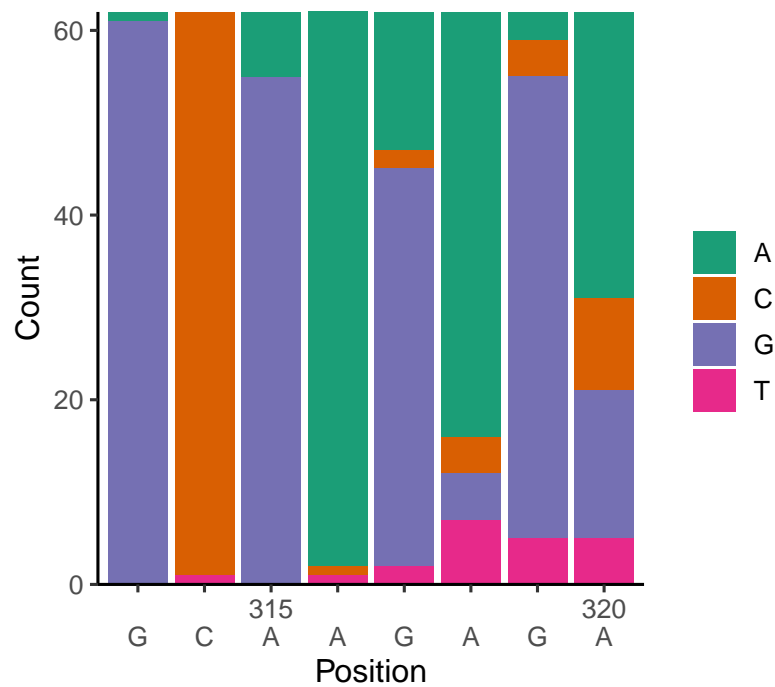
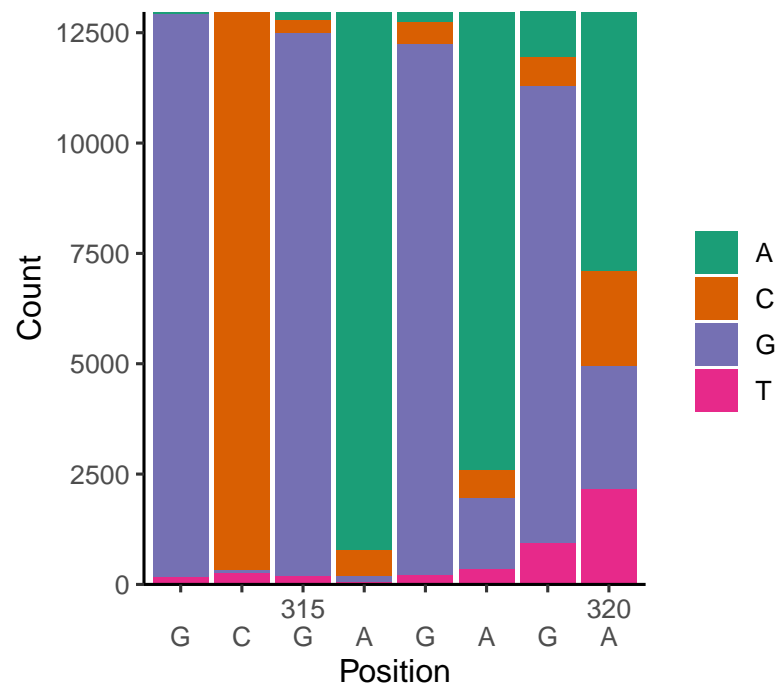


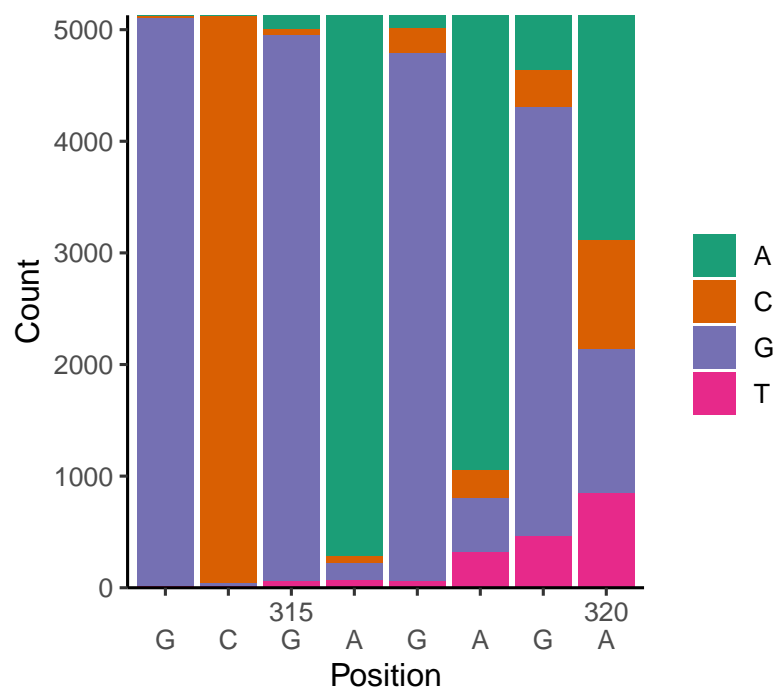
Gene IGHV3-13\*01\_A243C\_T246C\_C258



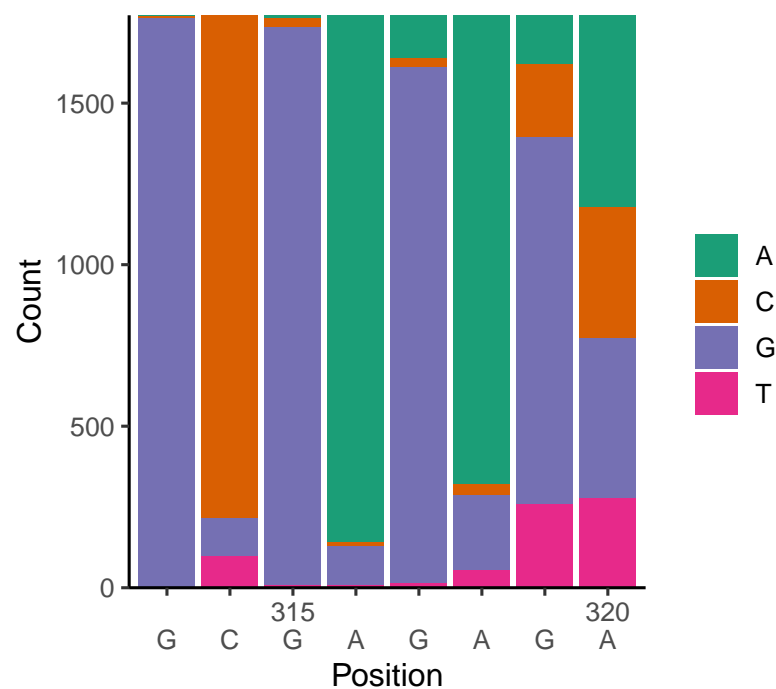
Gene IGHV1-18\*01\_A190G



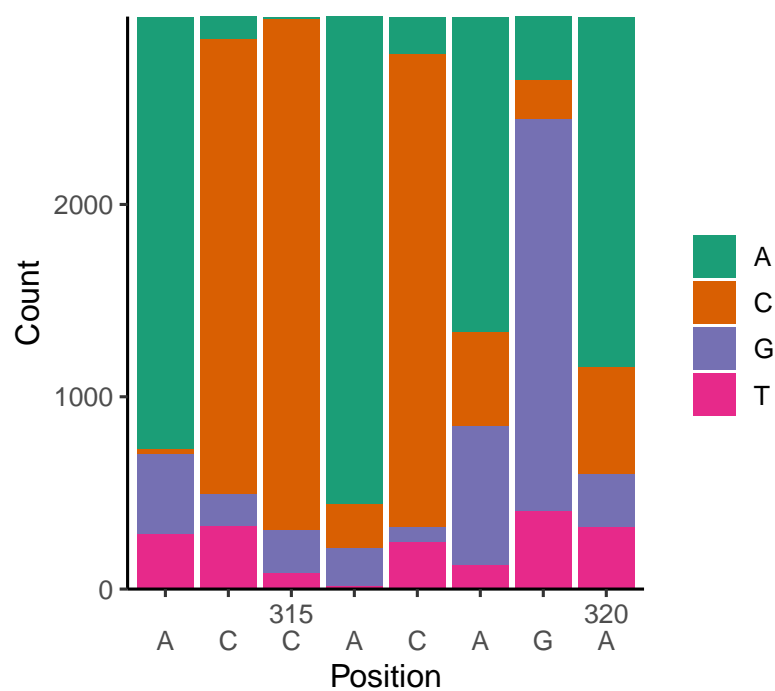
Gene IGHV1-69\*10\_A244G



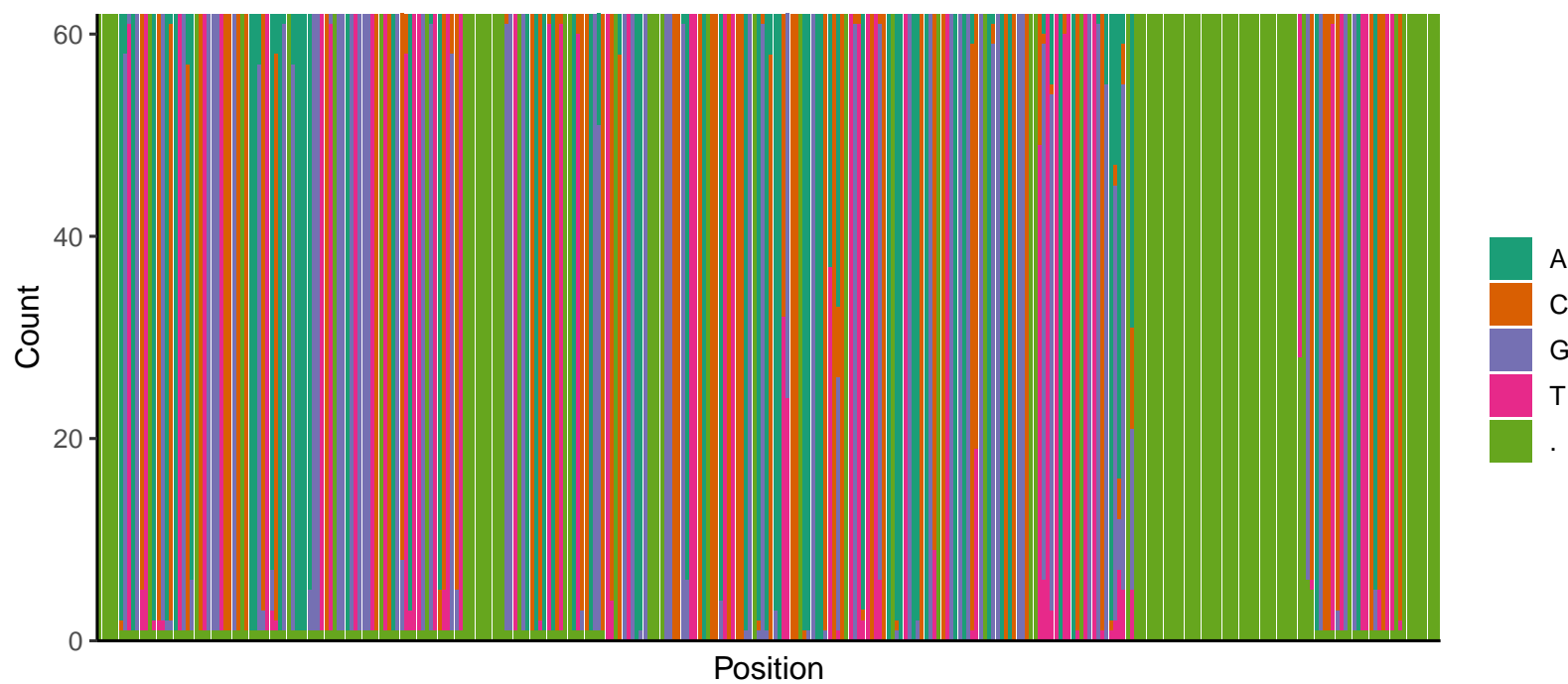
Gene IGHV4-31\*02\_C198T



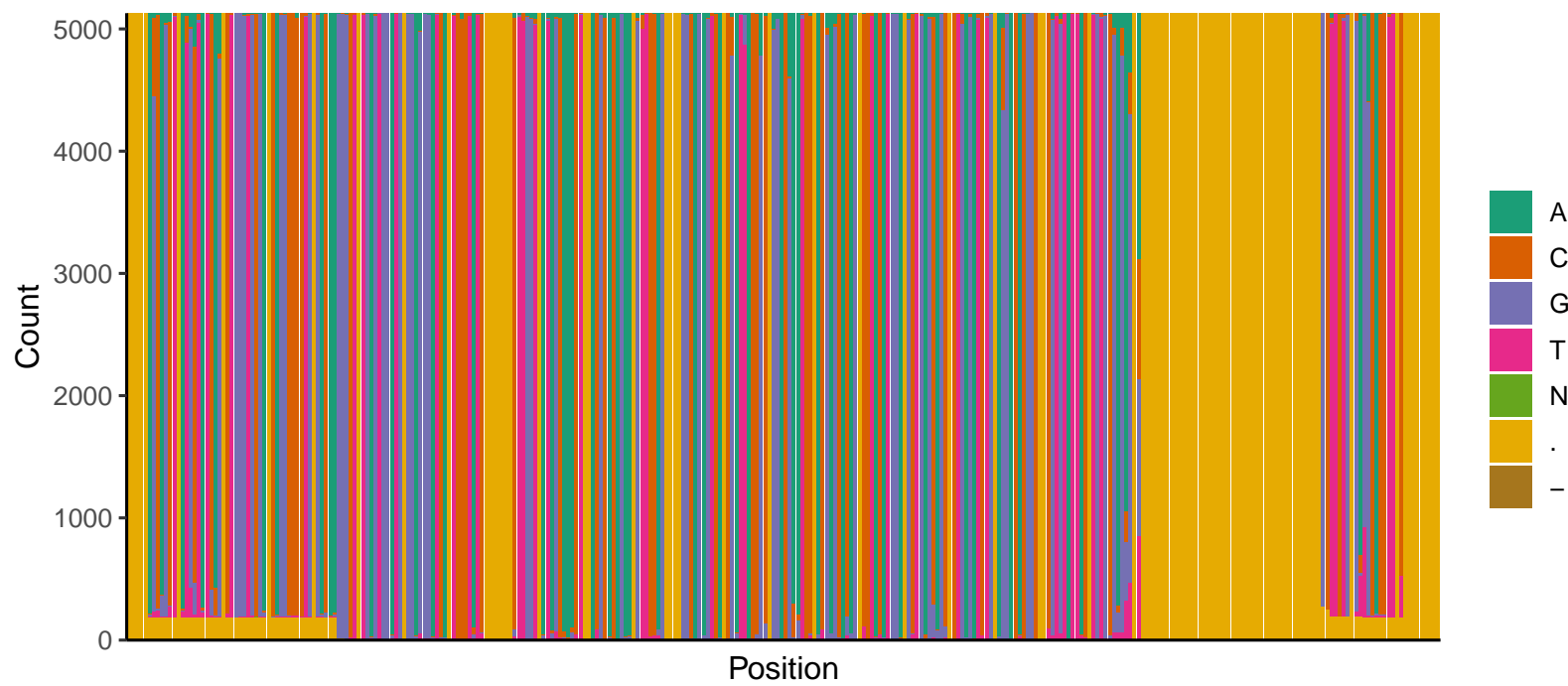
Gene IGHV3-15\*07\_C159T



Gene IGHV3-13\*01\_A243C\_T246C\_C258A\_T259C\_T267G\_G290A



Gene IGHV1-69\*10\_A244G



Gene IGHV3-15\*07\_C159T



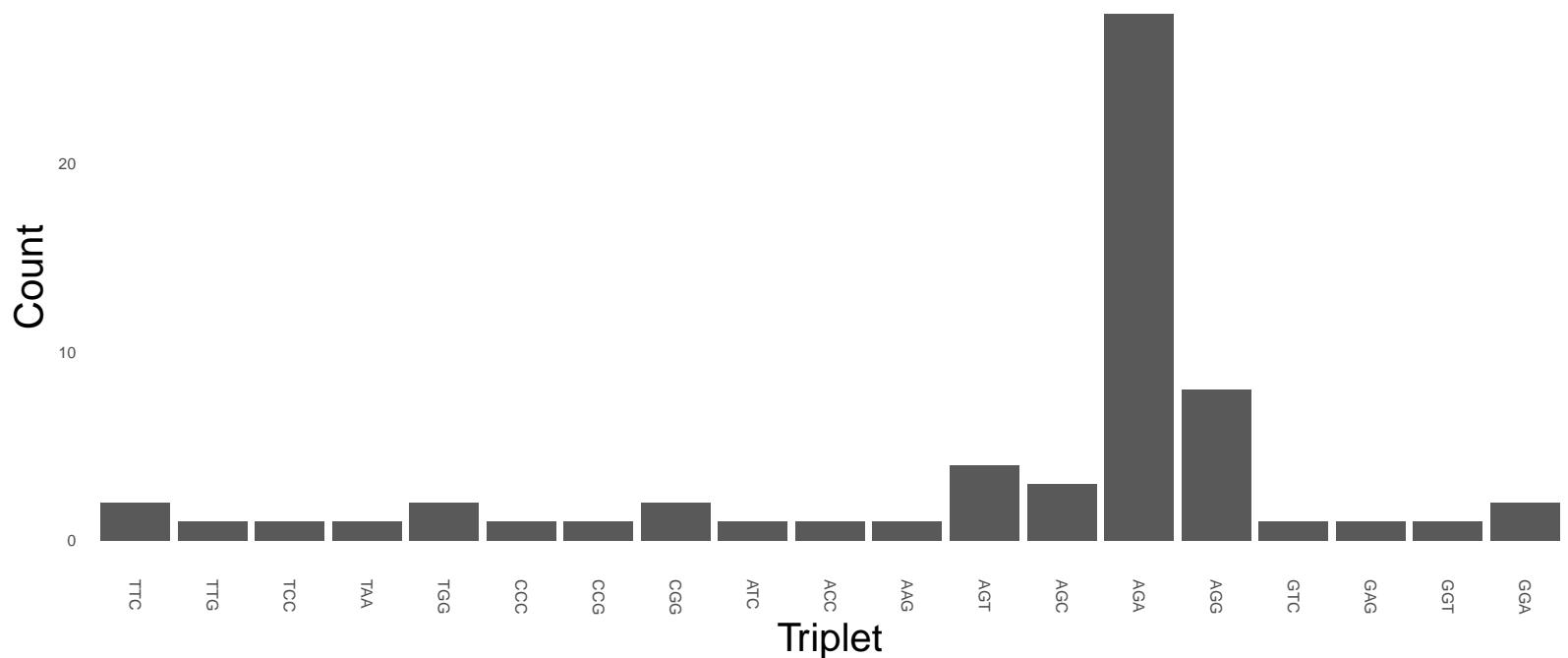
Gene IGHV1-18\*01\_A190G



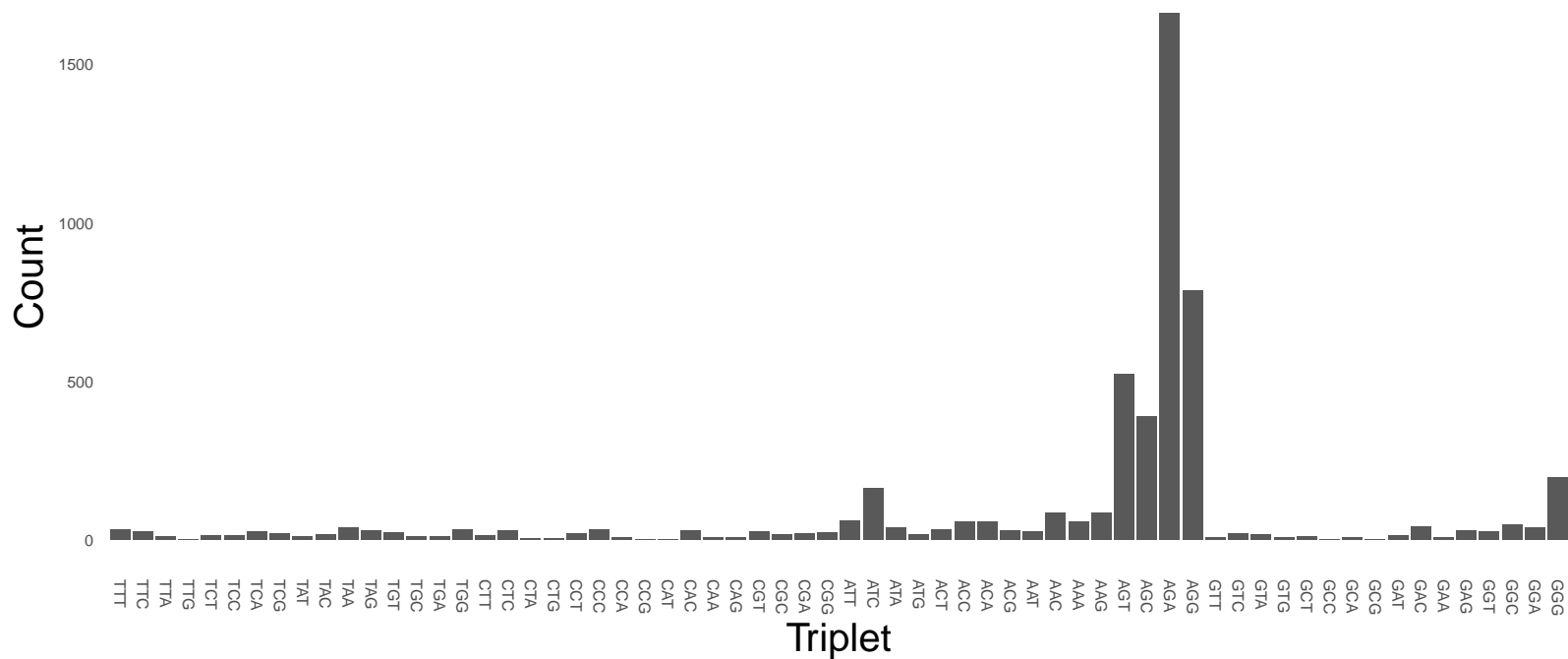
Gene IGHV4-31\*02\_C198T



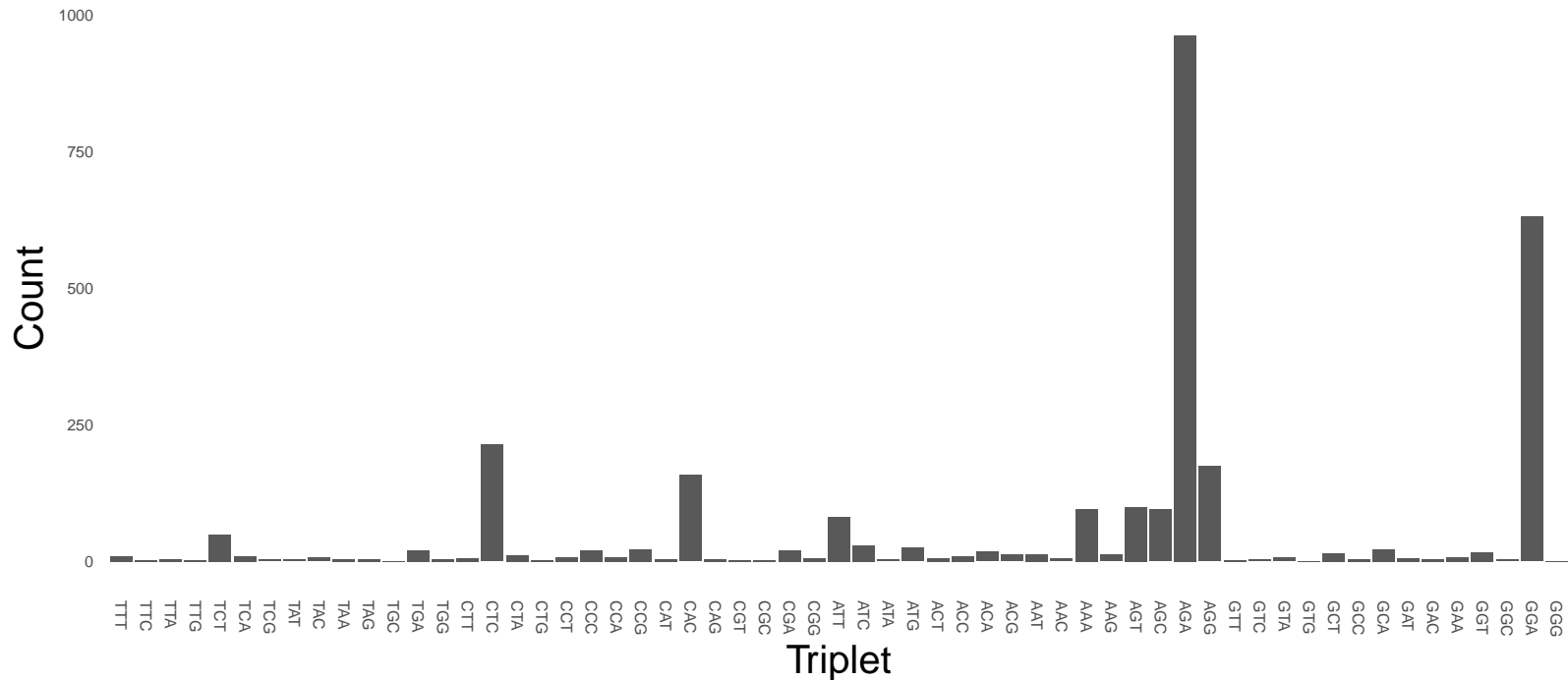
IGHV3-13\*01\_A243C\_T246C\_C258A\_T259C\_T267G\_G290A- Final 3 nucleotides as a triplet



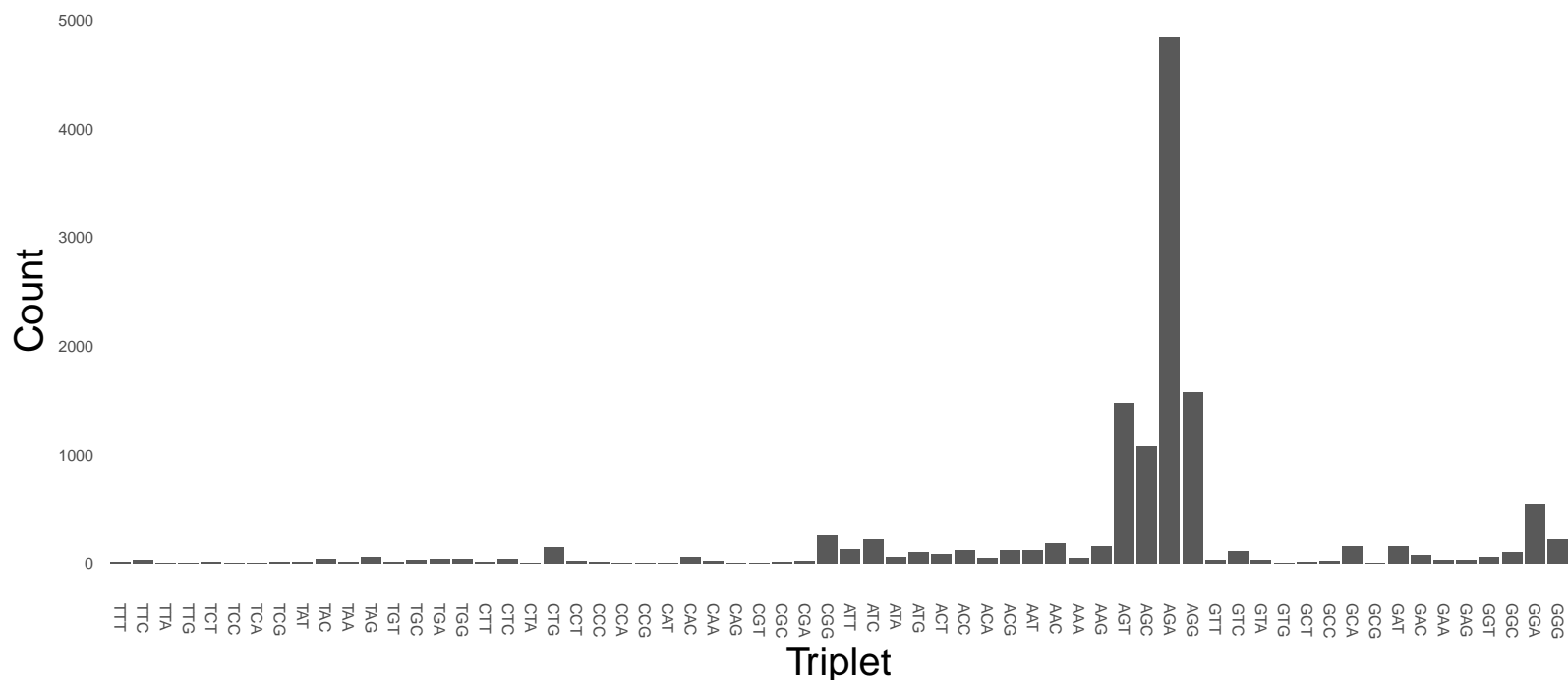
IGHV1-69\*10\_A244G- Final 3 nucleotides as a triplet



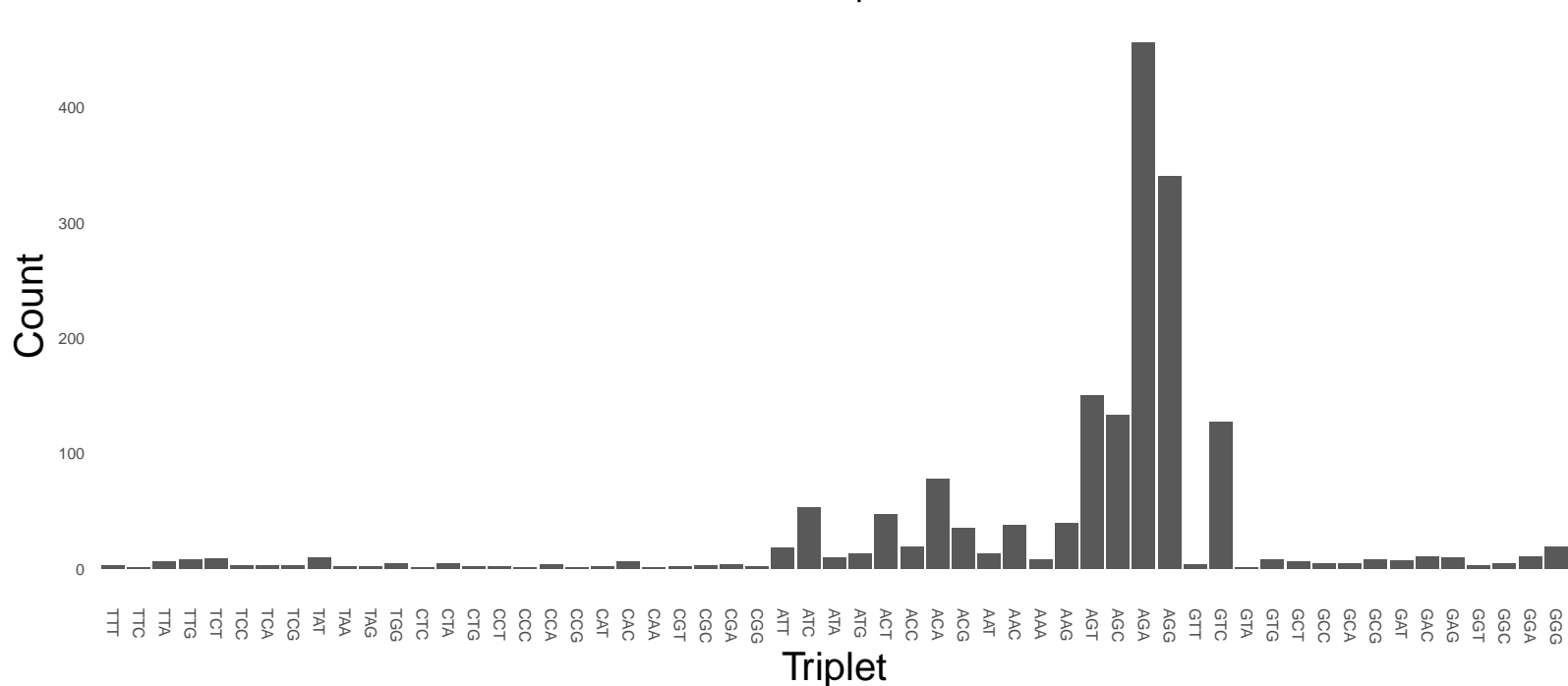
IGHV3-15\*07\_C159T- Final 3 nucleotides as a triplet



IGHV1-18\*01\_A190G- Final 3 nucleotides as a triplet

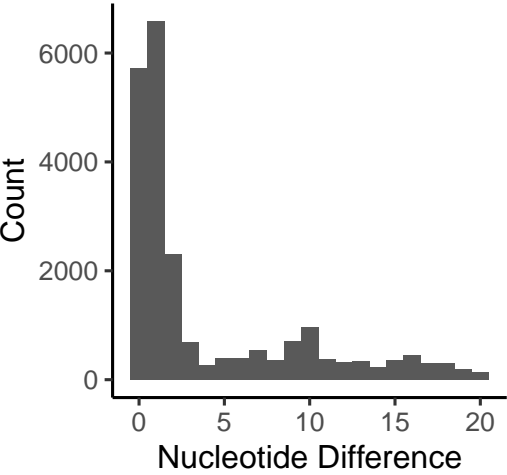


IGHV4-31\*02\_C198T- Final 3 nucleotides as a triplet



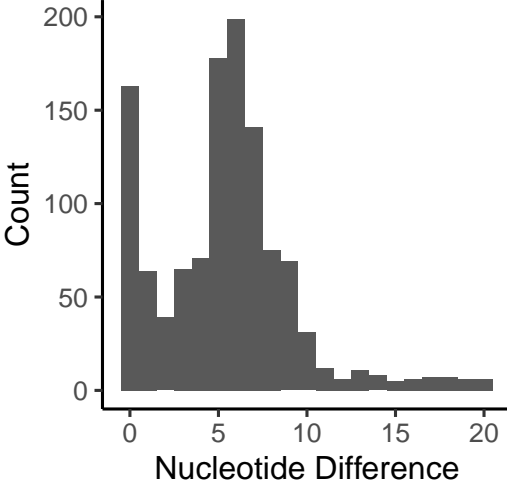
IGHV1-2\*02

24271 sequences assigned  
5714 (23.5%) exact matches, in which:  
4662 unique CDR3  
6 unique J



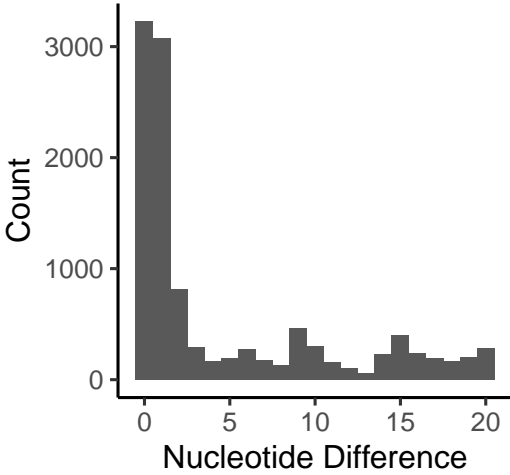
IGHV1-8\*02

1181 sequences assigned  
163 (13.8%) exact matches, in which:  
161 unique CDR3  
5 unique J



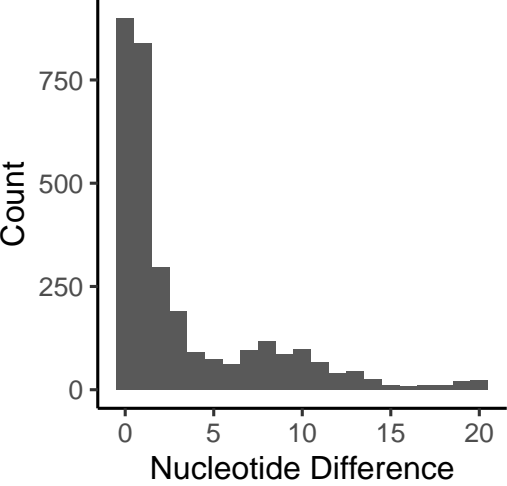
IGHV1-18\*01\_A190G

12971 sequences assigned  
3227 (24.9%) exact matches, in which:  
2722 unique CDR3  
6 unique J



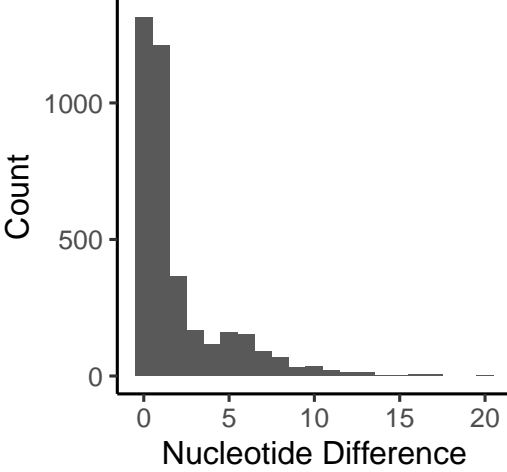
IGHV1-3\*01\_05

3465 sequences assigned  
900 (26%) exact matches, in which:  
759 unique CDR3  
6 unique J



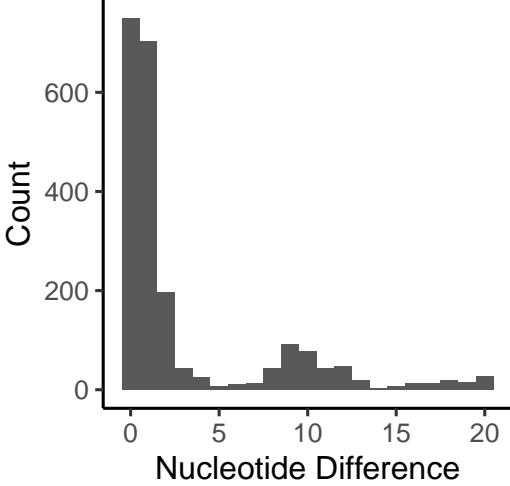
IGHV1-8\*03

3820 sequences assigned  
1312 (34.3%) exact matches, in which:  
1129 unique CDR3  
6 unique J



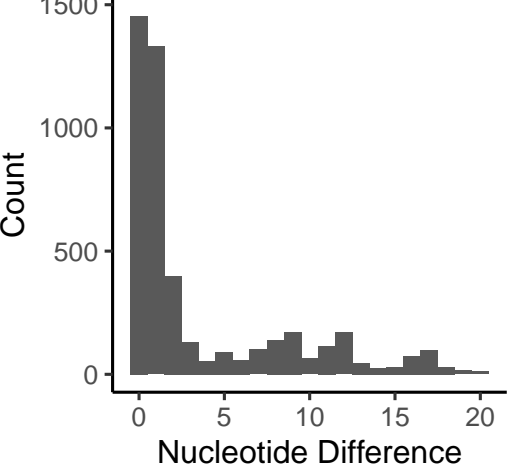
IGHV1-24\*01

2853 sequences assigned  
750 (26.3%) exact matches, in which:  
638 unique CDR3  
6 unique J



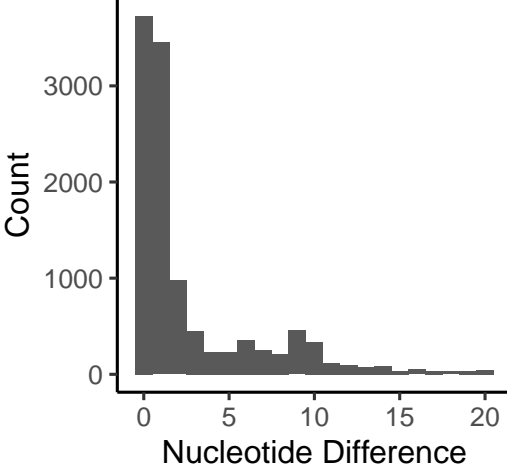
IGHV1-8\*01

4674 sequences assigned  
1454 (31.1%) exact matches, in which:  
1275 unique CDR3  
6 unique J



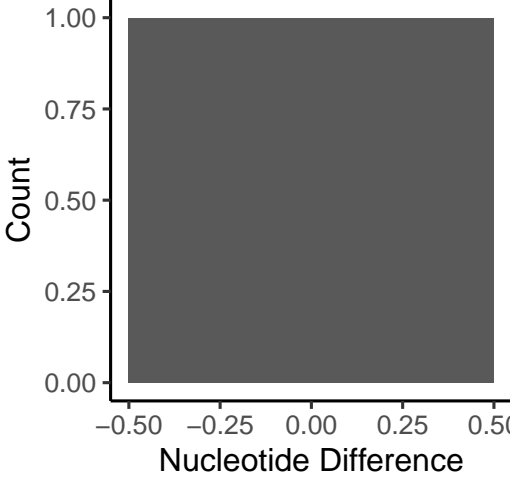
IGHV1-18\*01

11925 sequences assigned  
3726 (31.2%) exact matches, in which:  
3165 unique CDR3  
6 unique J



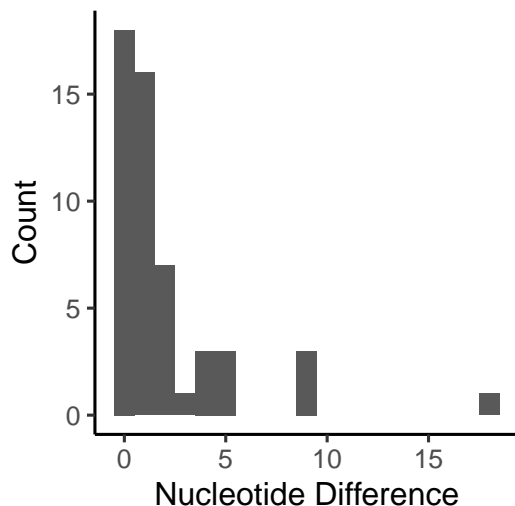
IGHV1-38-4\*01

1 sequences assigned  
1 (100%) exact matches, in which:  
1 unique CDR3  
1 unique J



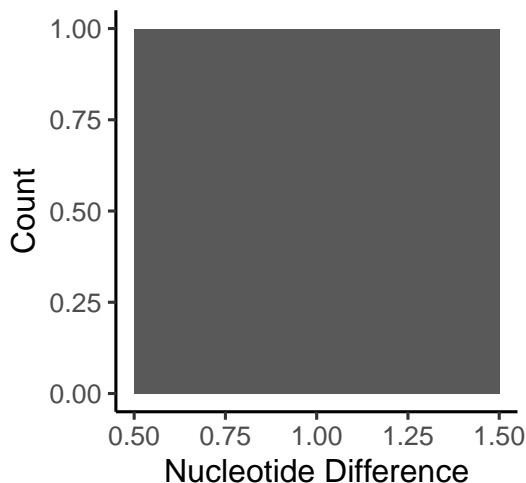
## IGHV1-45\*02

52 sequences assigned  
18 (34.6%) exact matches, in which:  
15 unique CDR3  
2 unique J



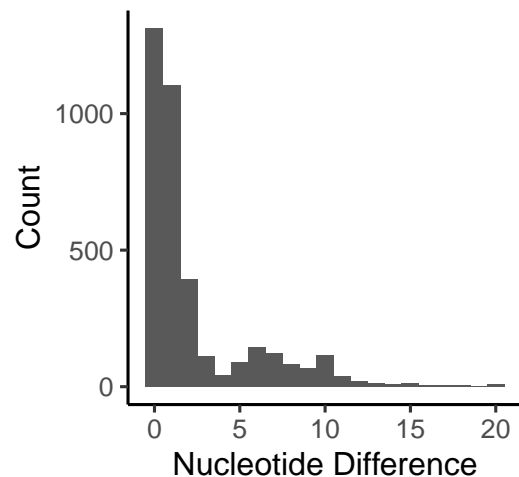
## IGHV1-68\*02\_03

1 sequences assigned  
No exact matches.



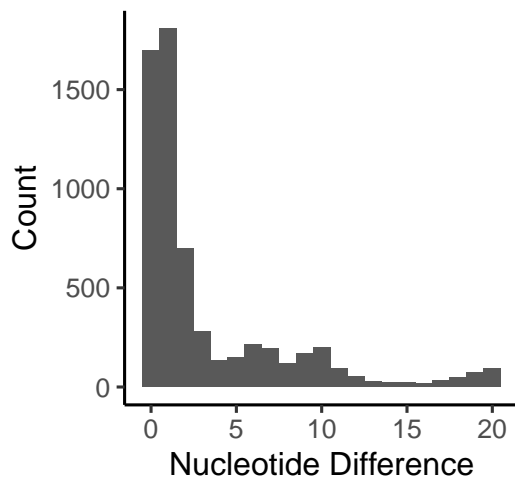
## IGHV1-69\*05

3902 sequences assigned  
1312 (33.6%) exact matches, in which:  
1174 unique CDR3  
6 unique J



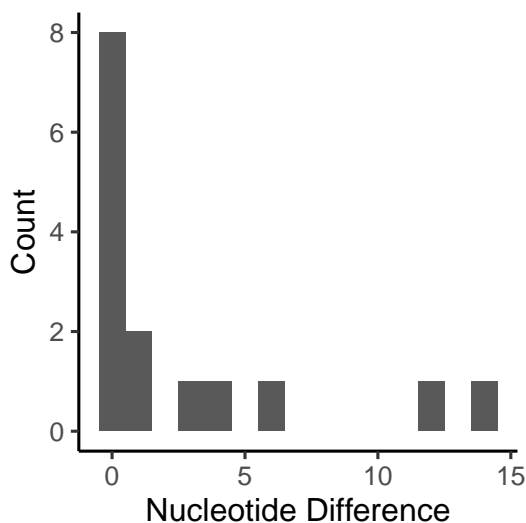
## IGHV1-46\*01

6612 sequences assigned  
1696 (25.7%) exact matches, in which:  
1434 unique CDR3  
6 unique J



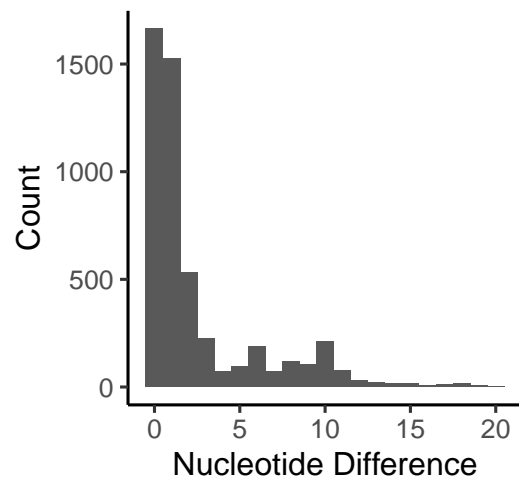
## IGHV1-69-2\*01

20 sequences assigned  
8 (40%) exact matches, in which:  
6 unique CDR3  
4 unique J



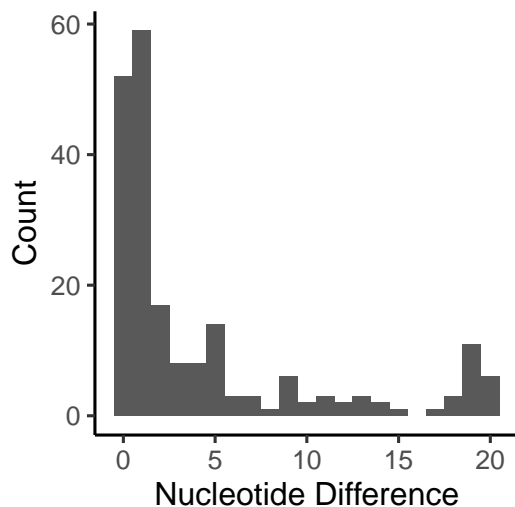
## IGHV1-69\*10\_A244G

5129 sequences assigned  
1664 (32.4%) exact matches, in which:  
1484 unique CDR3  
6 unique J



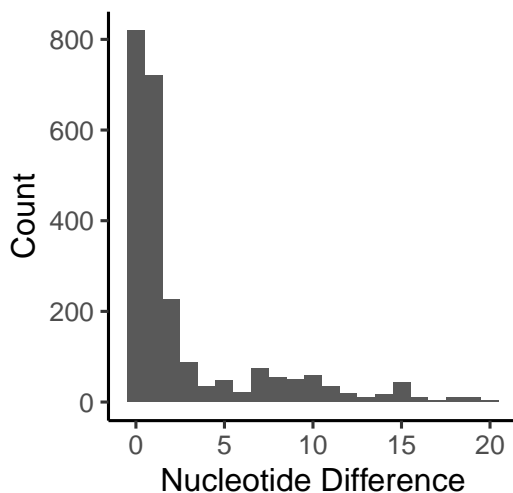
## IGHV1-58\*02

267 sequences assigned  
52 (19.5%) exact matches, in which:  
41 unique CDR3  
5 unique J



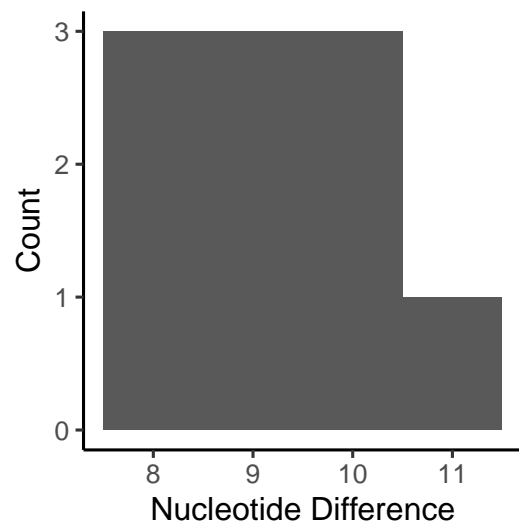
## IGHV1-69\*02

3112 sequences assigned  
820 (26.3%) exact matches, in which:  
730 unique CDR3  
6 unique J



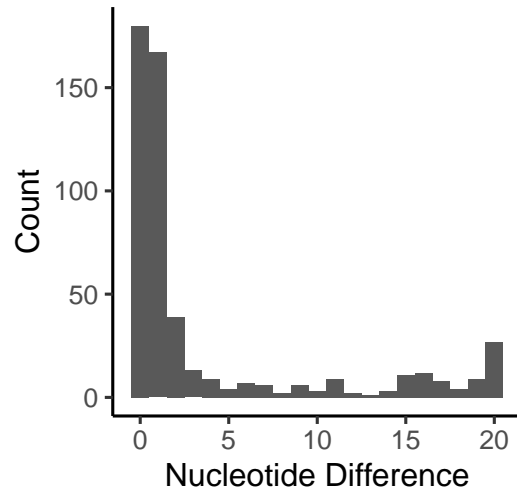
## IGHV1-NL1\*01

10 sequences assigned  
No exact matches.



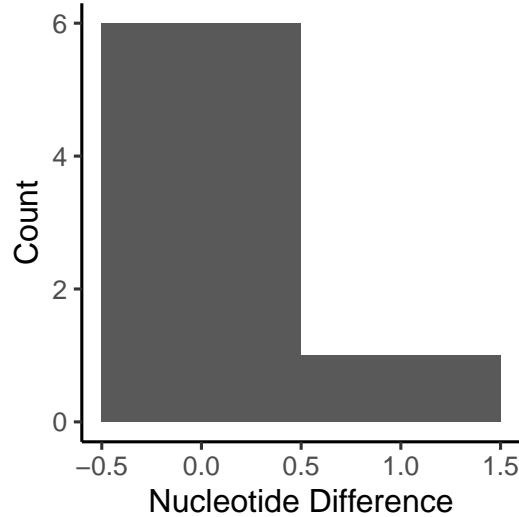
### IGHV2-5\*01

870 sequences assigned  
180 (20.7%) exact matches, in which:  
157 unique CDR3  
6 unique J



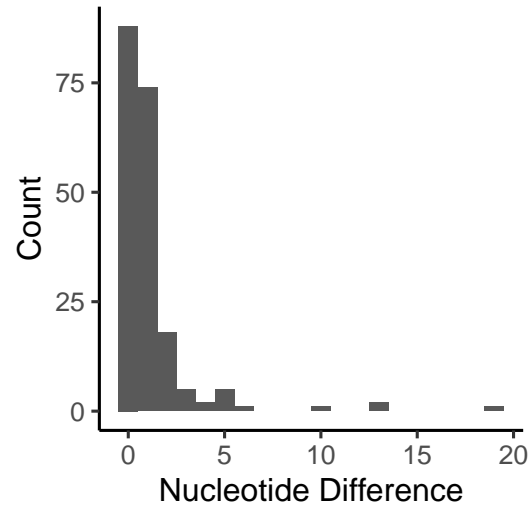
### IGHV2-26\*02

7 sequences assigned  
6 (85.7%) exact matches, in which:  
6 unique CDR3  
3 unique J



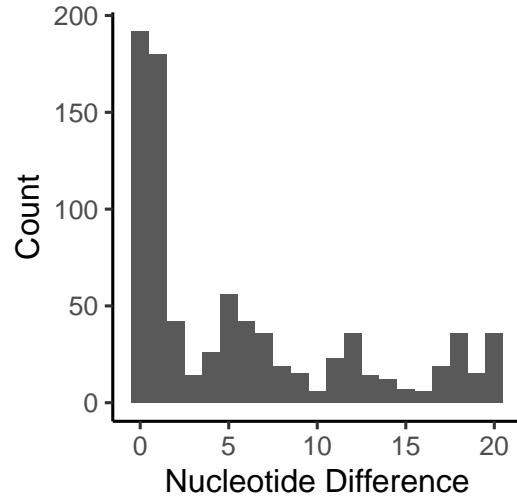
### IGHV2-70\*20

257 sequences assigned  
88 (34.2%) exact matches, in which:  
63 unique CDR3  
5 unique J



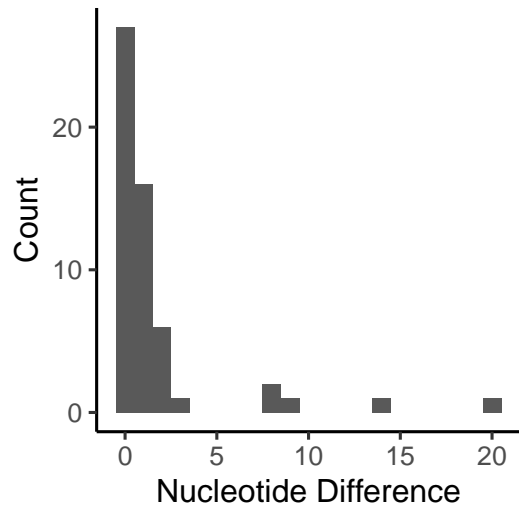
### IGHV2-5\*02

1102 sequences assigned  
192 (17.4%) exact matches, in which:  
169 unique CDR3  
5 unique J



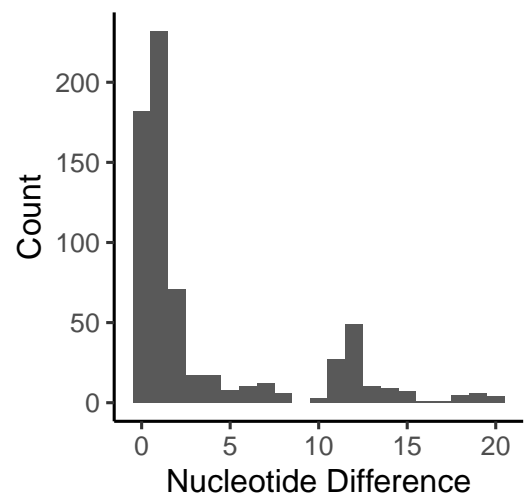
### IGHV2-26\*04

170 sequences assigned  
27 (15.9%) exact matches, in which:  
23 unique CDR3  
4 unique J



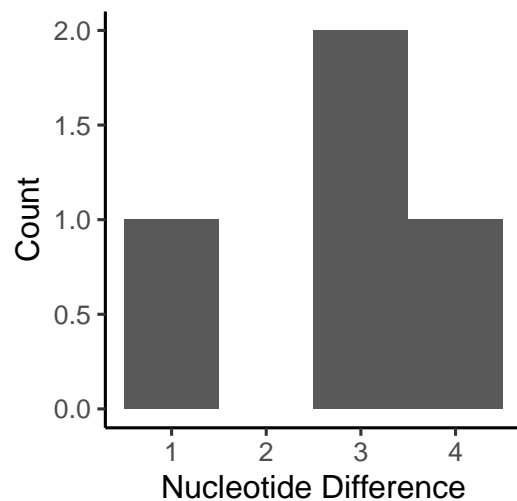
### IGHV2-70\*11\_15

714 sequences assigned  
182 (25.5%) exact matches, in which:  
149 unique CDR3  
6 unique J



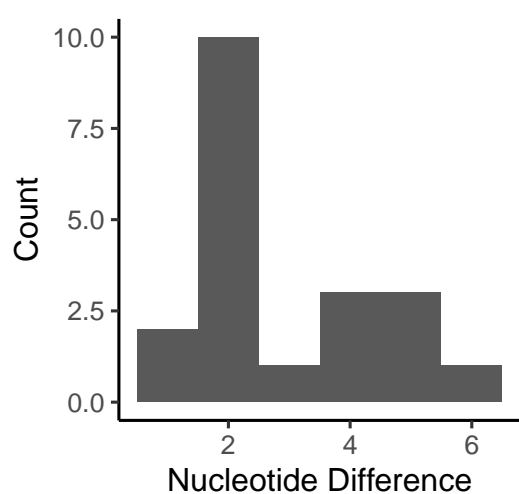
### IGHV2-26\*01

5 sequences assigned  
No exact matches.



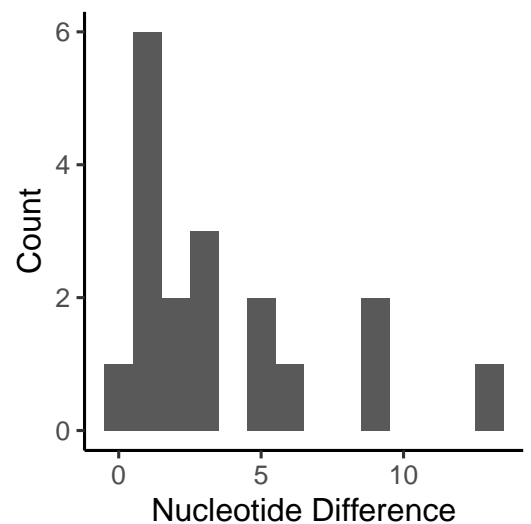
### IGHV2-70\*12

21 sequences assigned  
No exact matches.



### IGHV2-70D\*04

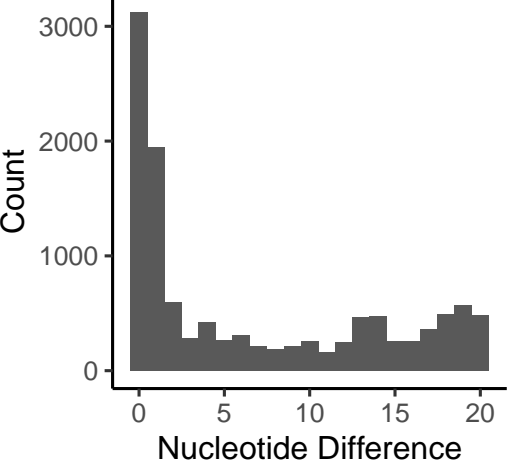
19 sequences assigned  
1 (5.3%) exact matches, in which:  
1 unique CDR3  
1 unique J





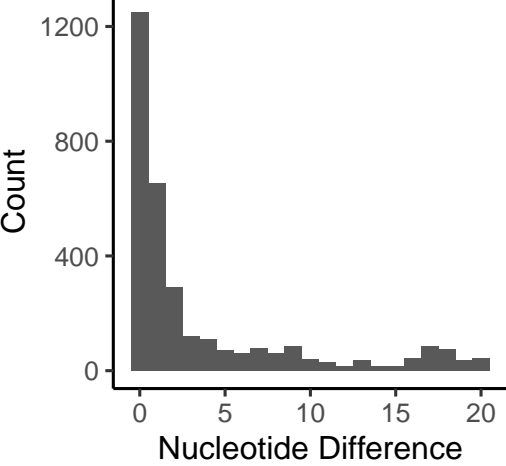
IGHV3-7\*01

16484 sequences assigned  
3121 (18.9%) exact matches, in which:  
2050 unique CDR3  
6 unique J



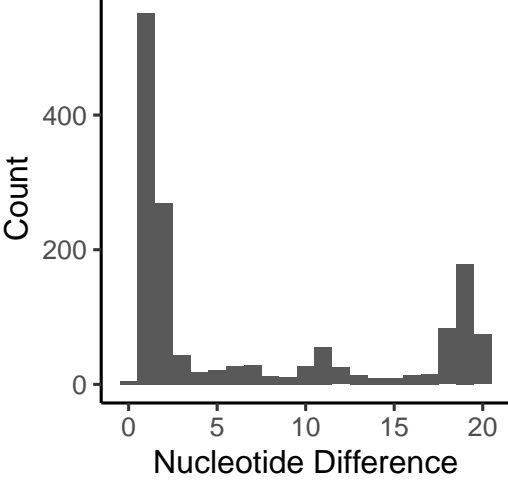
IGHV3-11\*04

4671 sequences assigned  
1249 (26.7%) exact matches, in which:  
865 unique CDR3  
6 unique J



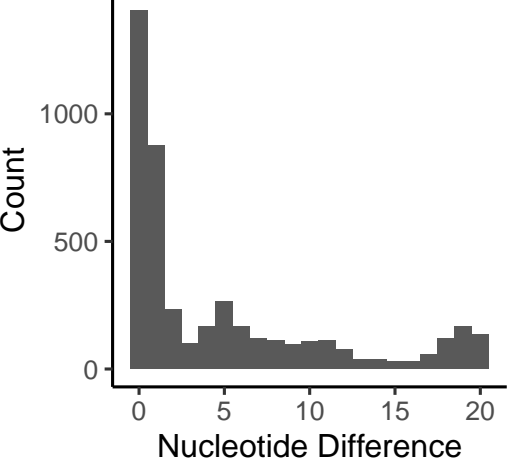
IGHV3-15\*01\_02

1925 sequences assigned  
5 (0.3%) exact matches, in which:  
5 unique CDR3  
3 unique J



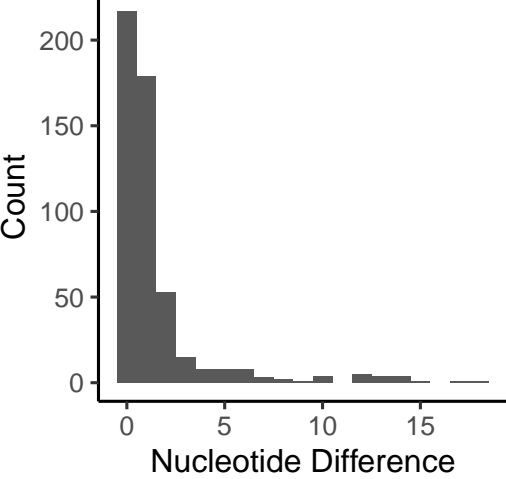
IGHV3-9\*01

5167 sequences assigned  
1404 (27.2%) exact matches, in which:  
848 unique CDR3  
6 unique J



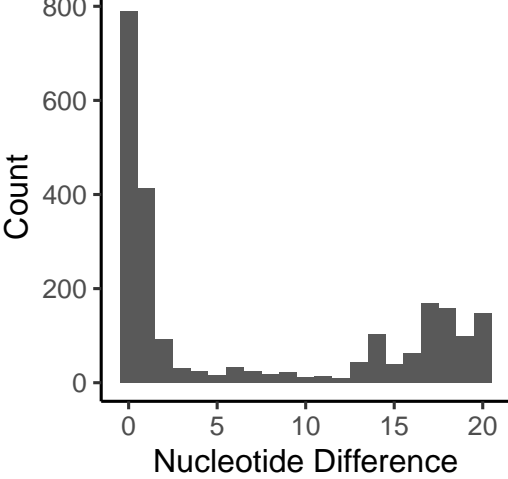
IGHV3-13\*01

519 sequences assigned  
217 (41.8%) exact matches, in which:  
133 unique CDR3  
6 unique J



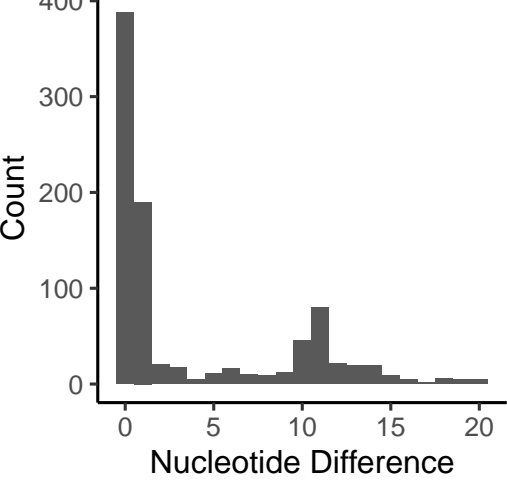
IGHV3-15\*07\_C159T

2977 sequences assigned  
790 (26.5%) exact matches, in which:  
526 unique CDR3  
6 unique J



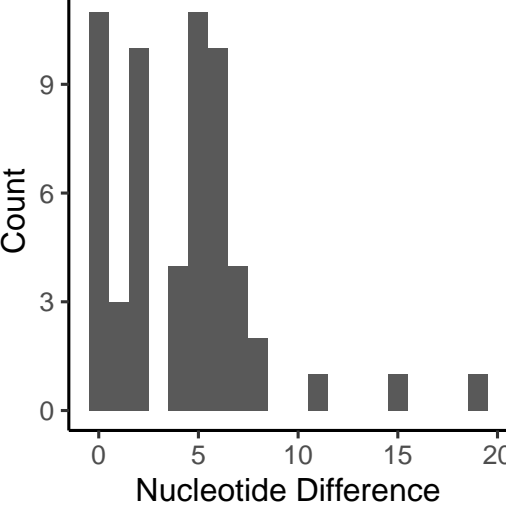
IGHV3-9\*03

901 sequences assigned  
388 (43.1%) exact matches, in which:  
225 unique CDR3  
6 unique J



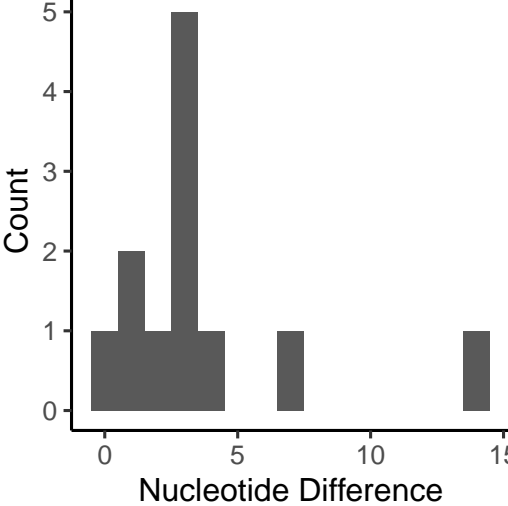
IGHV3-13\*01\_A243C\_T244

62 sequences assigned  
11 (17.7%) exact matches, in which:  
11 unique CDR3  
5 unique J



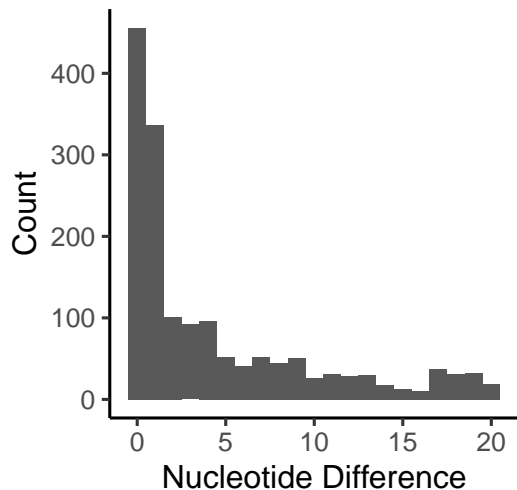
IGHV3-19\*01

12 sequences assigned  
1 (8.3%) exact matches, in which:  
1 unique CDR3  
0 unique J



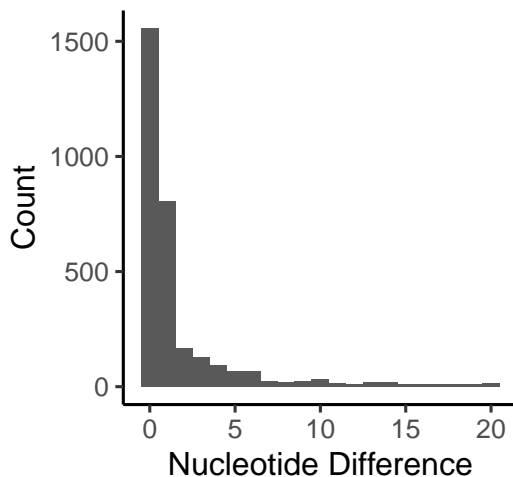
### IGHV3-20\*03\_04

1785 sequences assigned  
456 (25.5%) exact matches, in which:  
294 unique CDR3  
6 unique J



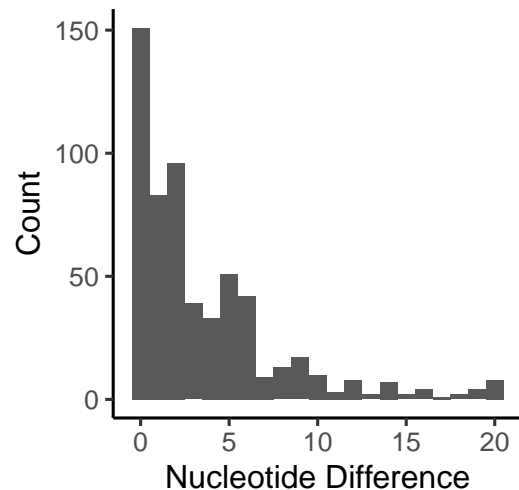
### IGHV3-30-3\*01

3765 sequences assigned  
1556 (41.3%) exact matches, in which:  
1029 unique CDR3  
6 unique J



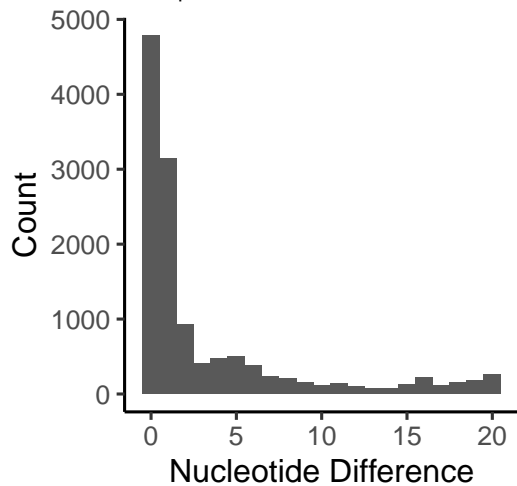
### IGHV3-33\*08

812 sequences assigned  
151 (18.6%) exact matches, in which:  
134 unique CDR3  
6 unique J



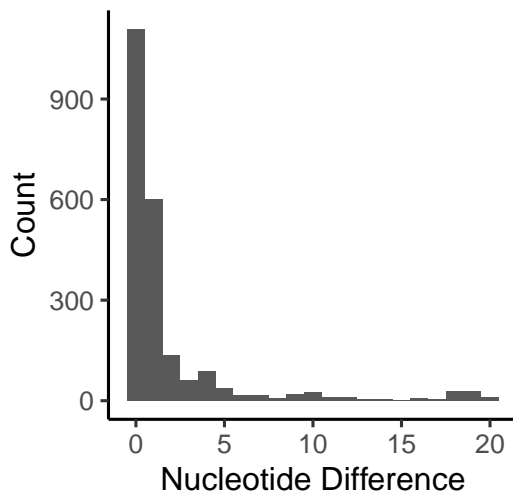
### IGHV3-21\*01\_02

16124 sequences assigned  
4782 (29.7%) exact matches, in which:  
2984 unique CDR3  
6 unique J



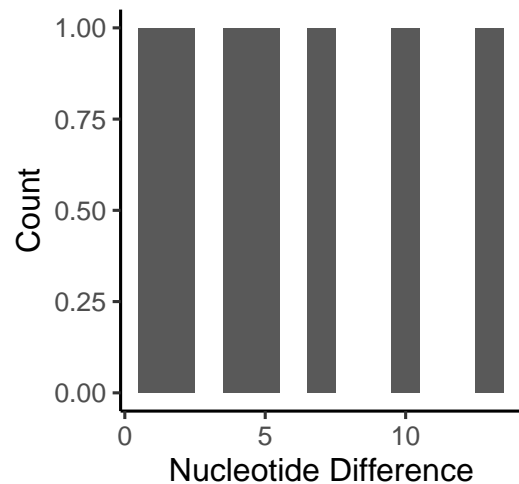
### IGHV3-33\*01

2493 sequences assigned  
1109 (44.5%) exact matches, in which:  
739 unique CDR3  
6 unique J



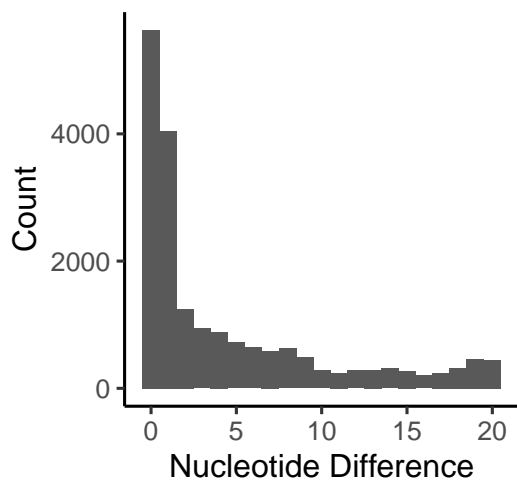
### IGHV3-35\*01

7 sequences assigned  
No exact matches.



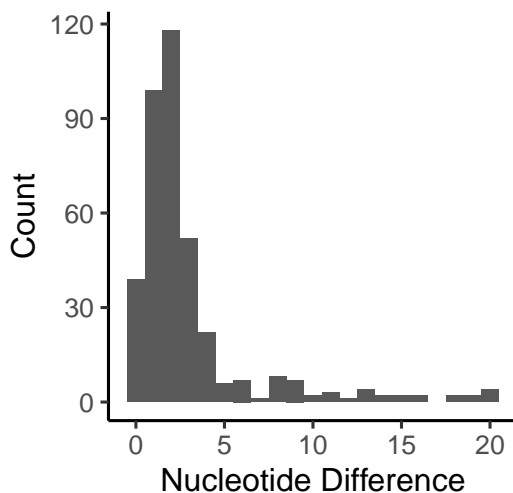
### IGHV3-23\*01\_04

26922 sequences assigned  
5632 (20.9%) exact matches, in which:  
3237 unique CDR3  
6 unique J



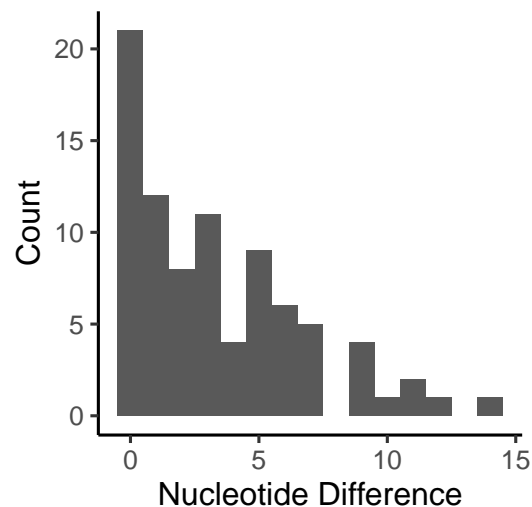
### IGHV3-33\*06

407 sequences assigned  
39 (9.6%) exact matches, in which:  
39 unique CDR3  
5 unique J



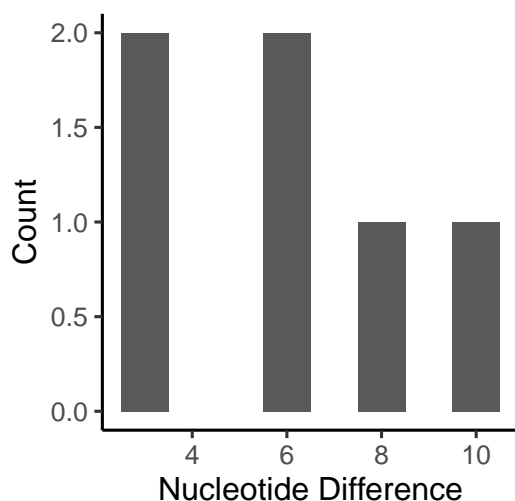
### IGHV3-38-3\*01

85 sequences assigned  
21 (24.7%) exact matches, in which:  
21 unique CDR3  
5 unique J



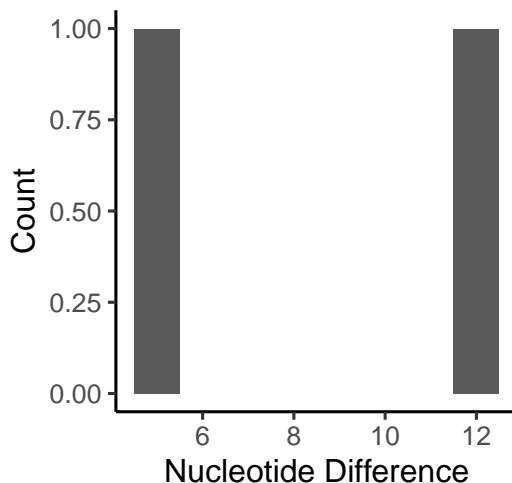
### IGHV3-38\*03

6 sequences assigned  
No exact matches.



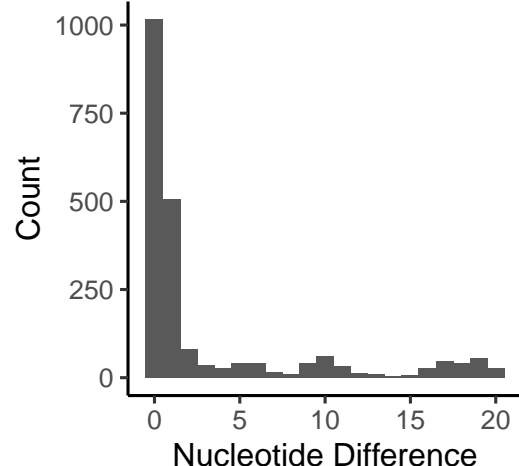
### IGHV3-47\*02

2 sequences assigned  
No exact matches.



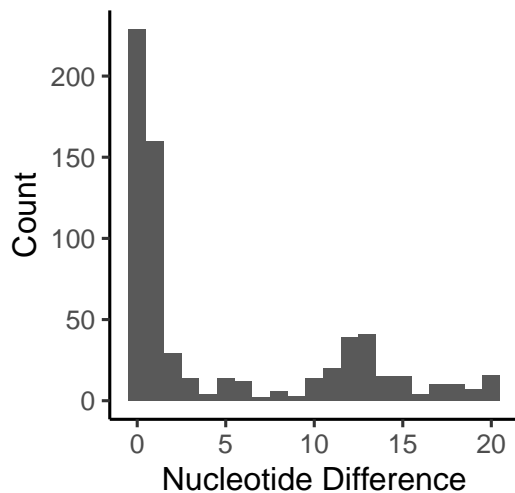
### IGHV3-48\*03

2243 sequences assigned  
1016 (45.3%) exact matches, in which:  
648 unique CDR3  
6 unique J



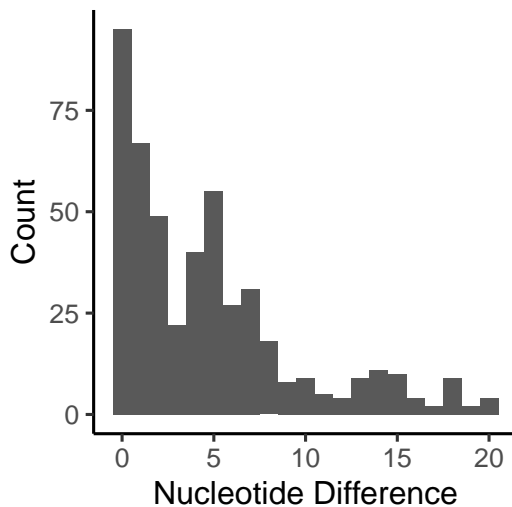
### IGHV3-43\*01

893 sequences assigned  
229 (25.6%) exact matches, in which:  
137 unique CDR3  
5 unique J



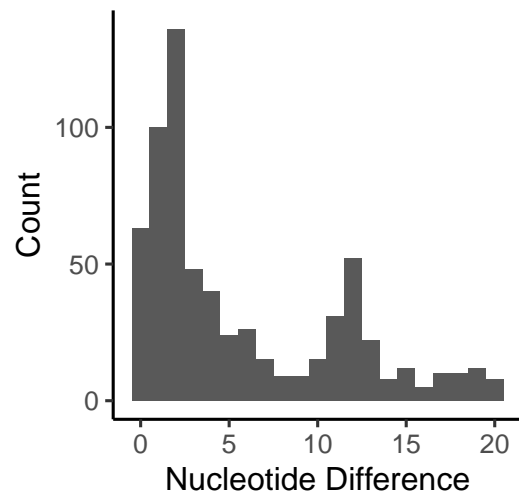
### IGHV3-48\*01

528 sequences assigned  
95 (18%) exact matches, in which:  
91 unique CDR3  
6 unique J



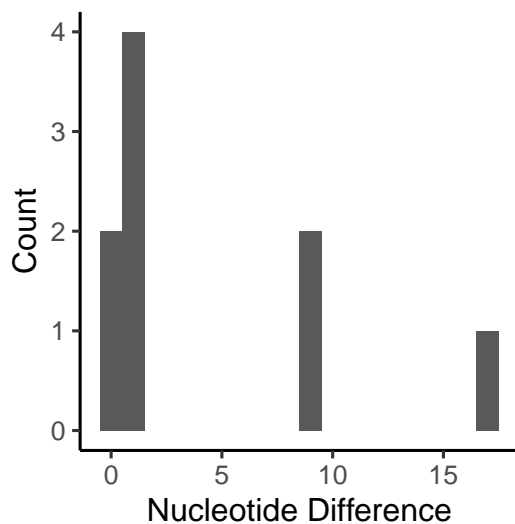
### IGHV3-48\*04

724 sequences assigned  
63 (8.7%) exact matches, in which:  
63 unique CDR3  
5 unique J



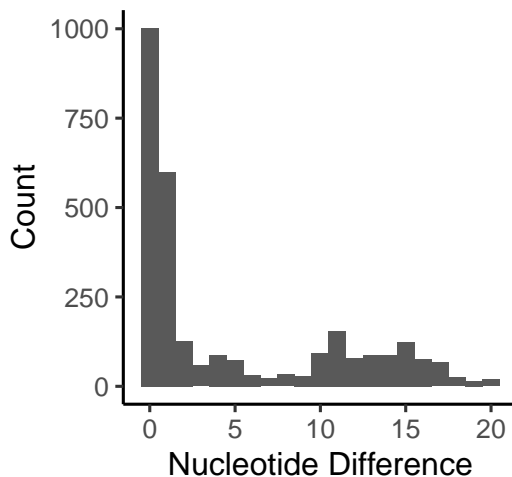
### IGHV3-47\*01

9 sequences assigned  
2 (22.2%) exact matches, in which:  
1 unique CDR3  
1 unique J



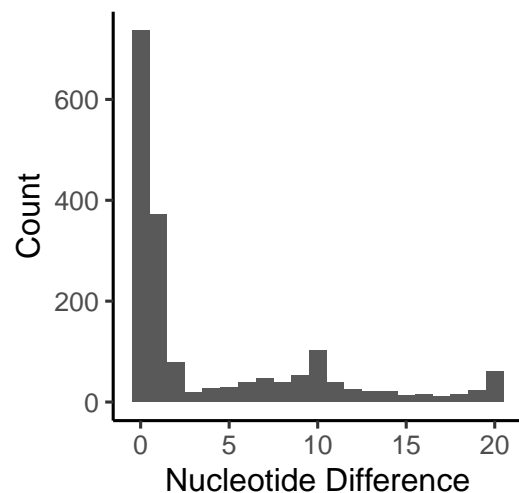
### IGHV3-48\*02

3898 sequences assigned  
1002 (25.7%) exact matches, in which:  
635 unique CDR3  
6 unique J



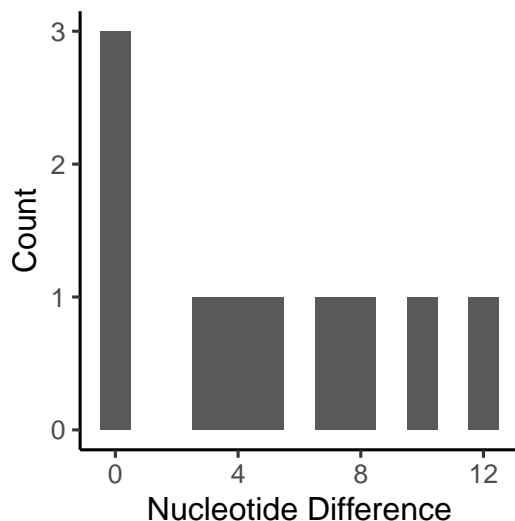
### IGHV3-49\*03\_05

2204 sequences assigned  
737 (33.4%) exact matches, in which:  
472 unique CDR3  
6 unique J



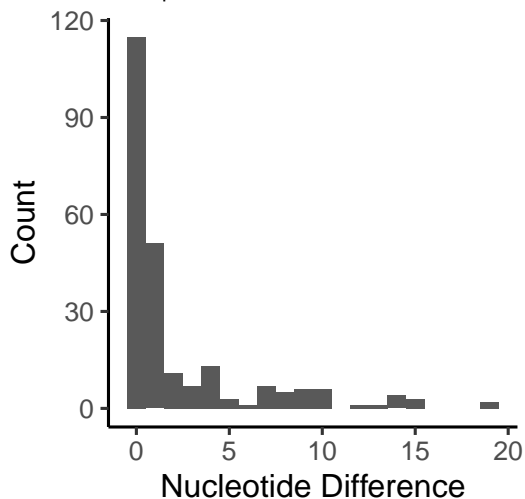
### IGHV3-52\*01\_03

10 sequences assigned  
3 (30%) exact matches, in which:  
3 unique CDR3  
2 unique J



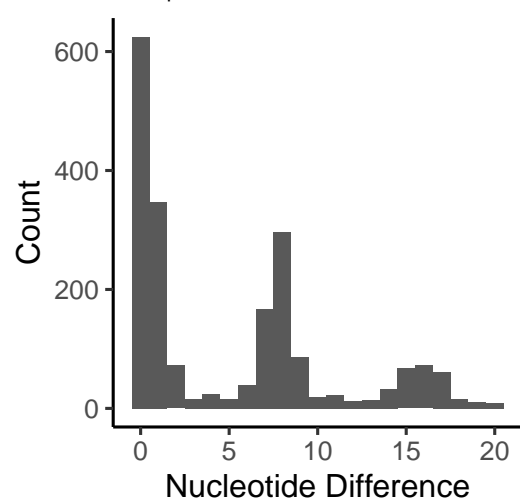
### IGHV3-64\*01

238 sequences assigned  
115 (48.3%) exact matches, in which:  
71 unique CDR3  
5 unique J



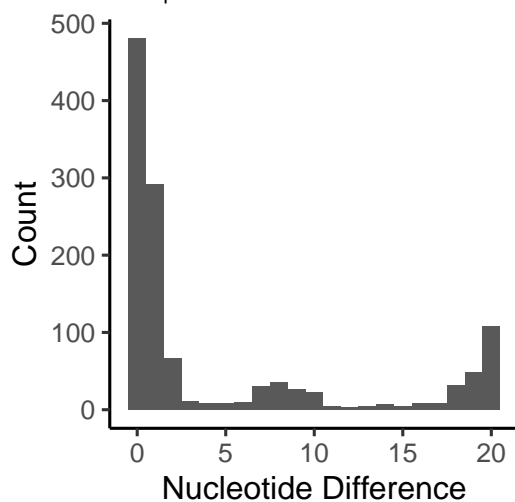
### IGHV3-66\*02

2238 sequences assigned  
625 (27.9%) exact matches, in which:  
394 unique CDR3  
6 unique J



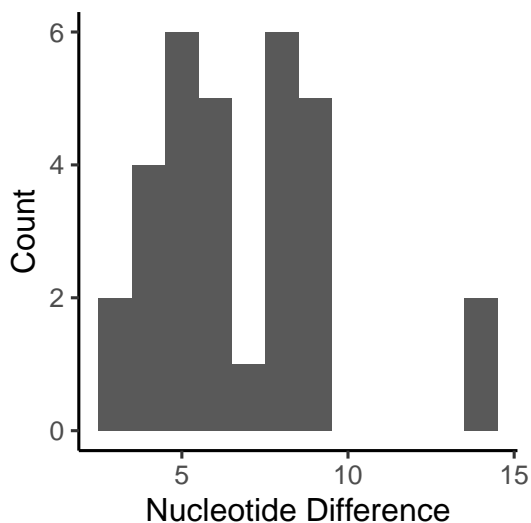
### IGHV3-53\*04

1682 sequences assigned  
481 (28.6%) exact matches, in which:  
302 unique CDR3  
6 unique J



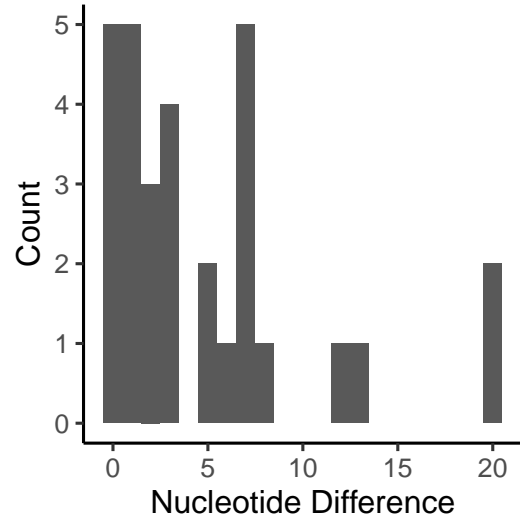
### IGHV3-64\*04

84 sequences assigned  
No exact matches.



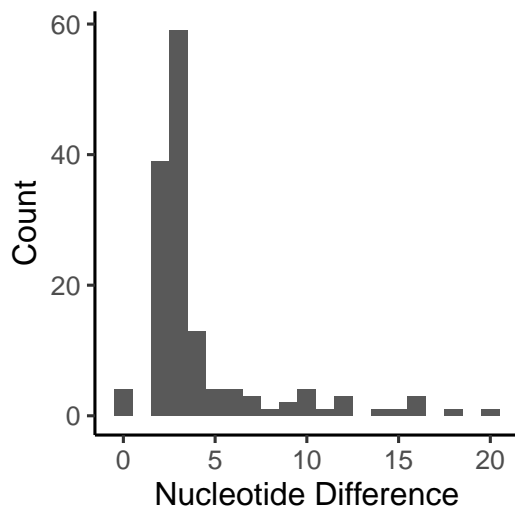
### IGHV3-69-1\*01

44 sequences assigned  
5 (11.4%) exact matches, in which:  
5 unique CDR3  
2 unique J



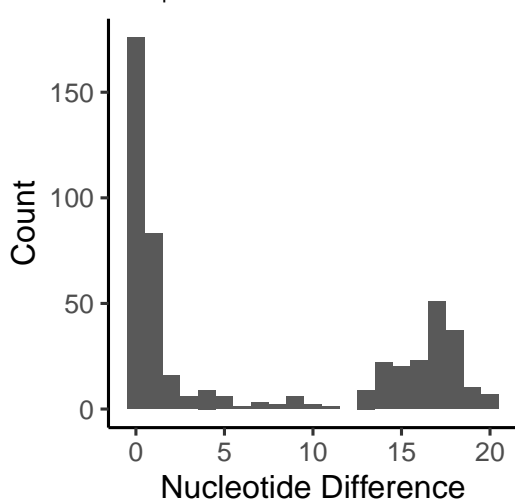
### IGHV3-53\*01\_02

156 sequences assigned  
4 (2.6%) exact matches, in which:  
4 unique CDR3  
2 unique J



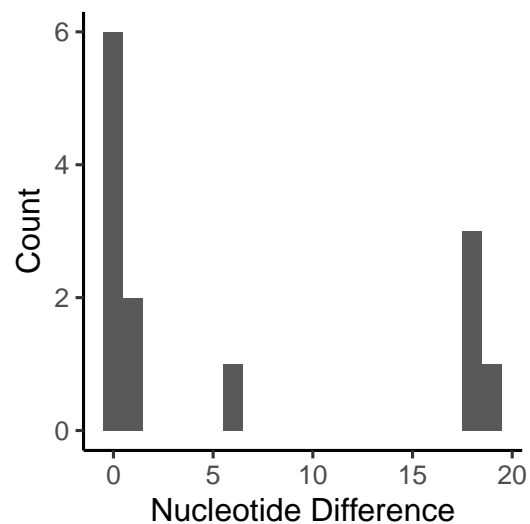
### IGHV3-64\*02\_07

572 sequences assigned  
176 (30.8%) exact matches, in which:  
114 unique CDR3  
6 unique J



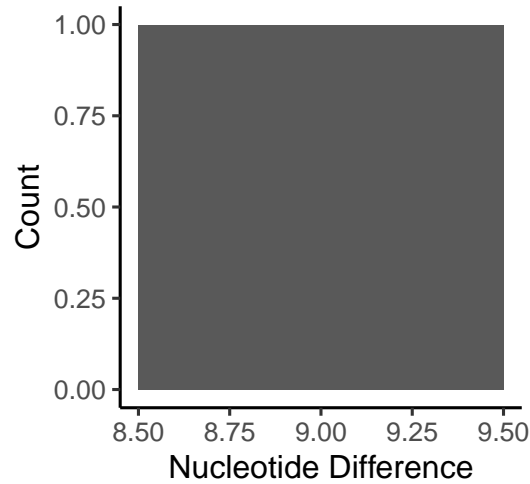
### IGHV3-69-1\*02

90 sequences assigned  
6 (6.7%) exact matches, in which:  
6 unique CDR3  
3 unique J



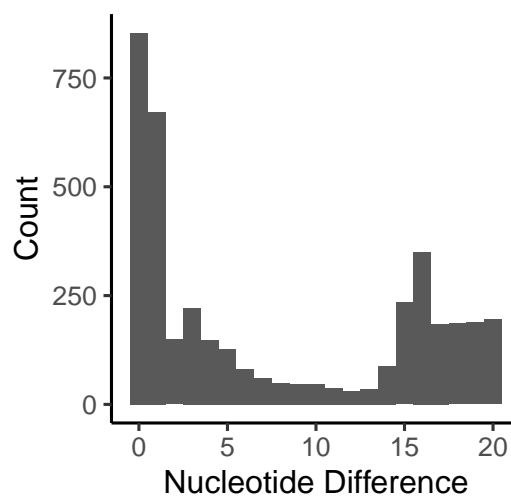
### IGHV3-71\*01\_04

3 sequences assigned  
No exact matches.



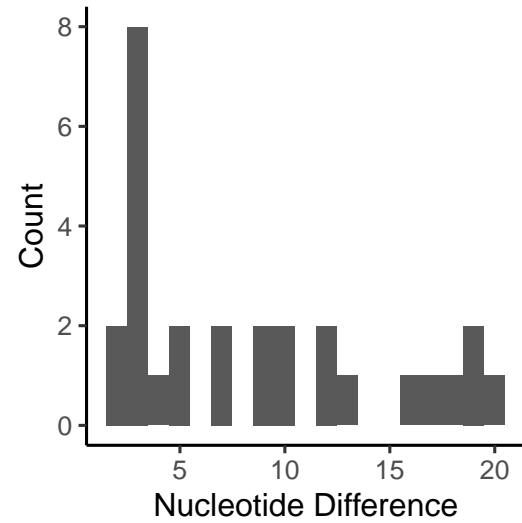
### IGHV3-74\*01\_02

6451 sequences assigned  
854 (13.2%) exact matches, in which:  
531 unique CDR3  
6 unique J



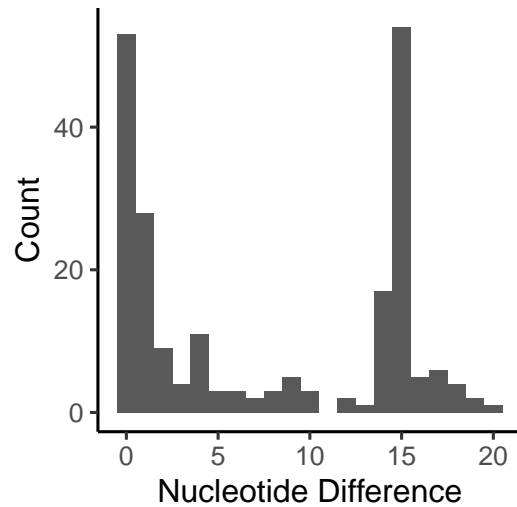
### IGHV3-NL1\*01

36 sequences assigned  
No exact matches.



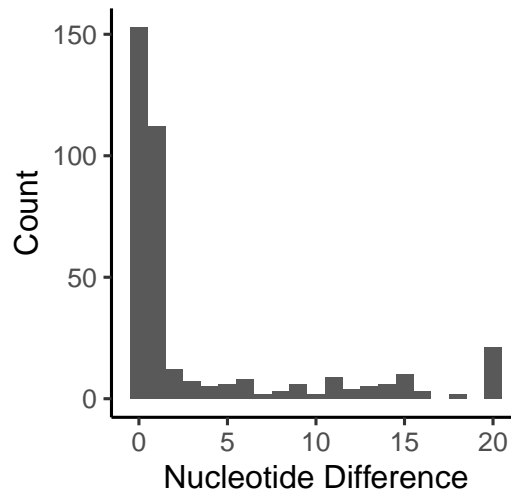
### IGHV3-72\*01

629 sequences assigned  
53 (8.4%) exact matches, in which:  
35 unique CDR3  
5 unique J



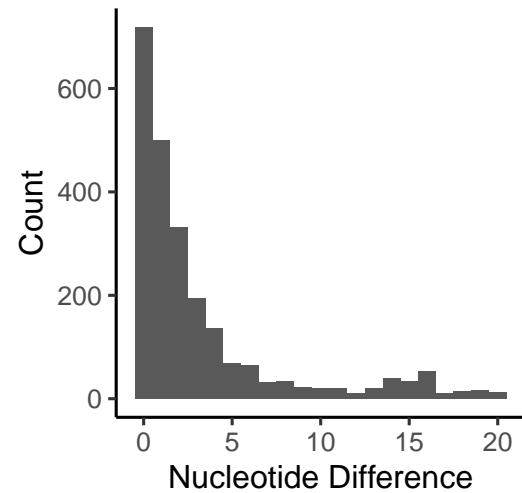
### IGHV3-43D\*03

429 sequences assigned  
153 (35.7%) exact matches, in which:  
95 unique CDR3  
5 unique J



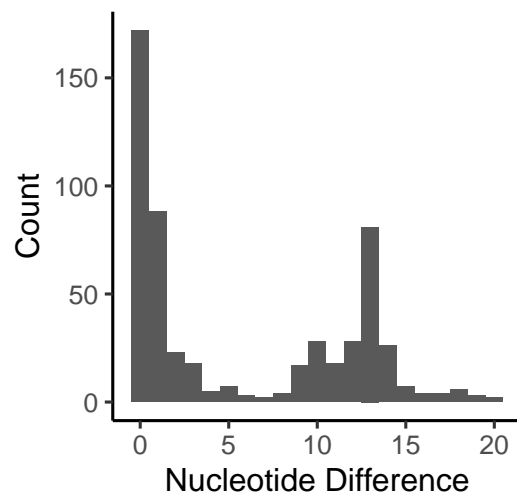
### IGHV4-4\*02\_03

3121 sequences assigned  
719 (23%) exact matches, in which:  
592 unique CDR3  
6 unique J



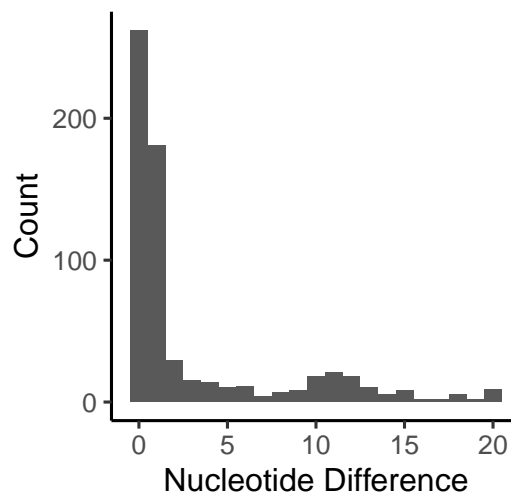
### IGHV3-73\*01\_02

598 sequences assigned  
172 (28.8%) exact matches, in which:  
106 unique CDR3  
6 unique J



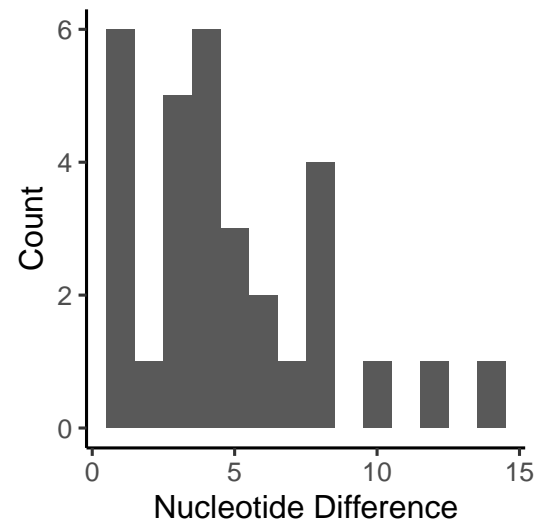
### IGHV3-43D\*04

704 sequences assigned  
262 (37.2%) exact matches, in which:  
154 unique CDR3  
6 unique J



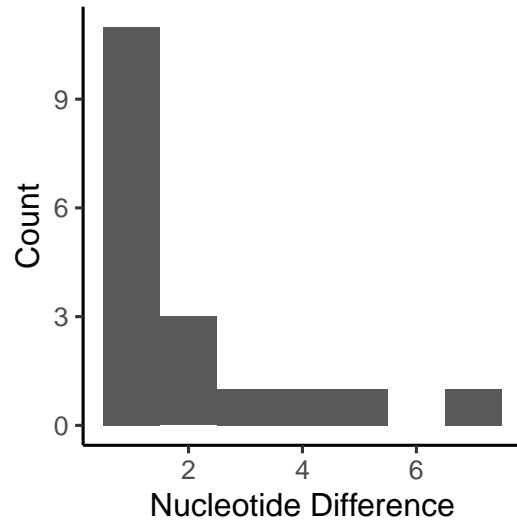
### IGHV4-28\*03

33 sequences assigned  
No exact matches.



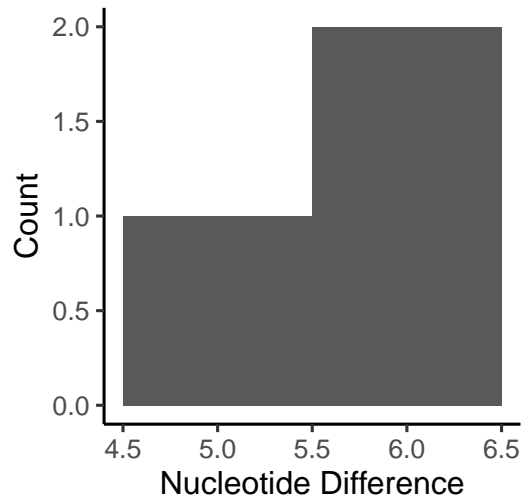
### IGHV4-28\*01\_07

50 sequences assigned  
No exact matches.



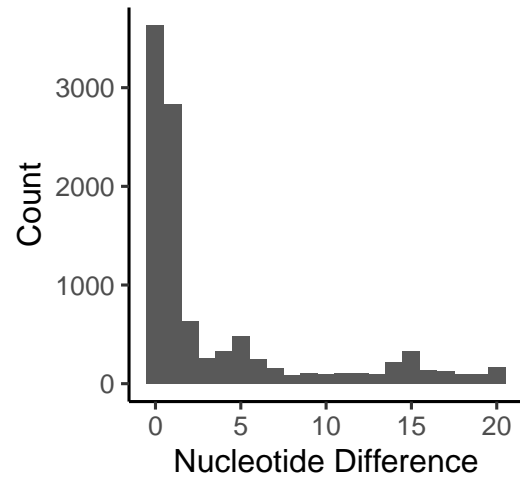
### IGHV4-30-2\*05

3 sequences assigned  
No exact matches.



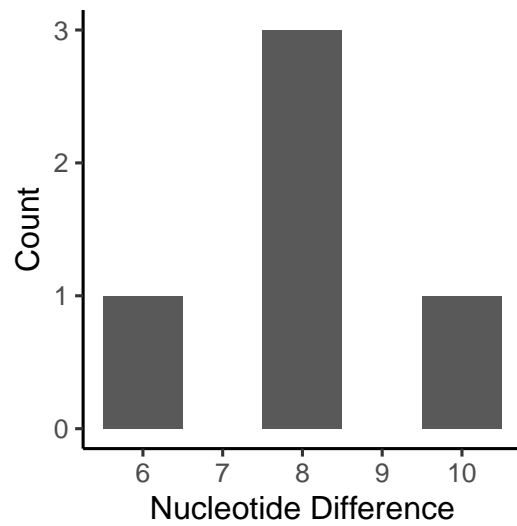
### IGHV4-34\*01\_02

12545 sequences assigned  
3631 (28.9%) exact matches, in which:  
2717 unique CDR3  
6 unique J



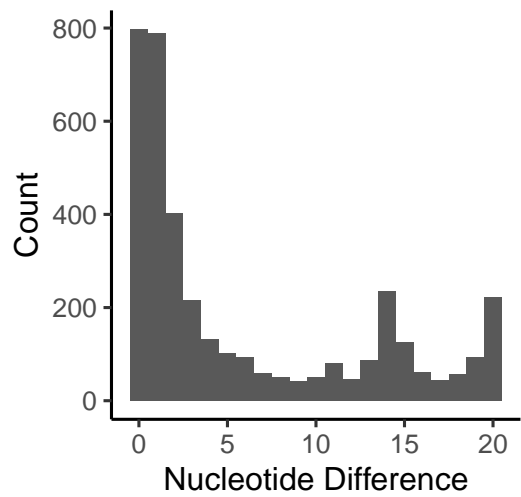
### IGHV4-30-2\*03

7 sequences assigned  
No exact matches.



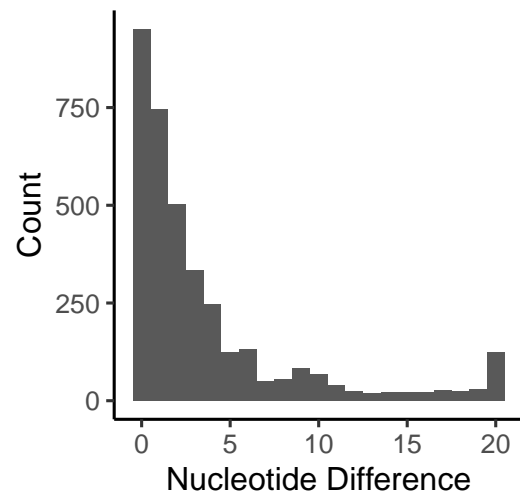
### IGHV4-30-4\*08

4947 sequences assigned  
798 (16.1%) exact matches, in which:  
690 unique CDR3  
6 unique J



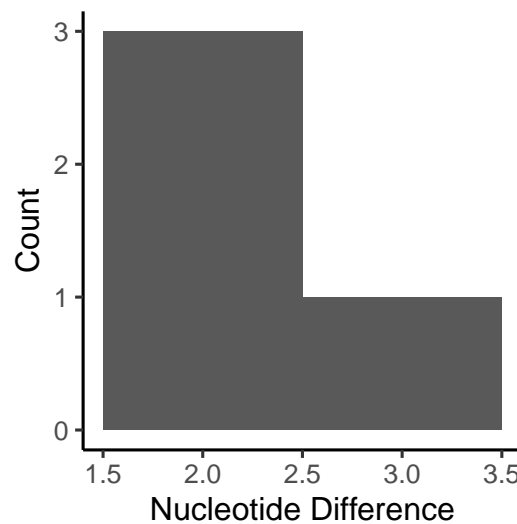
### IGHV4-38-2\*02

6385 sequences assigned  
951 (14.9%) exact matches, in which:  
891 unique CDR3  
6 unique J



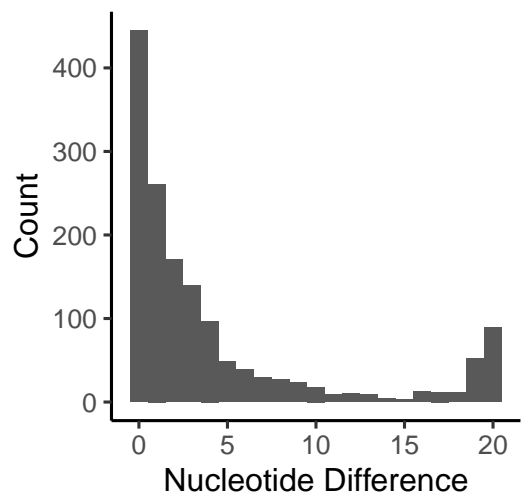
### IGHV4-30-2\*04

4 sequences assigned  
No exact matches.



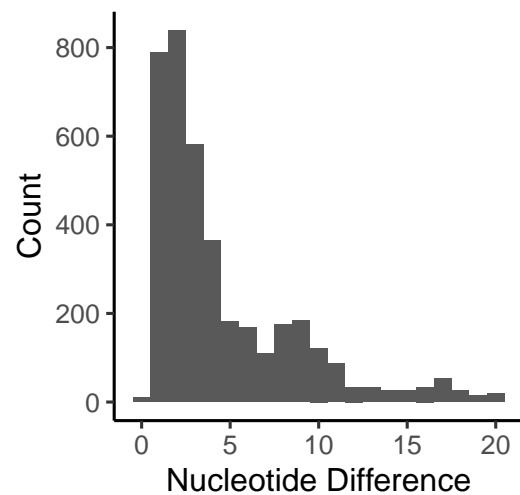
### IGHV4-31\*02\_C198T

1772 sequences assigned  
445 (25.1%) exact matches, in which:  
400 unique CDR3  
6 unique J



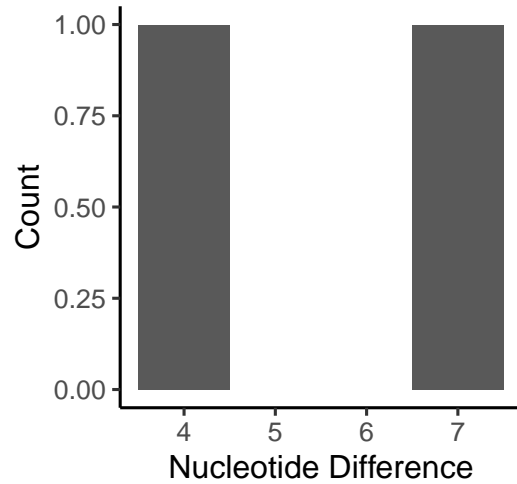
### IGHV4-39\*07

4890 sequences assigned  
11 (0.2%) exact matches, in which:  
11 unique CDR3  
4 unique J



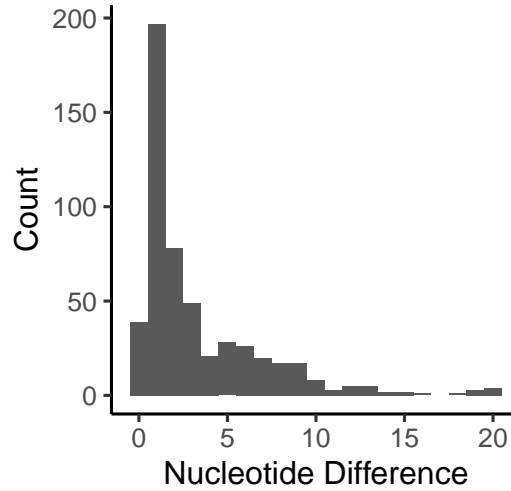
### IGHV4-55\*09

2 sequences assigned  
No exact matches.



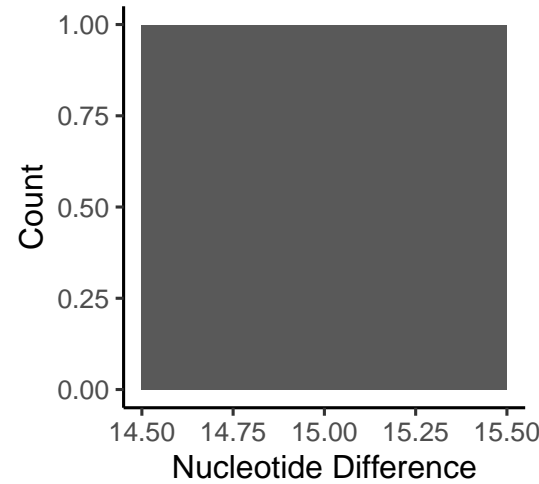
### IGHV4-59\*12

648 sequences assigned  
39 (6%) exact matches, in which:  
39 unique CDR3  
5 unique J



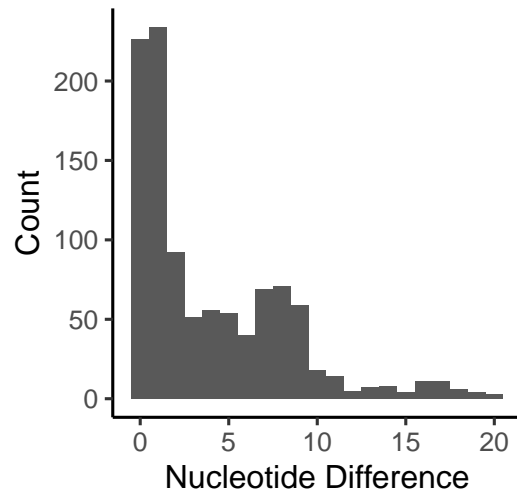
### IGHV1/OR15-1\*04

2 sequences assigned  
No exact matches.



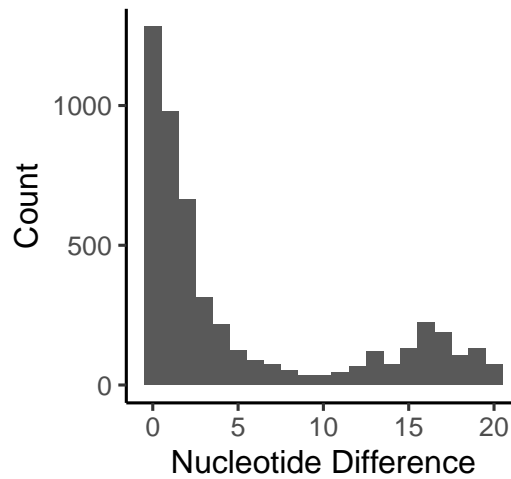
### IGHV4-59\*08

1132 sequences assigned  
226 (20%) exact matches, in which:  
223 unique CDR3  
6 unique J



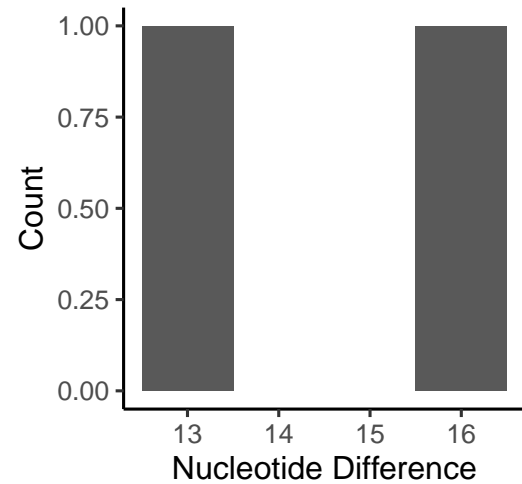
### IGHV4-61\*02

6636 sequences assigned  
1282 (19.3%) exact matches, in which:  
1167 unique CDR3  
6 unique J



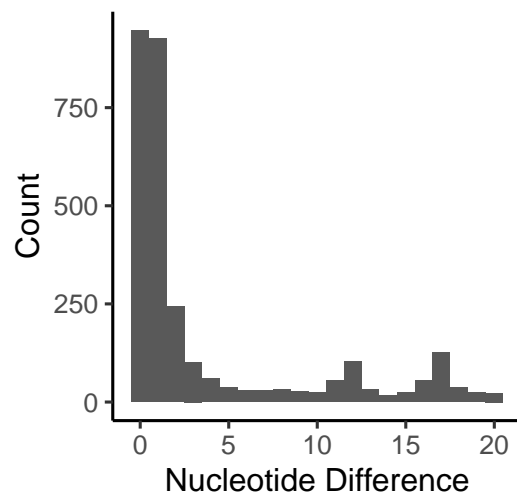
### IGHV1/OR15-2\*02\_03

8 sequences assigned  
No exact matches.



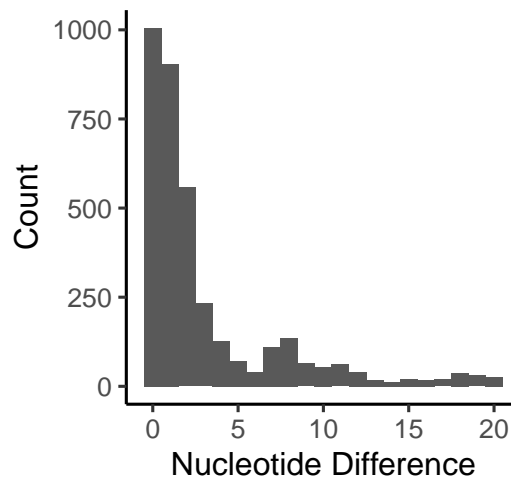
### IGHV4-59\*11

4082 sequences assigned  
947 (23.2%) exact matches, in which:  
781 unique CDR3  
6 unique J



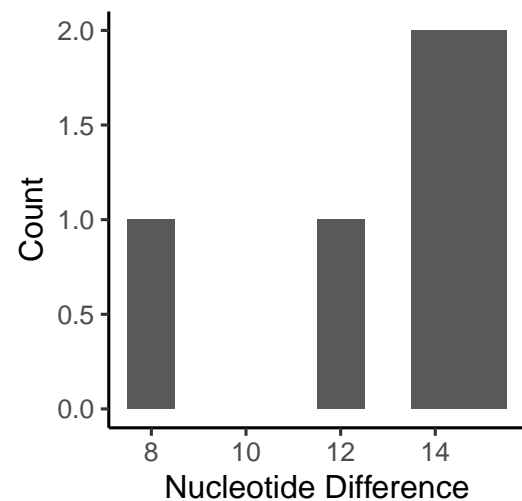
### IGHV4-61\*09

4496 sequences assigned  
1005 (22.4%) exact matches, in which:  
907 unique CDR3  
6 unique J



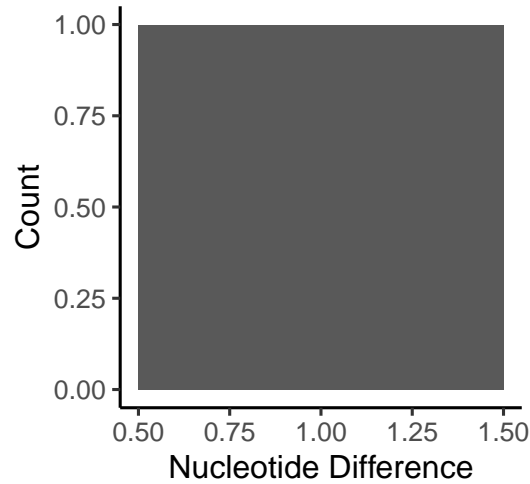
### IGHV1/OR15-3\*02

7 sequences assigned  
No exact matches.



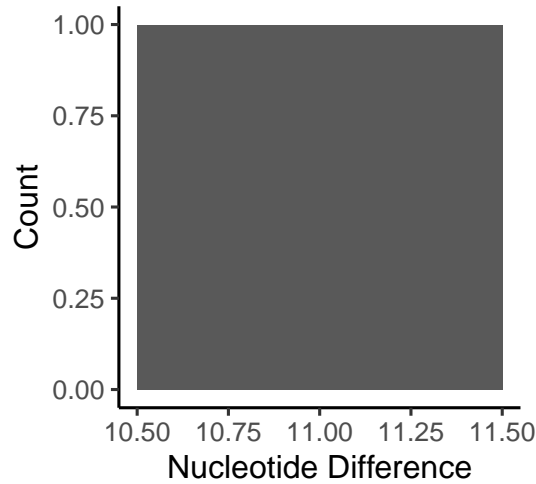
### IGHV1/OR15-5\*01

1 sequences assigned  
No exact matches.



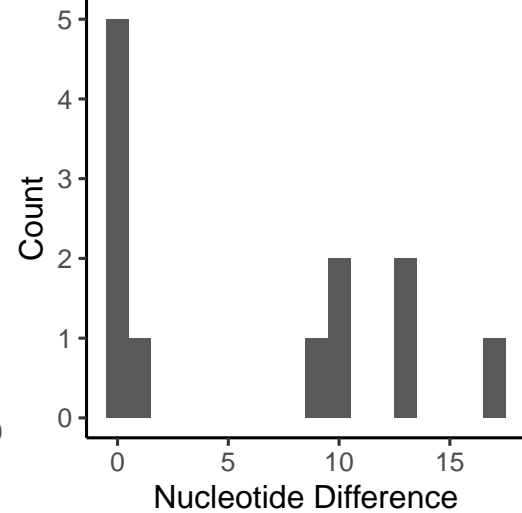
### IGHV1/OR15-9\*01

1 sequences assigned  
No exact matches.



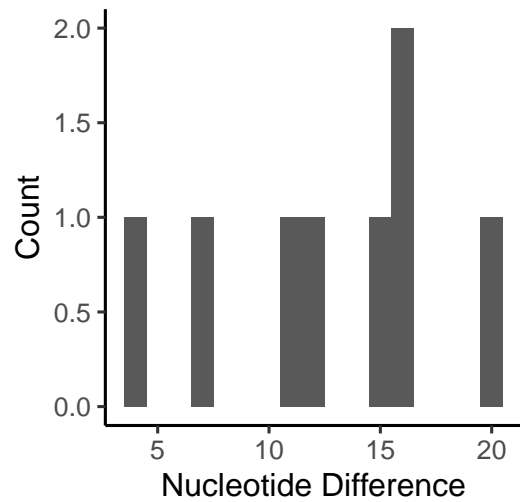
### IGHV5-51\*06

14 sequences assigned  
5 (35.7%) exact matches, in which:  
5 unique CDR3  
3 unique J



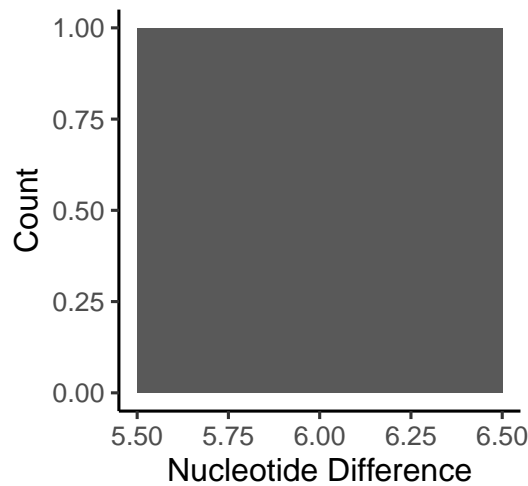
### IGHV4/OR15-8\*01

62 sequences assigned  
No exact matches.



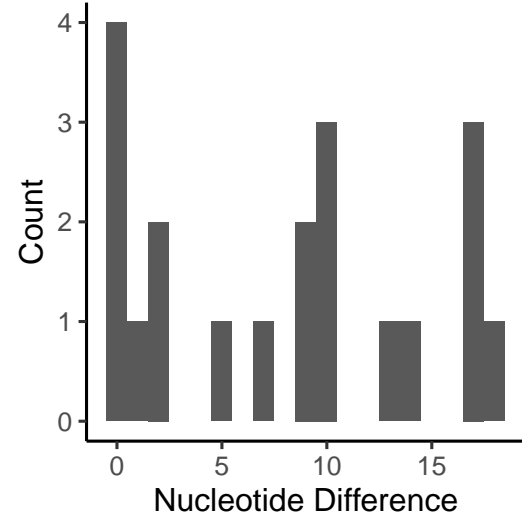
### IGHV5-10-1\*01\_03

2 sequences assigned  
No exact matches.



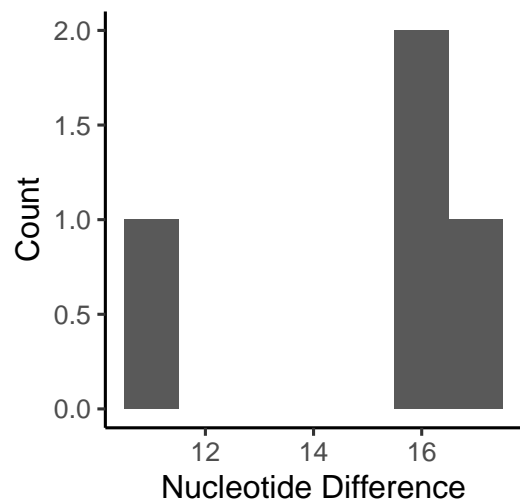
### IGHV5-51\*07

24 sequences assigned  
4 (16.7%) exact matches, in which:  
4 unique CDR3  
3 unique J



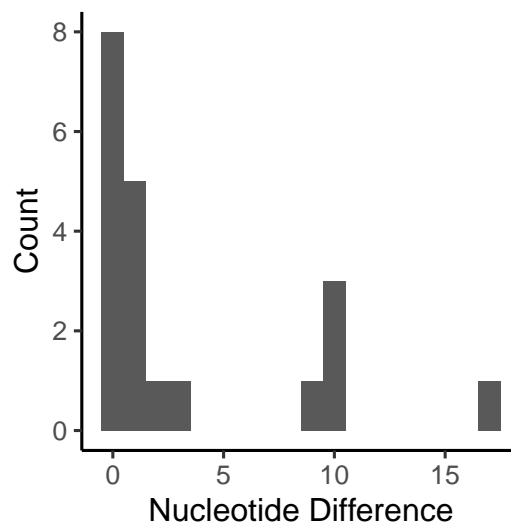
### IGHV4/OR15-8\*02

17 sequences assigned  
No exact matches.



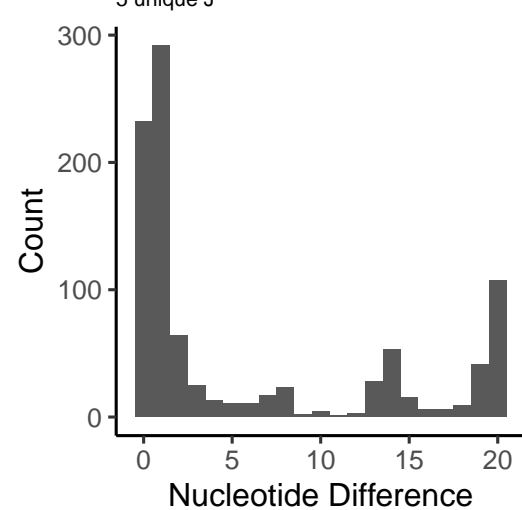
### IGHV5-51\*04

22 sequences assigned  
8 (36.4%) exact matches, in which:  
8 unique CDR3  
2 unique J



### IGHV6-1\*01\_02

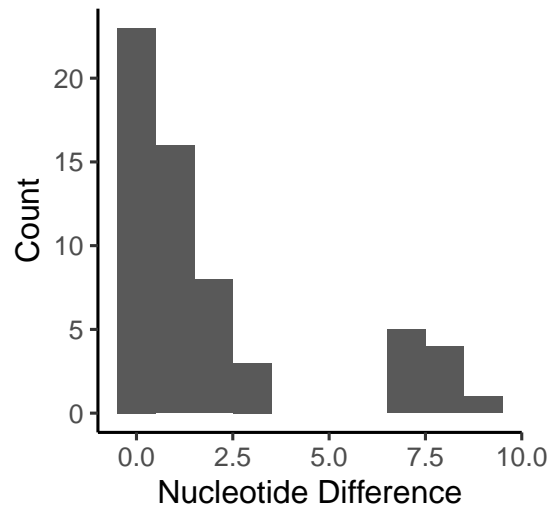
1815 sequences assigned  
232 (12.8%) exact matches, in which:  
206 unique CDR3  
5 unique J





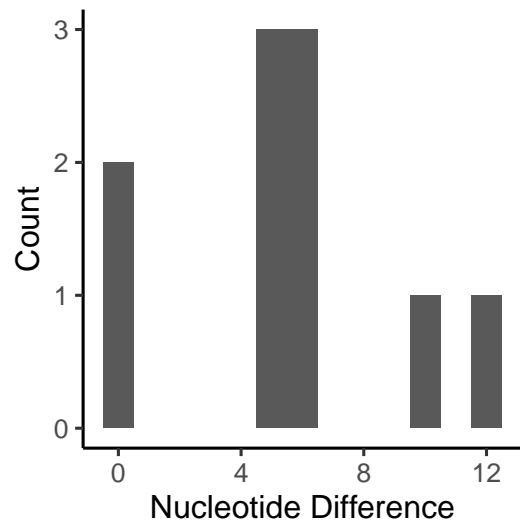
## IGHV7-4-1\*01

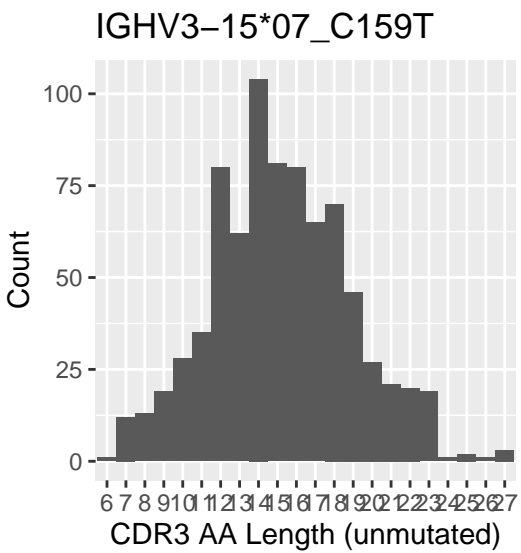
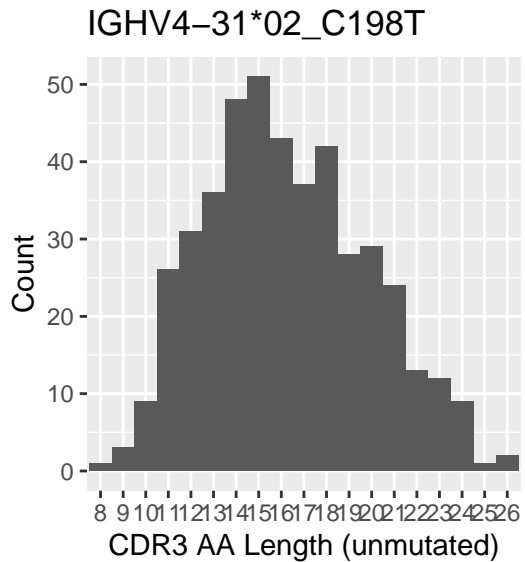
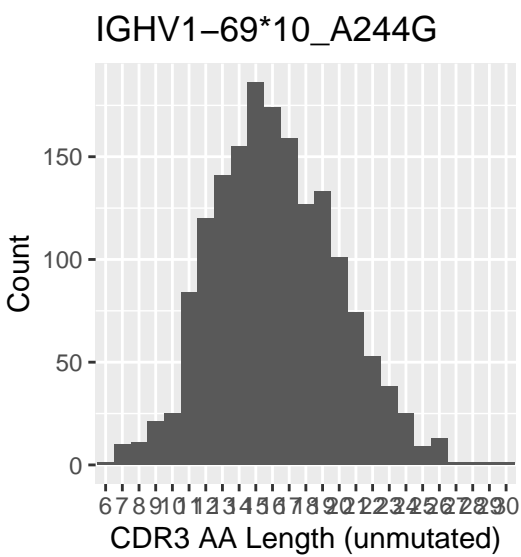
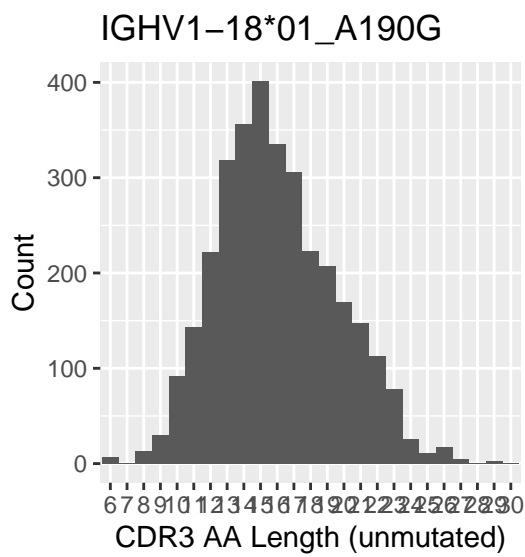
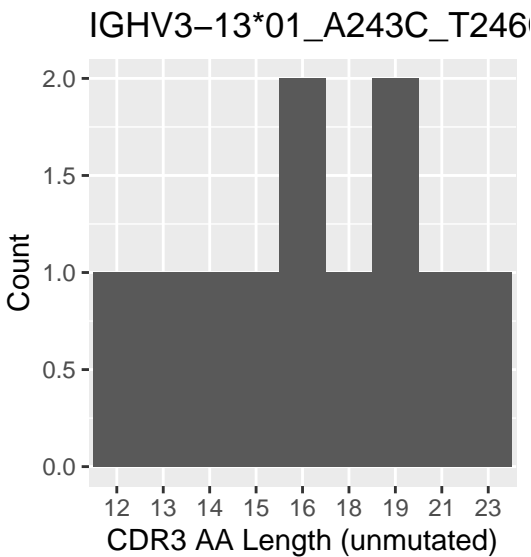
60 sequences assigned  
23 (38.3%) exact matches, in which:  
16 unique CDR3  
4 unique J



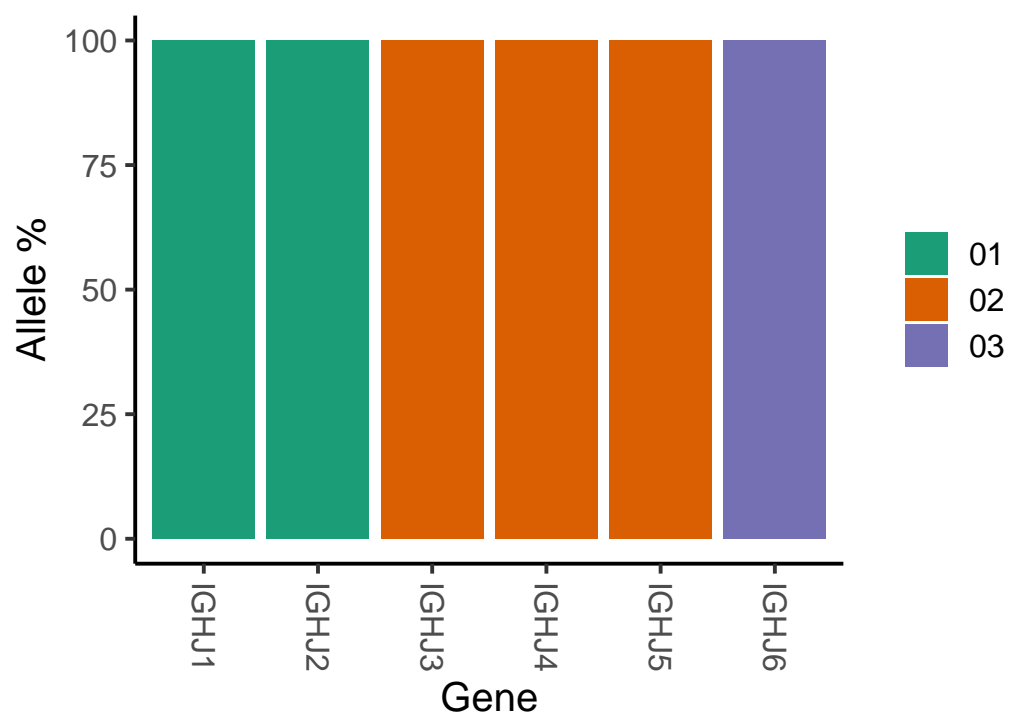
## IGHV7-4-1\*02

10 sequences assigned  
2 (20%) exact matches, in which:  
2 unique CDR3  
1 unique J





Allele Usage



[illegible]