned  
662 (20.9%) exact matches, in which:  
521 unique CDR3  
6 unique J



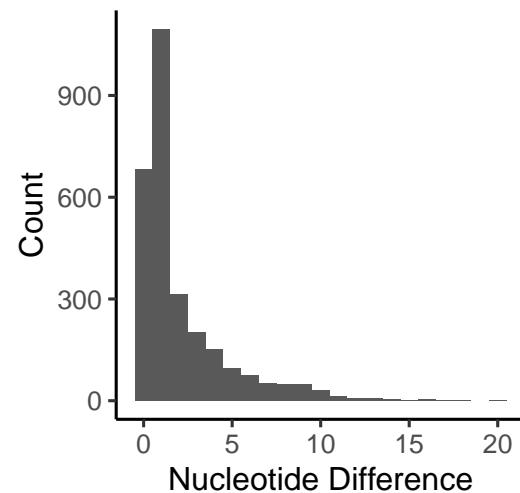
### IGHV2-5\*01

4092 sequences assigned  
1060 (25.9%) exact matches, in which:  
874 unique CDR3  
6 unique J



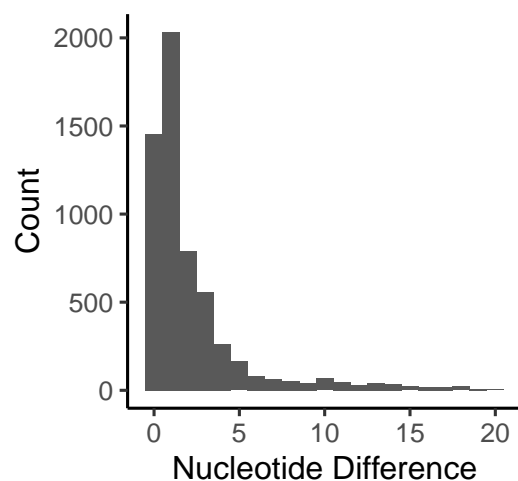
### IGHV2-70\*01

2888 sequences assigned  
683 (23.6%) exact matches, in which:  
582 unique CDR3  
6 unique J



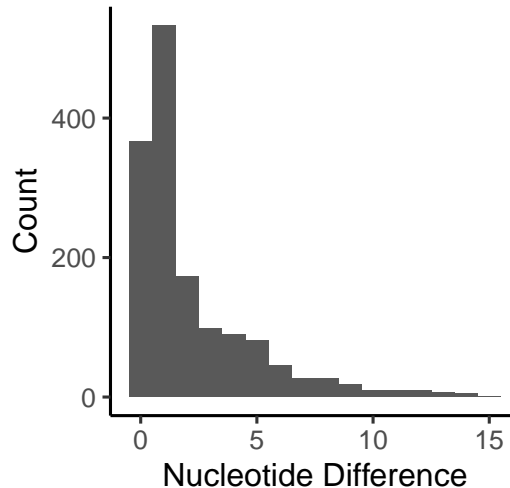
### IGHV1-58\*01

5846 sequences assigned  
1456 (24.9%) exact matches, in which:  
1126 unique CDR3  
6 unique J



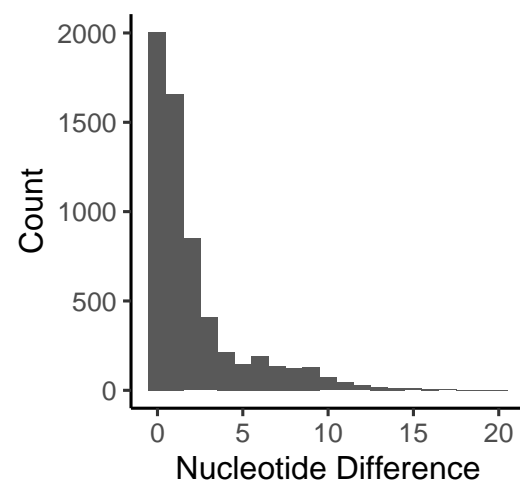
### IGHV2-5\*02

1514 sequences assigned  
367 (24.2%) exact matches, in which:  
309 unique CDR3  
6 unique J



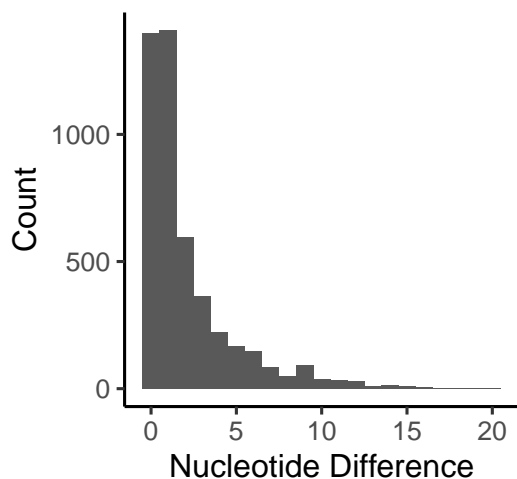
### IGHV3-7\*01

6119 sequences assigned  
2005 (32.8%) exact matches, in which:  
1754 unique CDR3  
6 unique J



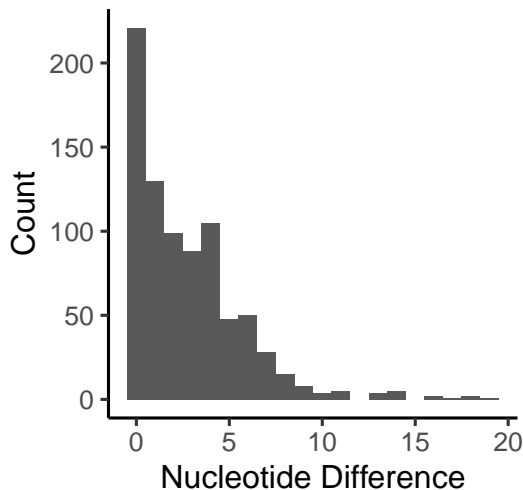
### IGHV3-7\*03

4701 sequences assigned  
1397 (29.7%) exact matches, in which:  
1218 unique CDR3  
6 unique J



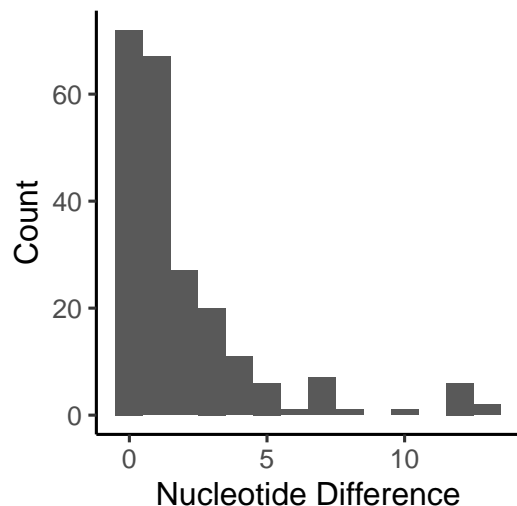
### IGHV3-11\*04

833 sequences assigned  
221 (26.5%) exact matches, in which:  
220 unique CDR3  
6 unique J



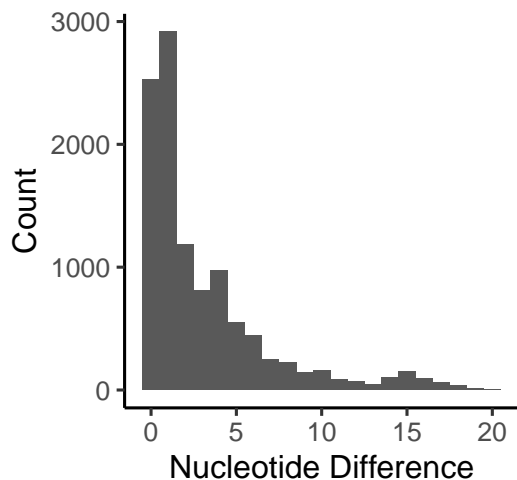
### IGHV3-13\*05

223 sequences assigned  
72 (32.3%) exact matches, in which:  
59 unique CDR3  
5 unique J



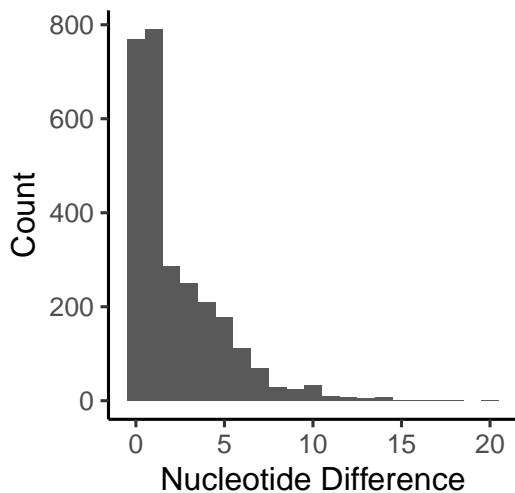
### IGHV3-9\*01

10957 sequences assigned  
2528 (23.1%) exact matches, in which:  
2080 unique CDR3  
6 unique J



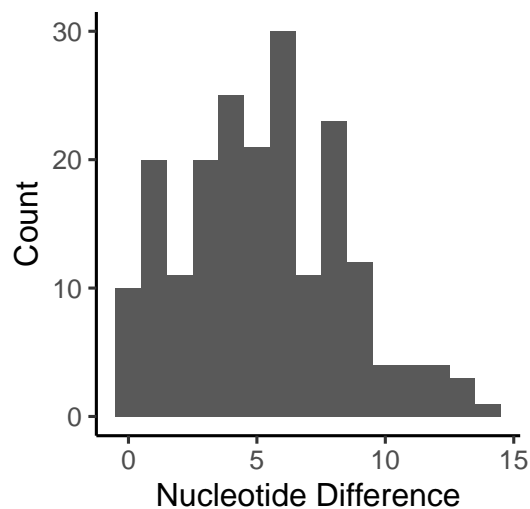
### IGHV3-11\*06

2809 sequences assigned  
770 (27.4%) exact matches, in which:  
642 unique CDR3  
6 unique J



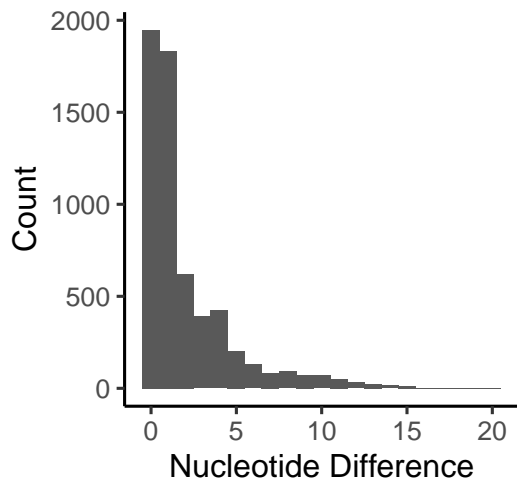
### IGHV3-13\*01\_G290A

199 sequences assigned  
10 (5%) exact matches, in which:  
10 unique CDR3  
3 unique J



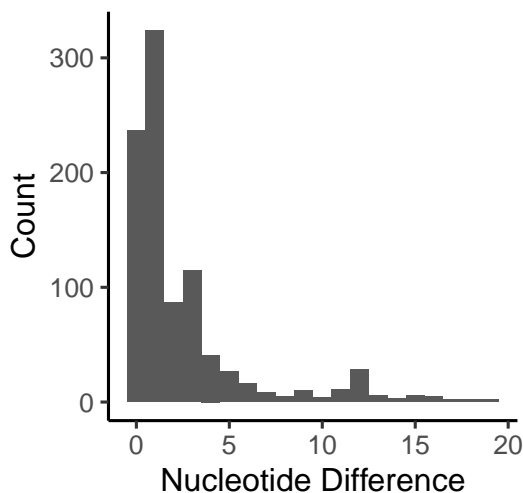
### IGHV3-11\*01

6059 sequences assigned  
1947 (32.1%) exact matches, in which:  
1589 unique CDR3  
6 unique J



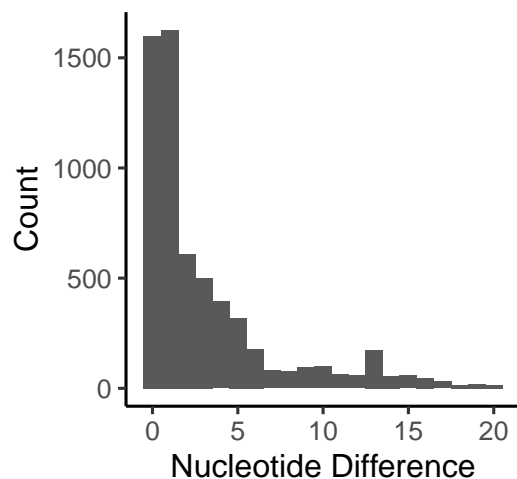
### IGHV3-13\*01

947 sequences assigned  
237 (25%) exact matches, in which:  
200 unique CDR3  
6 unique J



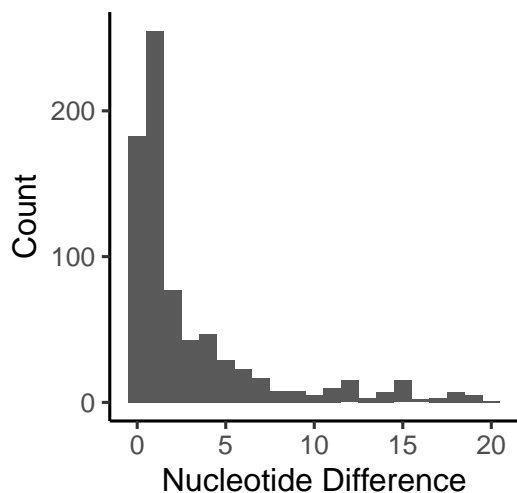
### IGHV3-15\*01

6182 sequences assigned  
1600 (25.9%) exact matches, in which:  
1313 unique CDR3  
6 unique J



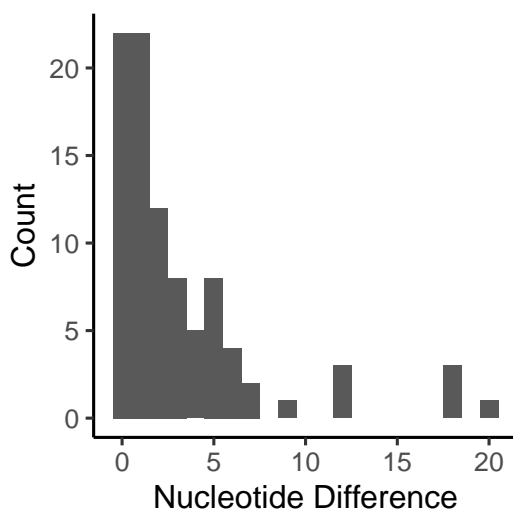
### IGHV3-20\*01

767 sequences assigned  
183 (23.9%) exact matches, in which:  
159 unique CDR3  
5 unique J



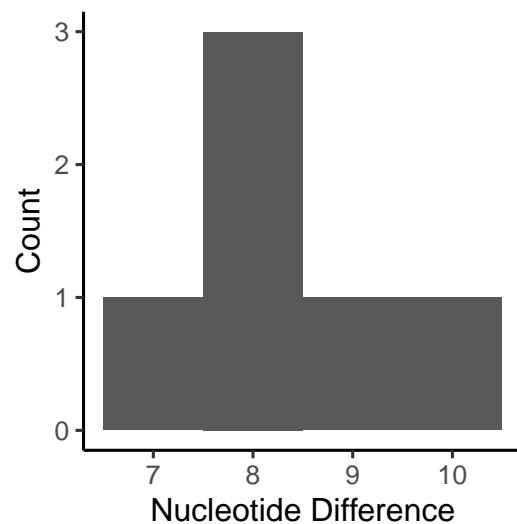
### IGHV3-20\*04\_T279C\_C30

91 sequences assigned  
22 (24.2%) exact matches, in which:  
22 unique CDR3  
5 unique J



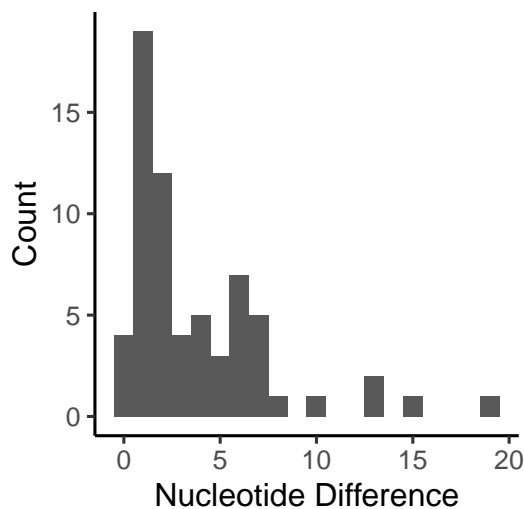
### IGHV3-22\*02

6 sequences assigned  
No exact matches.



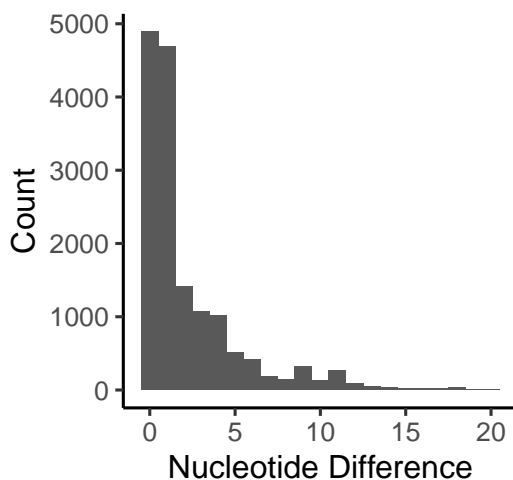
### IGHV3-20\*04

65 sequences assigned  
4 (6.2%) exact matches, in which:  
4 unique CDR3  
3 unique J



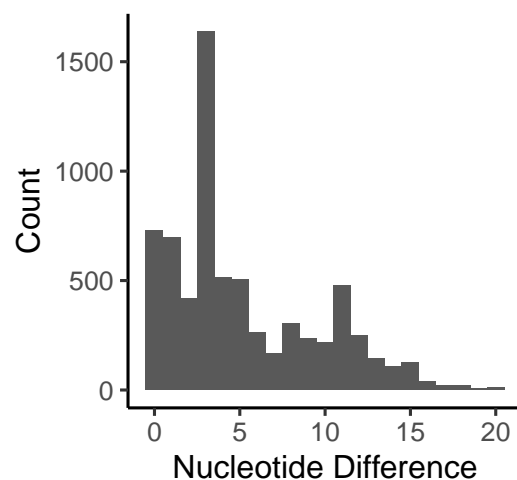
### IGHV3-21\*01

15411 sequences assigned  
4891 (31.7%) exact matches, in which:  
4079 unique CDR3  
6 unique J



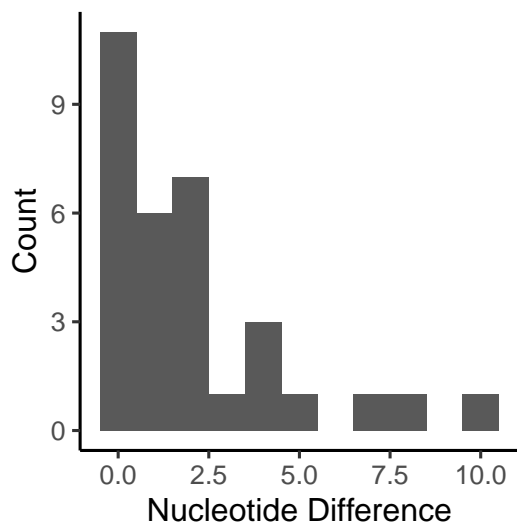
### IGHV3-23\*04

7088 sequences assigned  
727 (10.3%) exact matches, in which:  
653 unique CDR3  
6 unique J



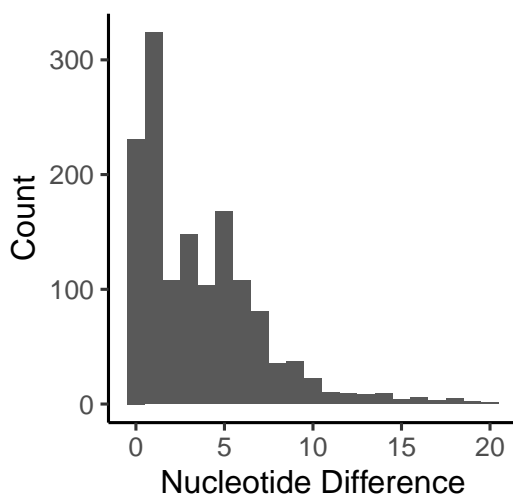
### IGHV3-20\*04\_C258A\_T279C\_C30

32 sequences assigned  
11 (34.4%) exact matches, in which:  
11 unique CDR3  
3 unique J



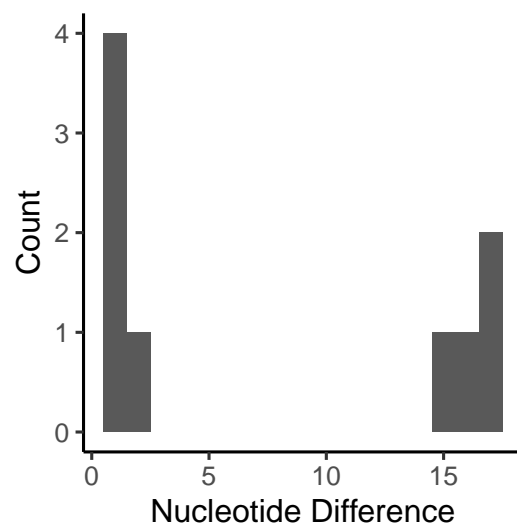
### IGHV3-21\*04

1427 sequences assigned  
231 (16.2%) exact matches, in which:  
231 unique CDR3  
6 unique J



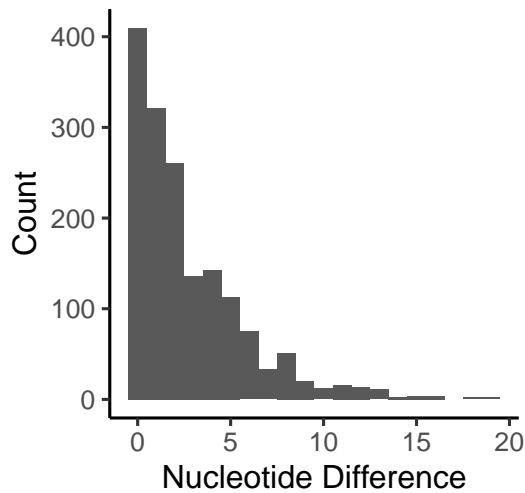
### IGHV3-30-3\*03

11 sequences assigned  
No exact matches.



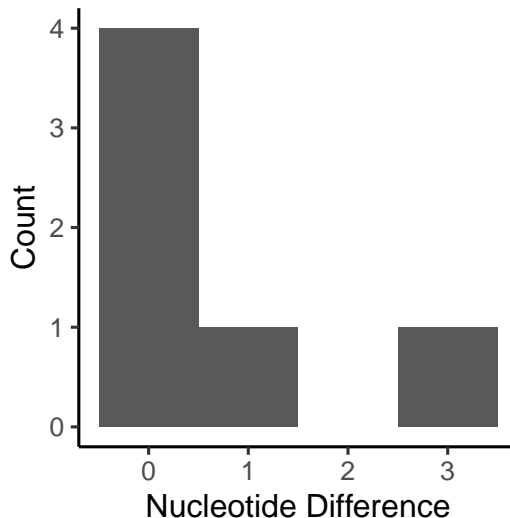
### IGHV3-30\*03\_T288C

1636 sequences assigned  
410 (25.1%) exact matches, in which:  
400 unique CDR3  
5 unique J



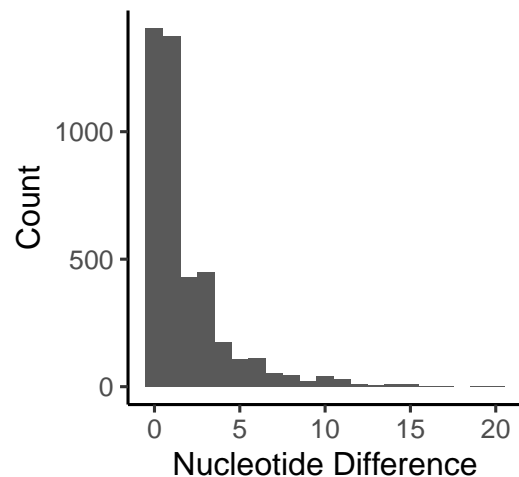
### IGHV3-35\*01

6 sequences assigned  
4 (66.7%) exact matches, in which:  
4 unique CDR3  
2 unique J



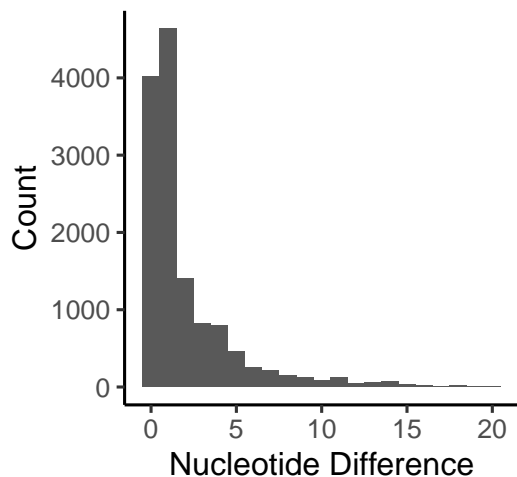
### IGHV3-48\*02

4306 sequences assigned  
1405 (32.6%) exact matches, in which:  
1173 unique CDR3  
6 unique J



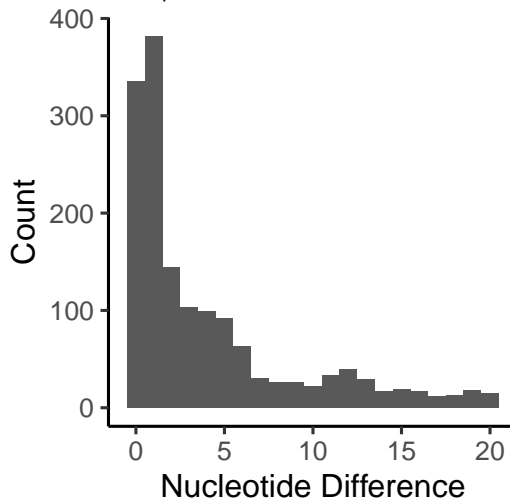
### IGHV3-33\*01

13411 sequences assigned  
4012 (29.9%) exact matches, in which:  
3291 unique CDR3  
6 unique J



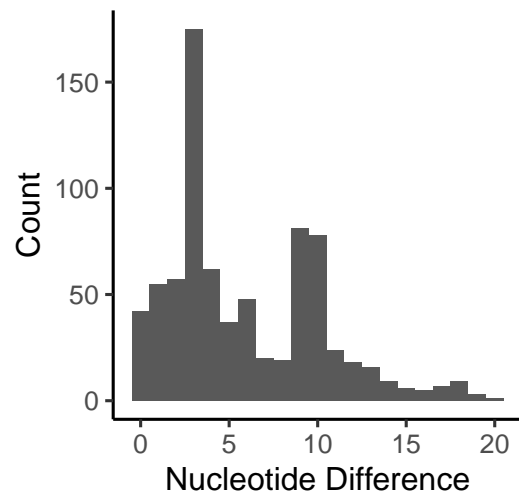
### IGHV3-43\*01

1574 sequences assigned  
336 (21.3%) exact matches, in which:  
278 unique CDR3  
6 unique J



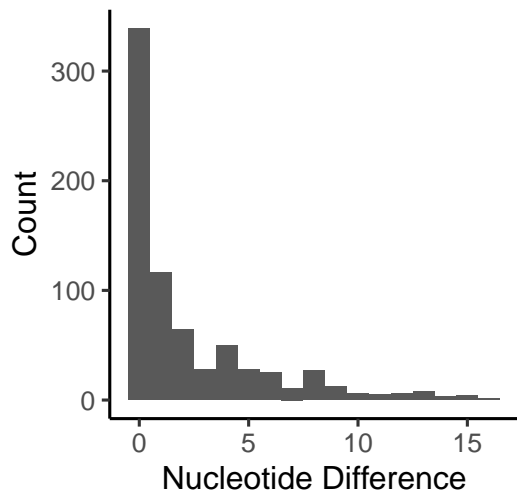
### IGHV3-48\*04

775 sequences assigned  
42 (5.4%) exact matches, in which:  
42 unique CDR3  
6 unique J



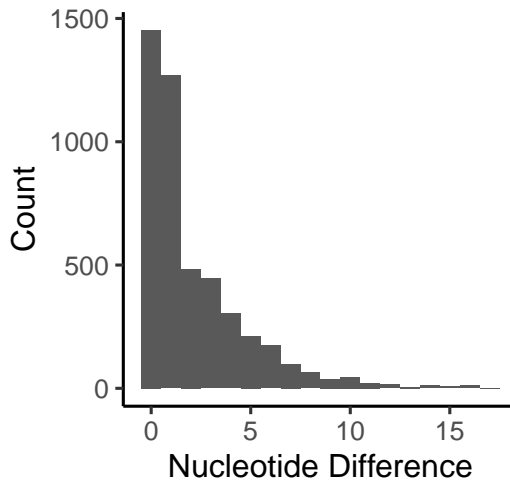
### IGHV3-33\*06\_T300C\_G3

735 sequences assigned  
339 (46.1%) exact matches, in which:  
332 unique CDR3  
6 unique J



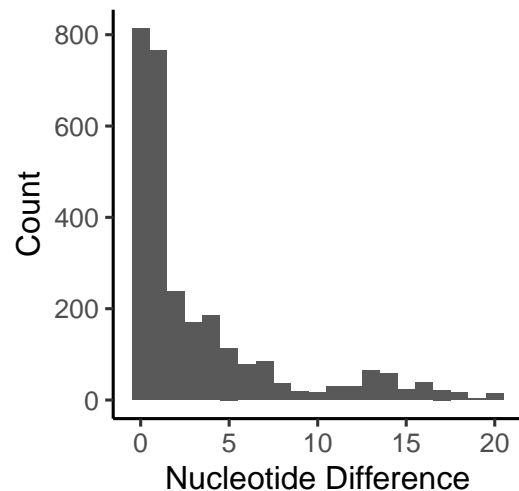
### IGHV3-48\*01

4684 sequences assigned  
1453 (31%) exact matches, in which:  
1219 unique CDR3  
6 unique J



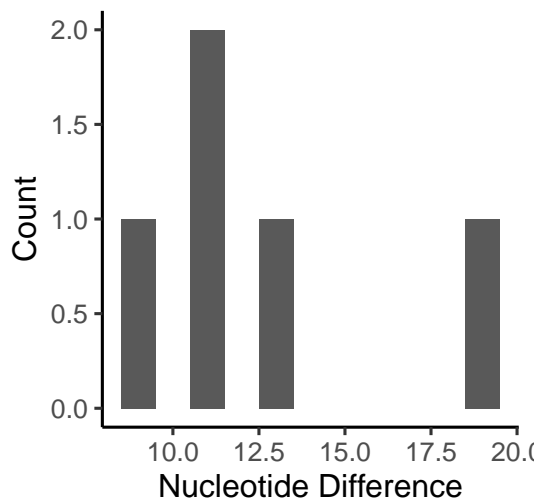
### IGHV3-49\*05

2858 sequences assigned  
814 (28.5%) exact matches, in which:  
668 unique CDR3  
6 unique J



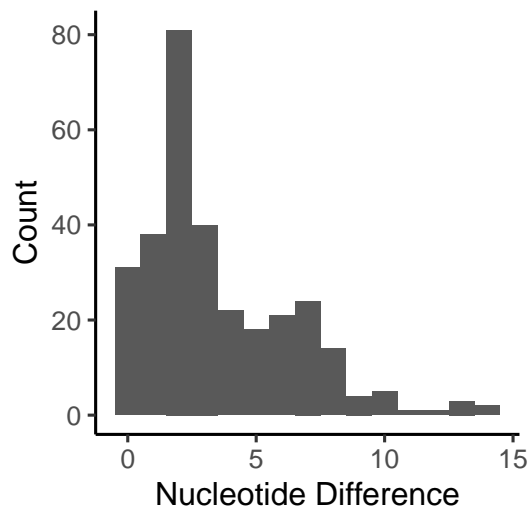
### IGHV3-52\*01

5 sequences assigned  
No exact matches.



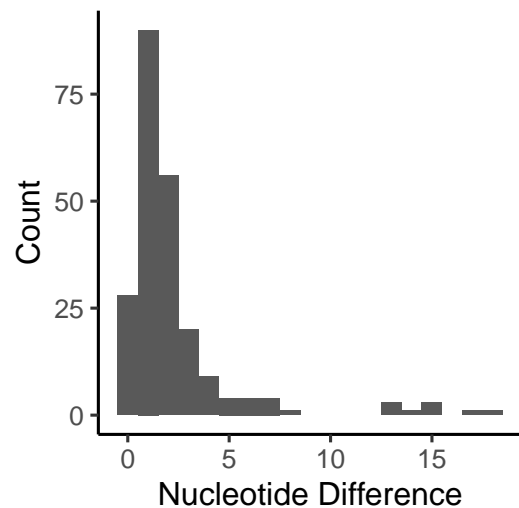
### IGHV3-64\*04\_A210C\_T28

307 sequences assigned  
31 (10.1%) exact matches, in which:  
30 unique CDR3  
5 unique J



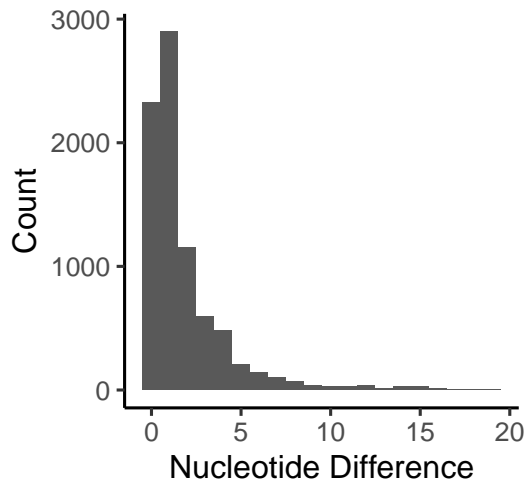
### IGHV3-66\*03\_T175G

226 sequences assigned  
28 (12.4%) exact matches, in which:  
28 unique CDR3  
6 unique J



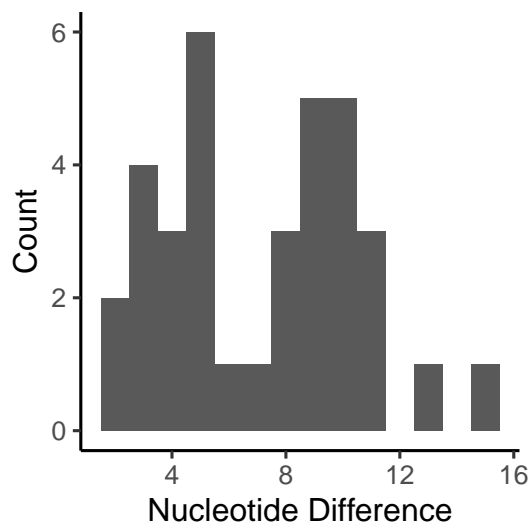
### IGHV3-53\*01

8199 sequences assigned  
2325 (28.4%) exact matches, in which:  
1904 unique CDR3  
6 unique J



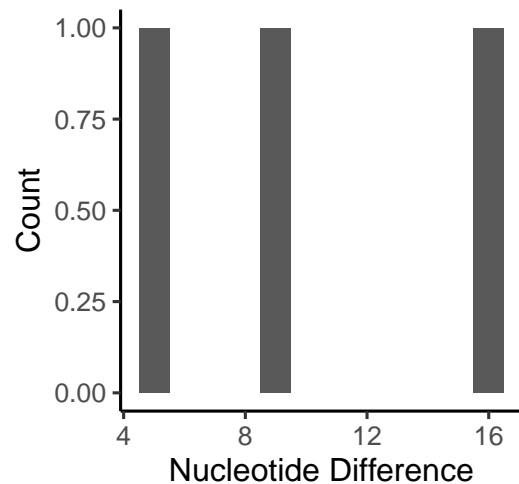
### IGHV3-66\*01

35 sequences assigned  
No exact matches.



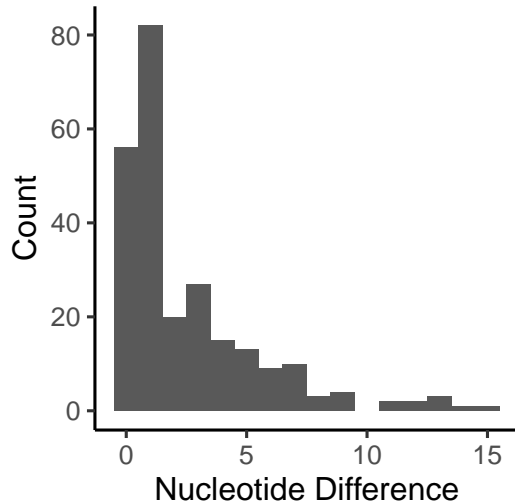
### IGHV3-69-1\*01

3 sequences assigned  
No exact matches.



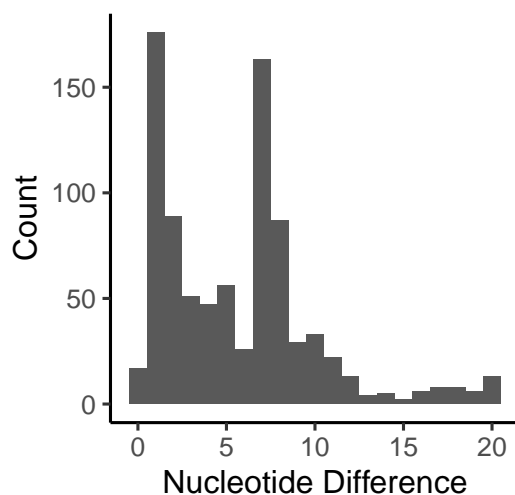
### IGHV3-64\*02

249 sequences assigned  
56 (22.5%) exact matches, in which:  
46 unique CDR3  
5 unique J



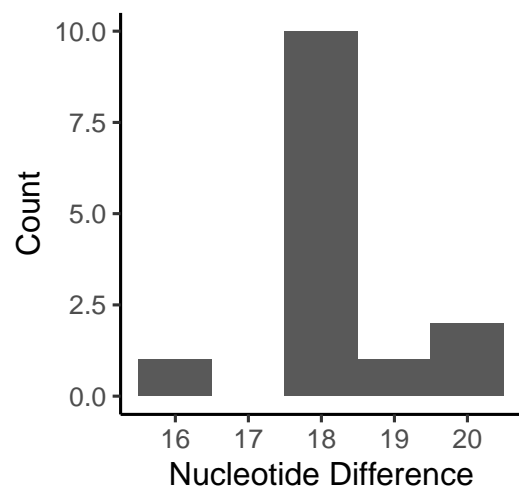
### IGHV3-66\*01\_G13T\_C39

903 sequences assigned  
17 (1.9%) exact matches, in which:  
17 unique CDR3  
4 unique J



### IGHV3-71\*04

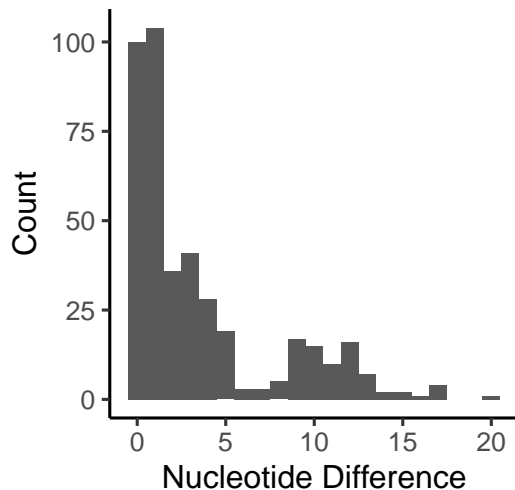
16 sequences assigned  
No exact matches.





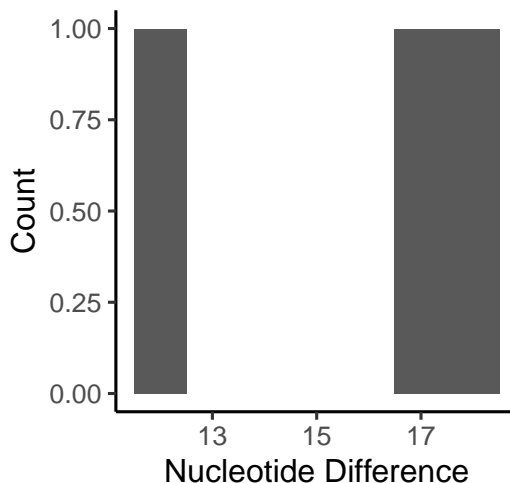
### IGHV3-72\*01

427 sequences assigned  
100 (23.4%) exact matches, in which:  
80 unique CDR3  
6 unique J



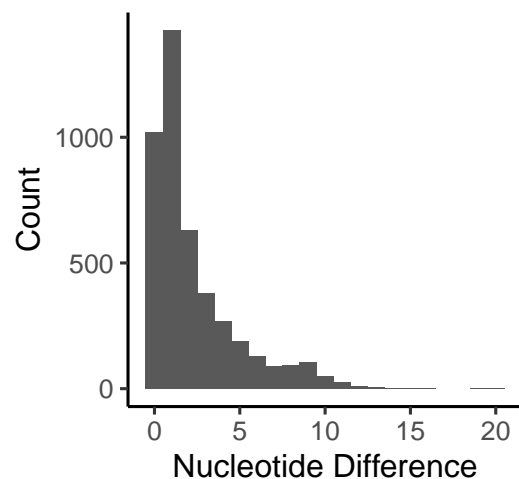
### IGHV3-43D\*04

3 sequences assigned  
No exact matches.



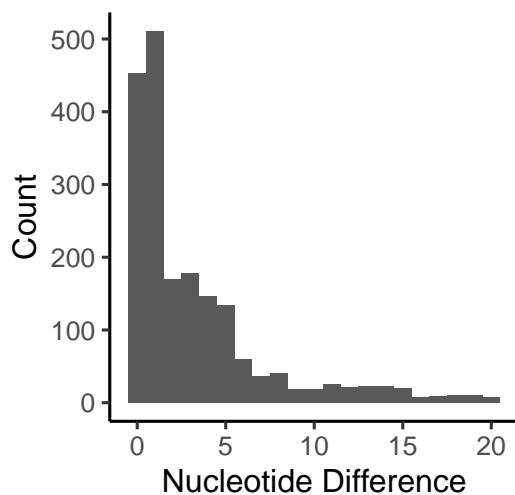
### IGHV4-4\*02

4477 sequences assigned  
1021 (22.8%) exact matches, in which:  
911 unique CDR3  
6 unique J



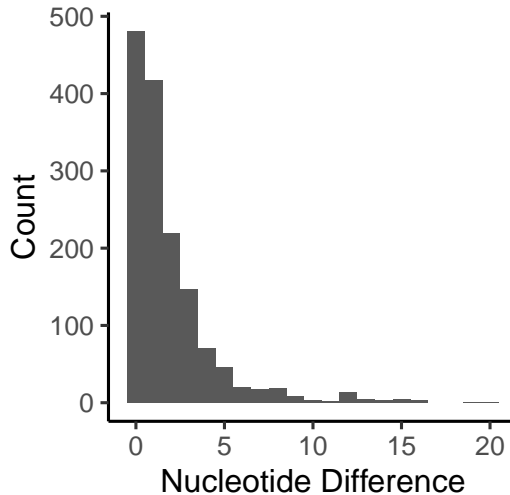
### IGHV3-73\*02

1942 sequences assigned  
453 (23.3%) exact matches, in which:  
385 unique CDR3  
6 unique J



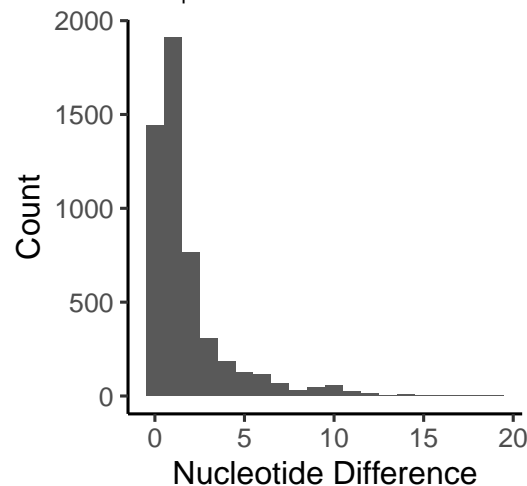
### IGHV3-64D\*06

1486 sequences assigned  
481 (32.4%) exact matches, in which:  
409 unique CDR3  
6 unique J



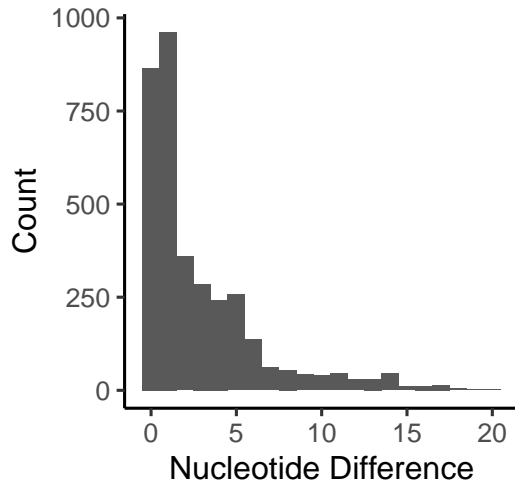
### IGHV4-4\*07

5116 sequences assigned  
1442 (28.2%) exact matches, in which:  
1219 unique CDR3  
6 unique J



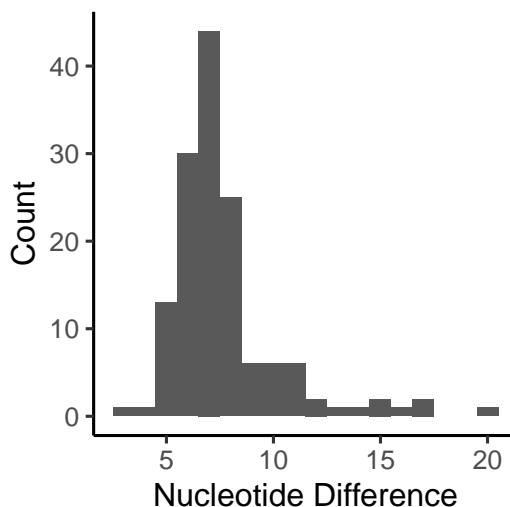
### IGHV3-74\*01

3523 sequences assigned  
865 (24.6%) exact matches, in which:  
741 unique CDR3  
6 unique J



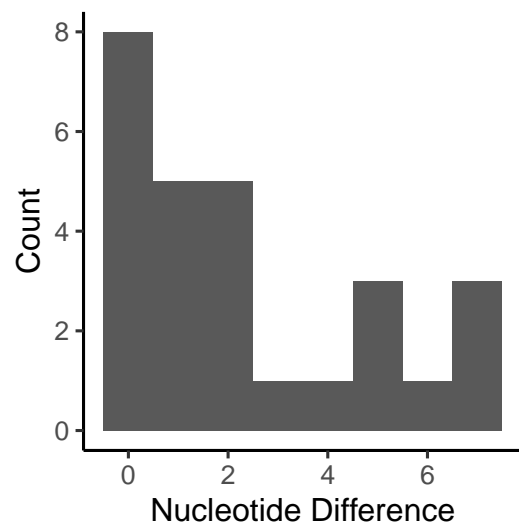
### IGHV3-NL1\*01

142 sequences assigned  
No exact matches.



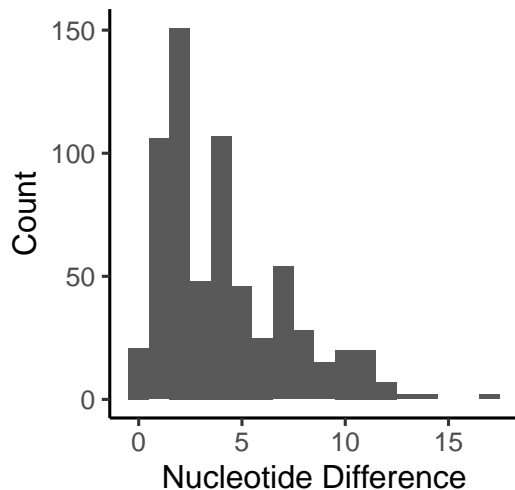
### IGHV4-28\*03

27 sequences assigned  
8 (29.6%) exact matches, in which:  
6 unique CDR3  
2 unique J



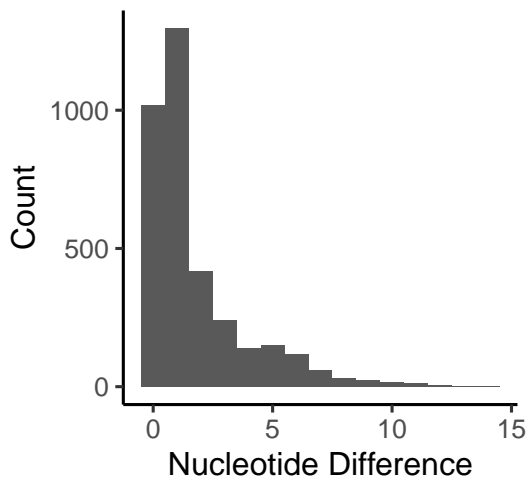
### IGHV4-30-2\*01

654 sequences assigned  
21 (3.2%) exact matches, in which:  
21 unique CDR3  
5 unique J



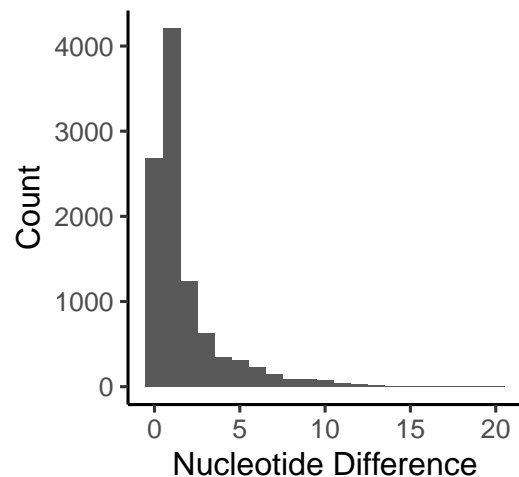
### IGHV4-30-2\*01\_C285T

3543 sequences assigned  
1018 (28.7%) exact matches, in which:  
864 unique CDR3  
6 unique J



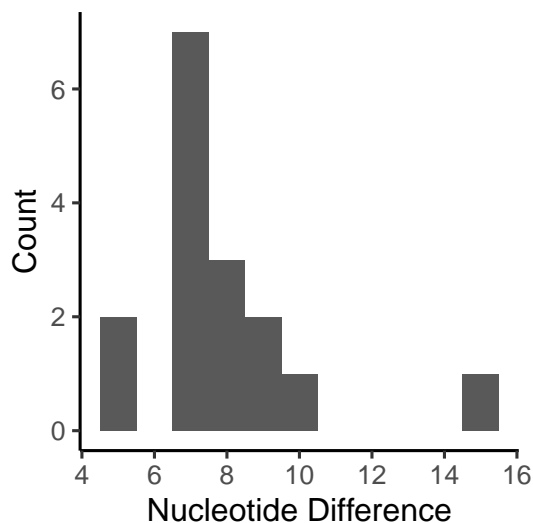
### IGHV4-39\*01

10233 sequences assigned  
2688 (26.3%) exact matches, in which:  
2208 unique CDR3  
6 unique J



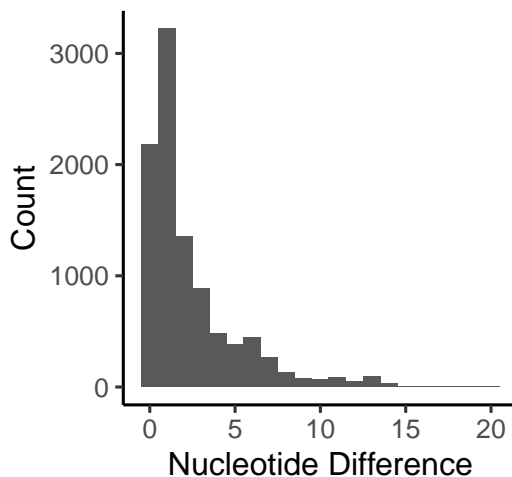
### IGHV4-30-4\*07

16 sequences assigned  
No exact matches.



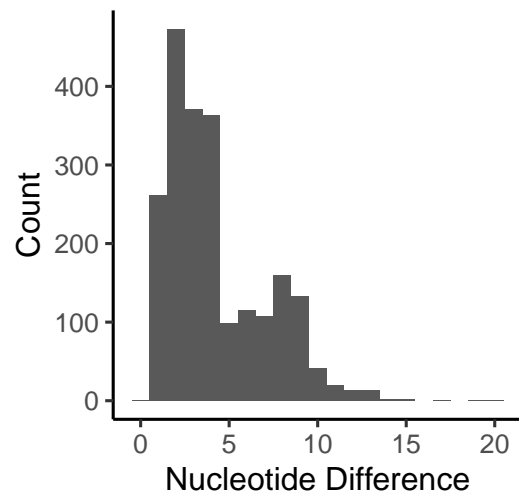
### IGHV4-31\*03

9825 sequences assigned  
2185 (22.2%) exact matches, in which:  
1851 unique CDR3  
6 unique J



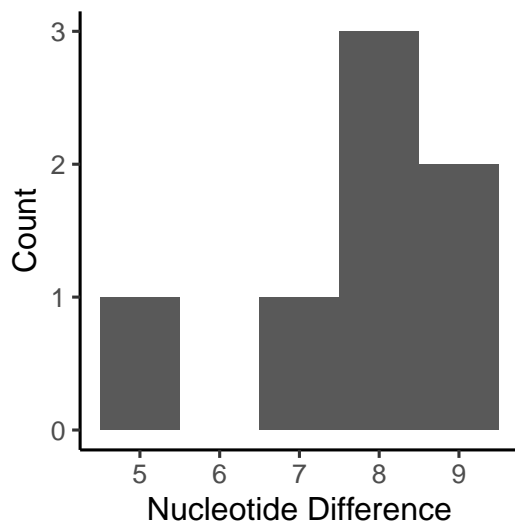
### IGHV4-39\*07

2202 sequences assigned  
1 (0%) exact matches, in which:  
1 unique CDR3  
1 unique J



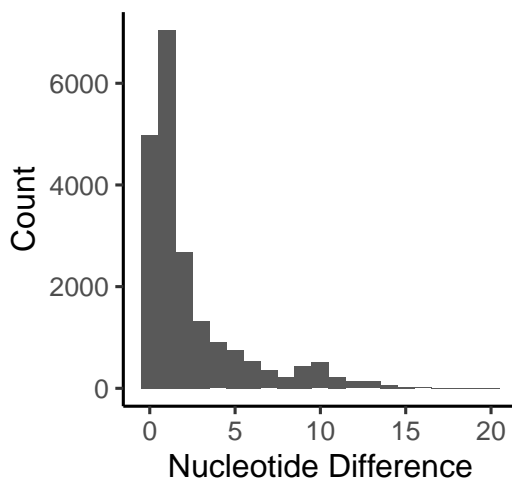
### IGHV4-30-4\*08

7 sequences assigned  
No exact matches.



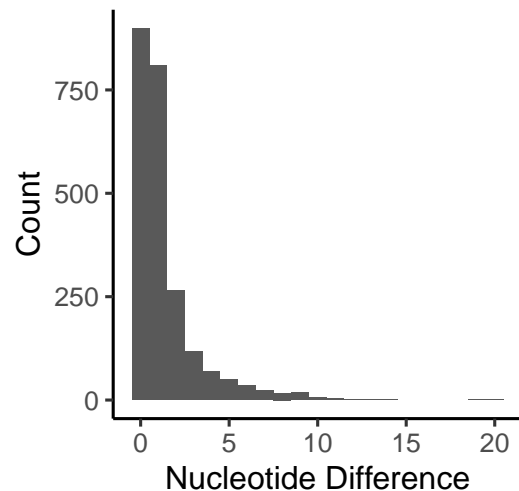
### IGHV4-34\*01

20531 sequences assigned  
4983 (24.3%) exact matches, in which:  
4177 unique CDR3  
6 unique J



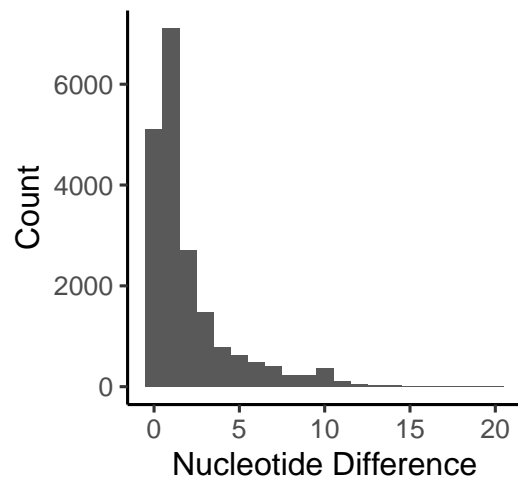
### IGHV4-39\*02\_C258G

2333 sequences assigned  
899 (38.5%) exact matches, in which:  
836 unique CDR3  
6 unique J



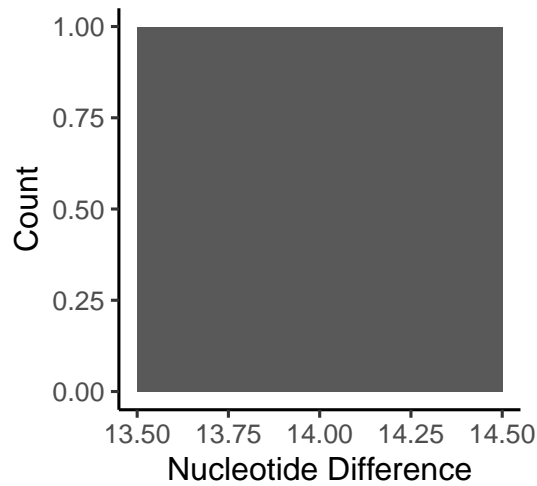
### IGHV4–59\*01

19845 sequences assigned  
5101 (25.7%) exact matches, in which:  
4186 unique CDR3  
6 unique J



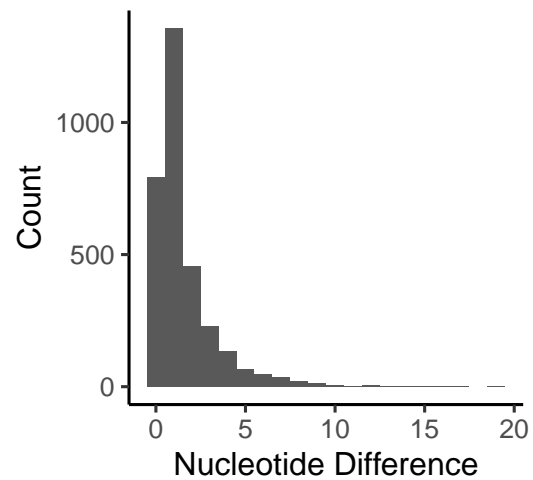
### IGHV1/OR15–3\*02

1 sequences assigned  
No exact matches.



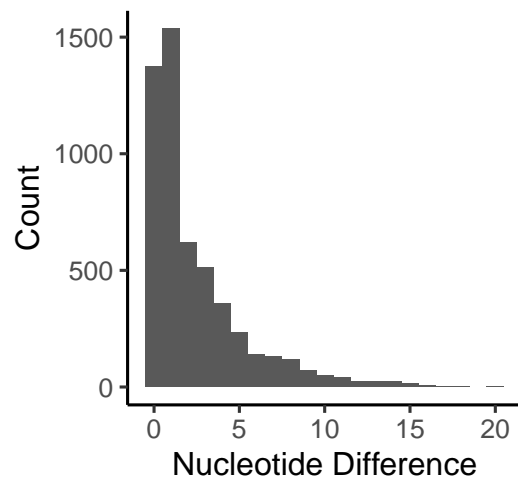
### IGHV6–1\*01

3177 sequences assigned  
794 (25%) exact matches, in which:  
604 unique CDR3  
6 unique J



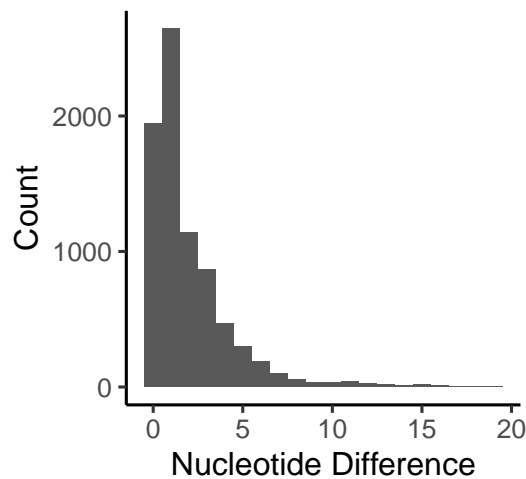
### IGHV4–61\*01

5295 sequences assigned  
1375 (26%) exact matches, in which:  
1229 unique CDR3  
6 unique J



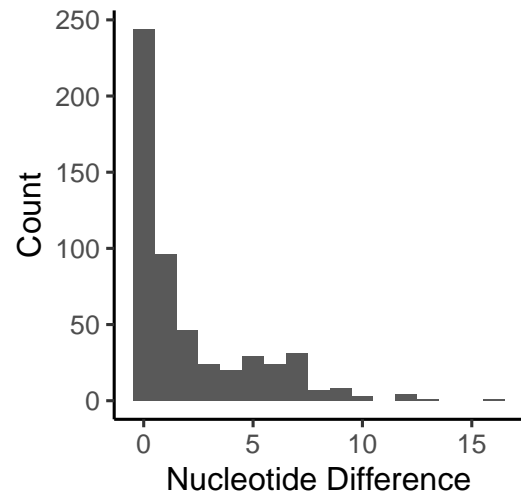
### IGHV5–10–1\*03

7979 sequences assigned  
1947 (24.4%) exact matches, in which:  
1645 unique CDR3  
6 unique J



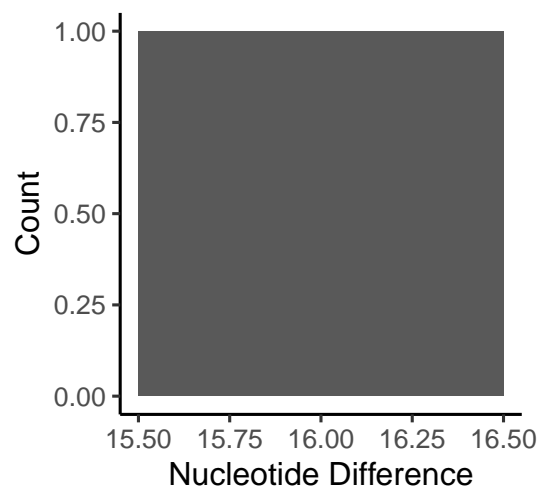
### IGHV6–1\*01\_A315G

539 sequences assigned  
244 (45.3%) exact matches, in which:  
244 unique CDR3  
6 unique J



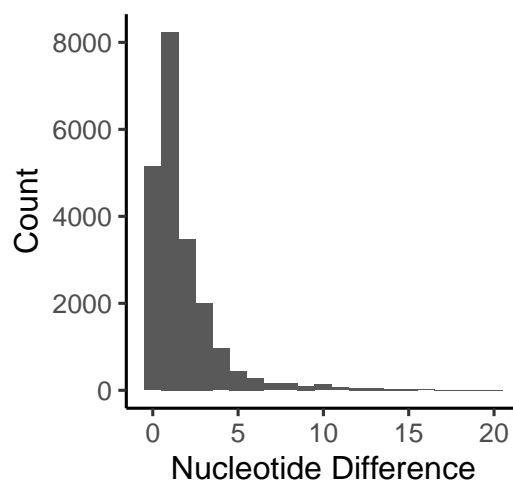
### IGHV1/OR15–1\*04

1 sequences assigned  
No exact matches.



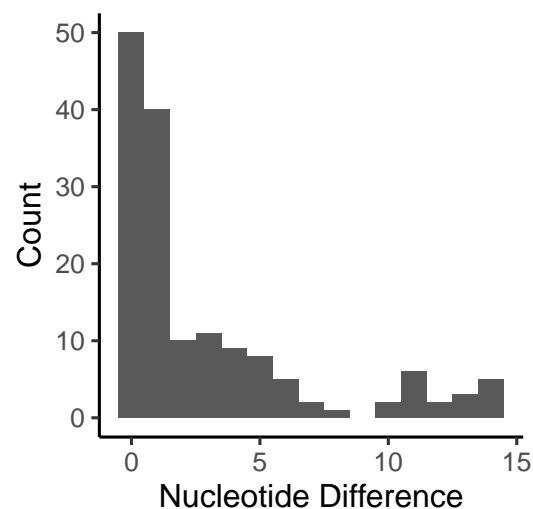
### IGHV5–51\*01

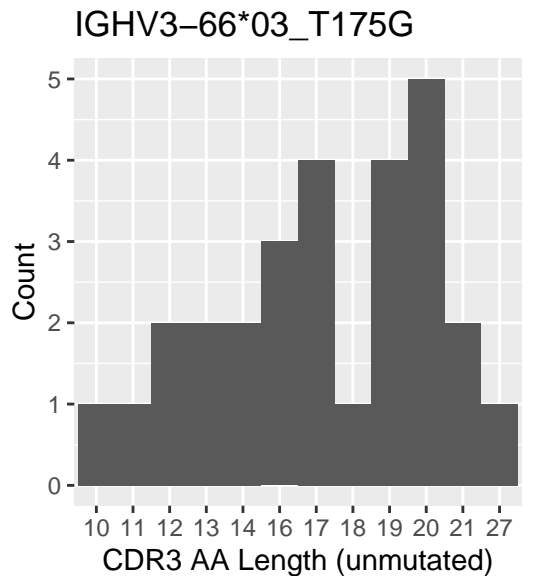
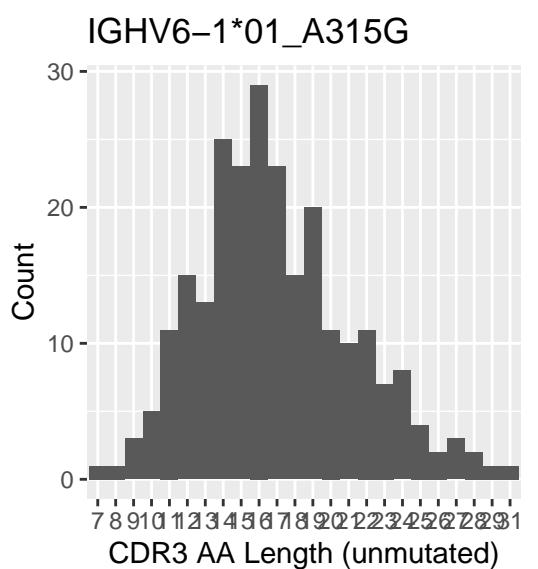
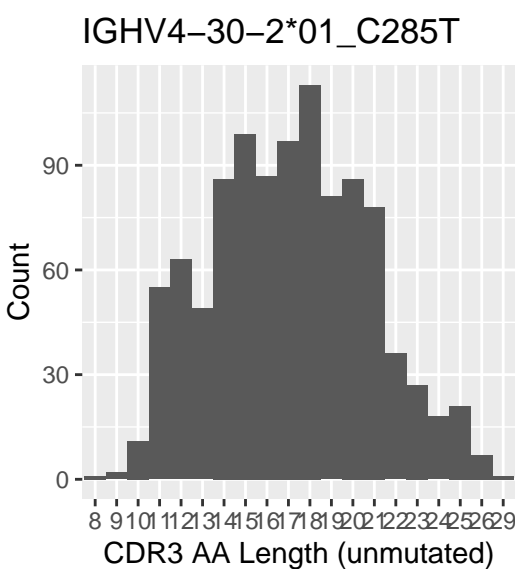
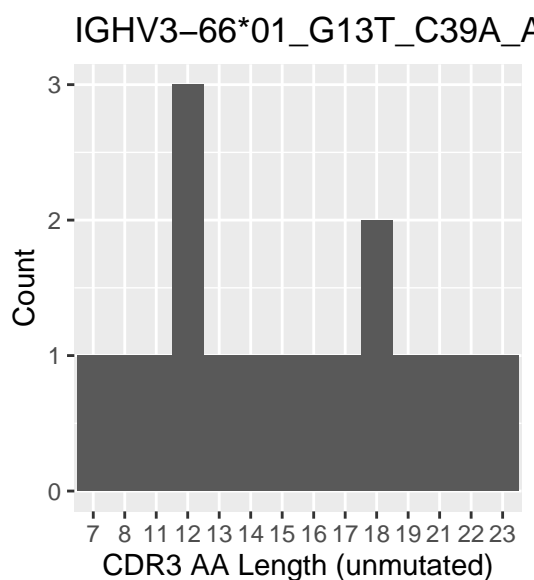
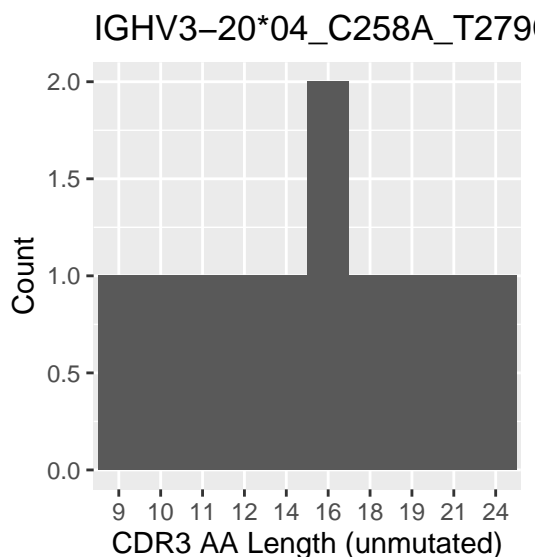
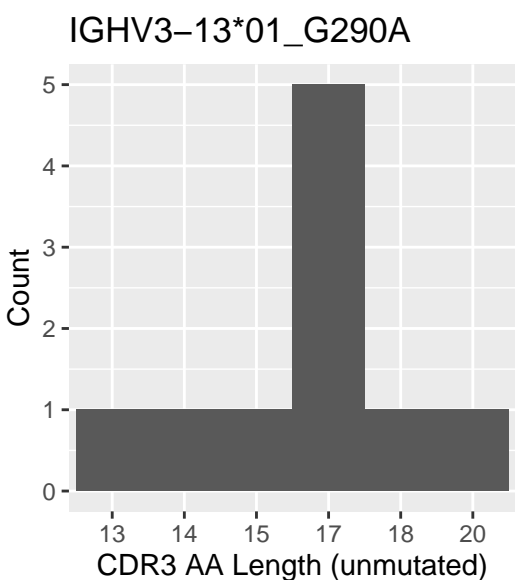
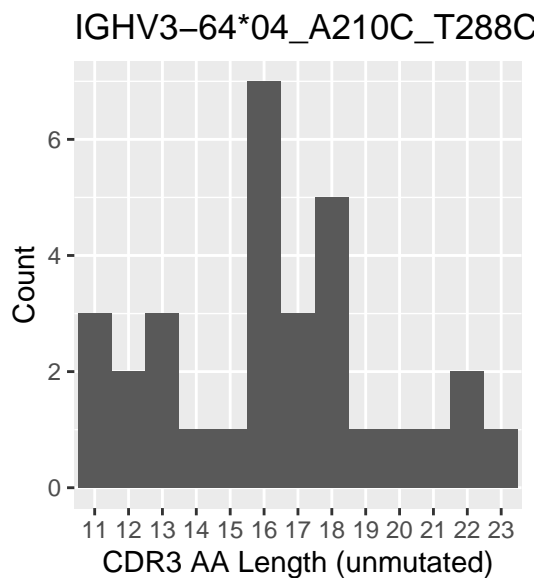
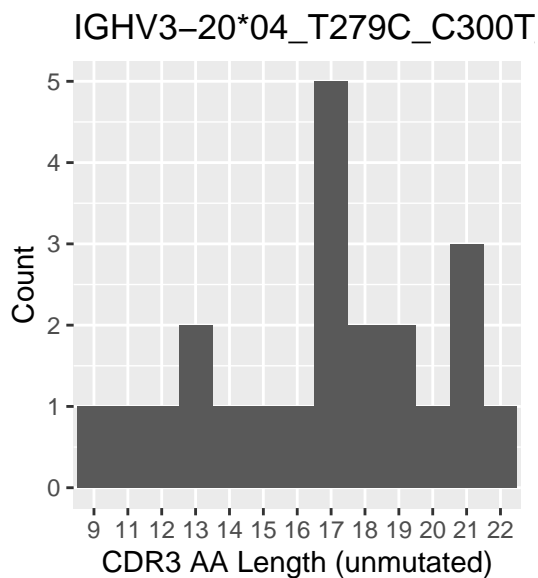
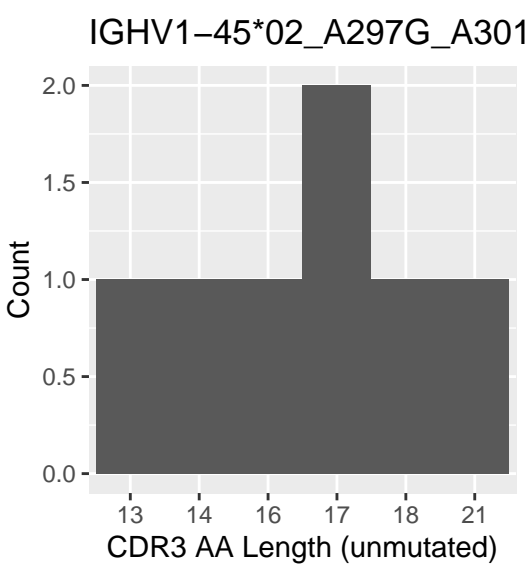
21509 sequences assigned  
5142 (23.9%) exact matches, in which:  
4094 unique CDR3  
6 unique J



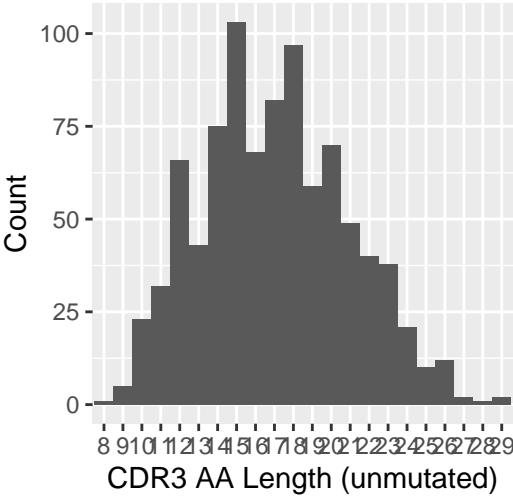
### IGHV7–4–1\*01

154 sequences assigned  
50 (32.5%) exact matches, in which:  
44 unique CDR3  
5 unique J

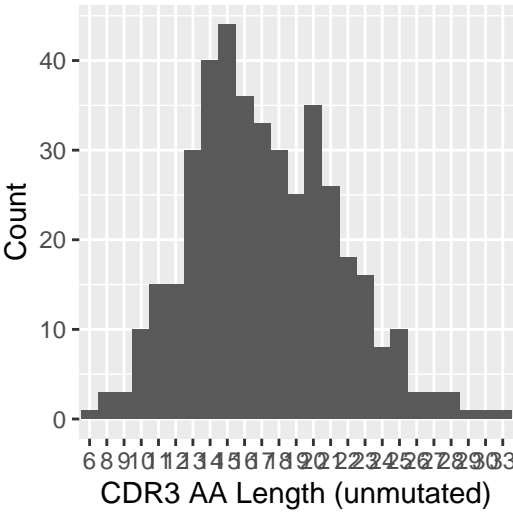




IGHV4-39\*02\_C258G



IGHV3-30\*03\_T288C



IGHV3-33\*06\_T300C\_G303A

