

Brain Tumor Marker Analysis

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Summary of Data Set

There were 33029 total fields measured and 27 fields with missing data. Fields with missing positivies were removed from further analysis.

Number of fields by marker

Marker	# Fields
CD14	7298
CD163	6601
CD3	6654
CD79A	5993
IBA1	6456

Counts of number of fields by marker for each sample:

	Type	Grade	CD14	CD163	CD3	CD79A	IBA1
A1	Adult	Low Grade	123	155	189	142	145
A10	Adult	High Grade	520	675	485	783	792
A11	Adult	High Grade	240	188	221	276	234
A2	Adult	Low Grade	422	288	300	245	300
A3	Adult	High Grade	392	482	362	343	525
A4	Adult	High Grade	746	689	595	473	623
A5	Adult	High Grade	695	432	354	357	372
A6	Adult	High Grade	271	232	130	185	248
A7	Adult	High Grade	467	489	387	404	227
A8	Adult	Low Grade	558	687	548	615	467
A9	Adult	High Grade	220	192	166	194	212
N09-531	Canine	High Grade	189	149	148	127	166
N09-547	Canine	High Grade	68	65	57	78	58
N09-651	Canine	High Grade	22	18	15	40	21
N09-868	Canine	High Grade	85	47	31	39	56
N10-159	Canine	Low Grade	55	54	46	33	57
N10-702	Canine	Low Grade	105	47	38	21	50
N12-166	Canine	Low Grade	223	125	153	148	163
N13-901	Canine	High Grade	225	170	181	140	149
N15-161	Canine	High Grade	77	52	113	64	117
N15-604	Canine	High Grade	67	70	75	68	60
N16-199	Canine	High Grade	43	29	41	48	29
11434	Pediatric	High Grade	42	33	70	38	84
KS18-1269	Pediatric	High Grade	480	492	434	468	460
KS19-607	Pediatric	Low Grade	54	66	48	40	0
S13-28076	Pediatric	High Grade	362	375	1222	334	559
S14-12021	Pediatric	High Grade	547	300	245	290	282

Counts of different types of samples (ped, adult, or breed):

Sample Type	Number
Adult	11
Boston terrier	4
Boxer	4
Lab	1
Mixed Dog?	1
Ped	5
Pit Bull	1

Marker Distributions

For each field, the “1+”, “2+”, and “3+” columns positivity are summed to create a new variable Positivity. The mean of the Positivity is computed across all fields for a given sample and marker. The means are shown in the table below.

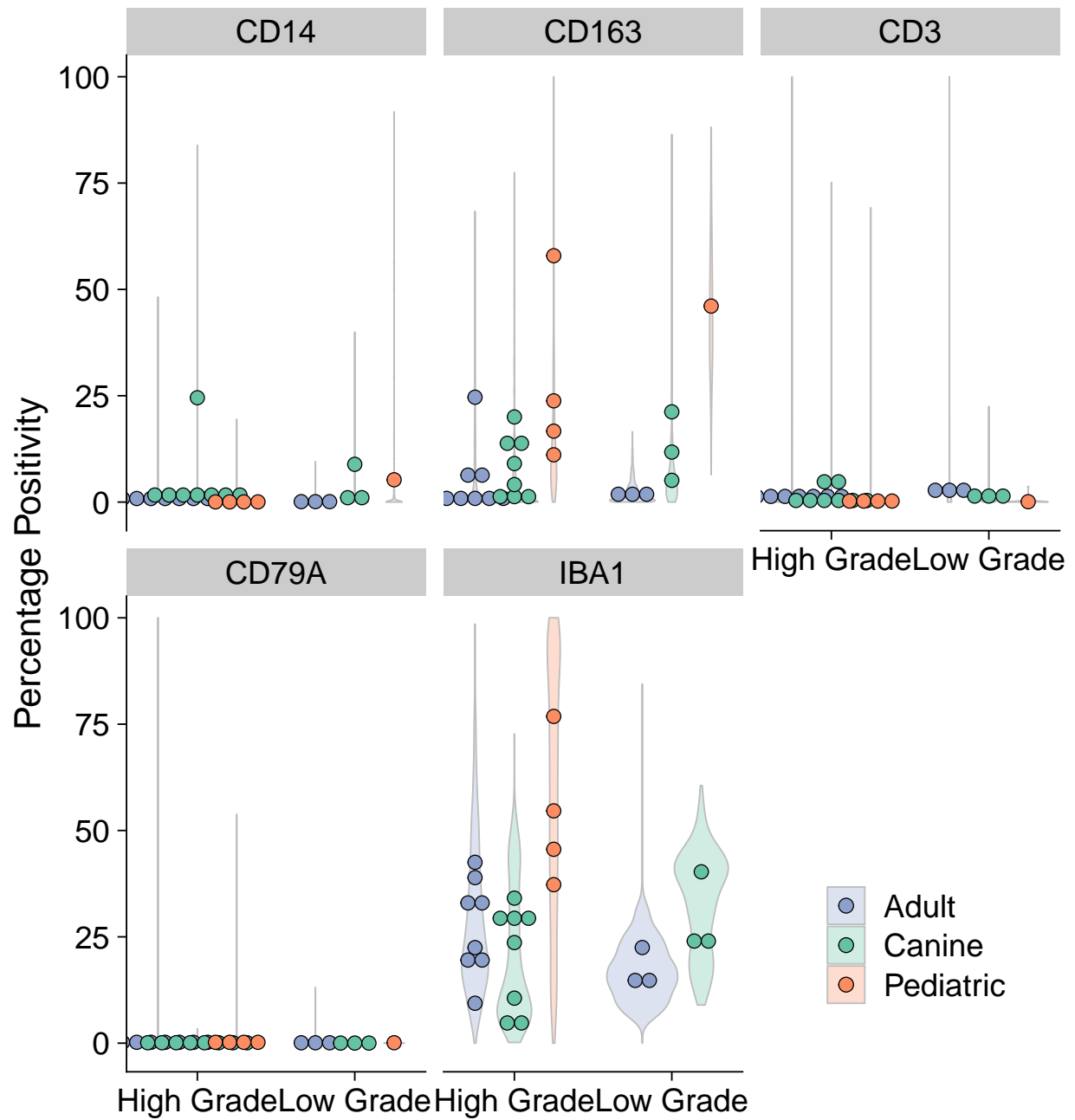
Sample.Name	type	Grade	CD14	CD163	CD3	CD79A	IBA1
A1	Adult	Low Grade	0.1	0.6	2.9	0.0	14.6
A10	Adult	High Grade	0.2	0.4	2.5	0.0	20.6
A11	Adult	High Grade	0.1	1.6	0.3	0.0	22.5
A2	Adult	Low Grade	0.0	0.6	3.9	0.0	22.5
A3	Adult	High Grade	0.8	0.9	0.2	0.0	42.5
A4	Adult	High Grade	1.3	7.0	0.7	0.4	34.0
A5	Adult	High Grade	1.6	24.7	2.0	0.0	38.9
A6	Adult	High Grade	0.1	0.1	0.5	0.0	9.4
A7	Adult	High Grade	0.1	5.7	0.3	0.0	31.9
A8	Adult	Low Grade	0.2	3.0	1.7	0.2	14.9
A9	Adult	High Grade	0.1	0.1	0.2	0.0	18.5
N09-531	Canine	High Grade	0.1	0.0	0.3	0.1	34.1
N09-547	Canine	High Grade	0.3	20.0	0.7	0.1	28.9
N09-651	Canine	High Grade	0.0	15.2	4.6	0.2	28.1
N09-868	Canine	High Grade	3.3	12.4	0.7	0.0	23.6
N10-159	Canine	Low Grade	8.9	11.8	2.5	0.0	24.4
N10-702	Canine	Low Grade	1.9	21.2	0.3	0.0	23.6
N12-166	Canine	Low Grade	0.1	5.1	1.0	0.0	40.3
N13-901	Canine	High Grade	2.6	0.3	0.5	0.2	6.2
N15-161	Canine	High Grade	0.6	2.6	0.7	0.1	10.6
N15-604	Canine	High Grade	0.6	9.1	4.9	0.0	30.6
N16-199	Canine	High Grade	24.5	4.1	0.1	0.0	3.3
11434	Pediatric	High Grade	0.0	57.9	0.5	0.1	37.3
KS18-1269	Pediatric	High Grade	0.0	16.7	0.4	0.3	45.6
KS19-607	Pediatric	Low Grade	5.2	46.1	0.1	0.1	NA
S13-28076	Pediatric	High Grade	0.0	11.1	0.1	0.2	76.8
S14-12021	Pediatric	High Grade	0.1	23.8	0.0	0.1	54.6

Violin Plots

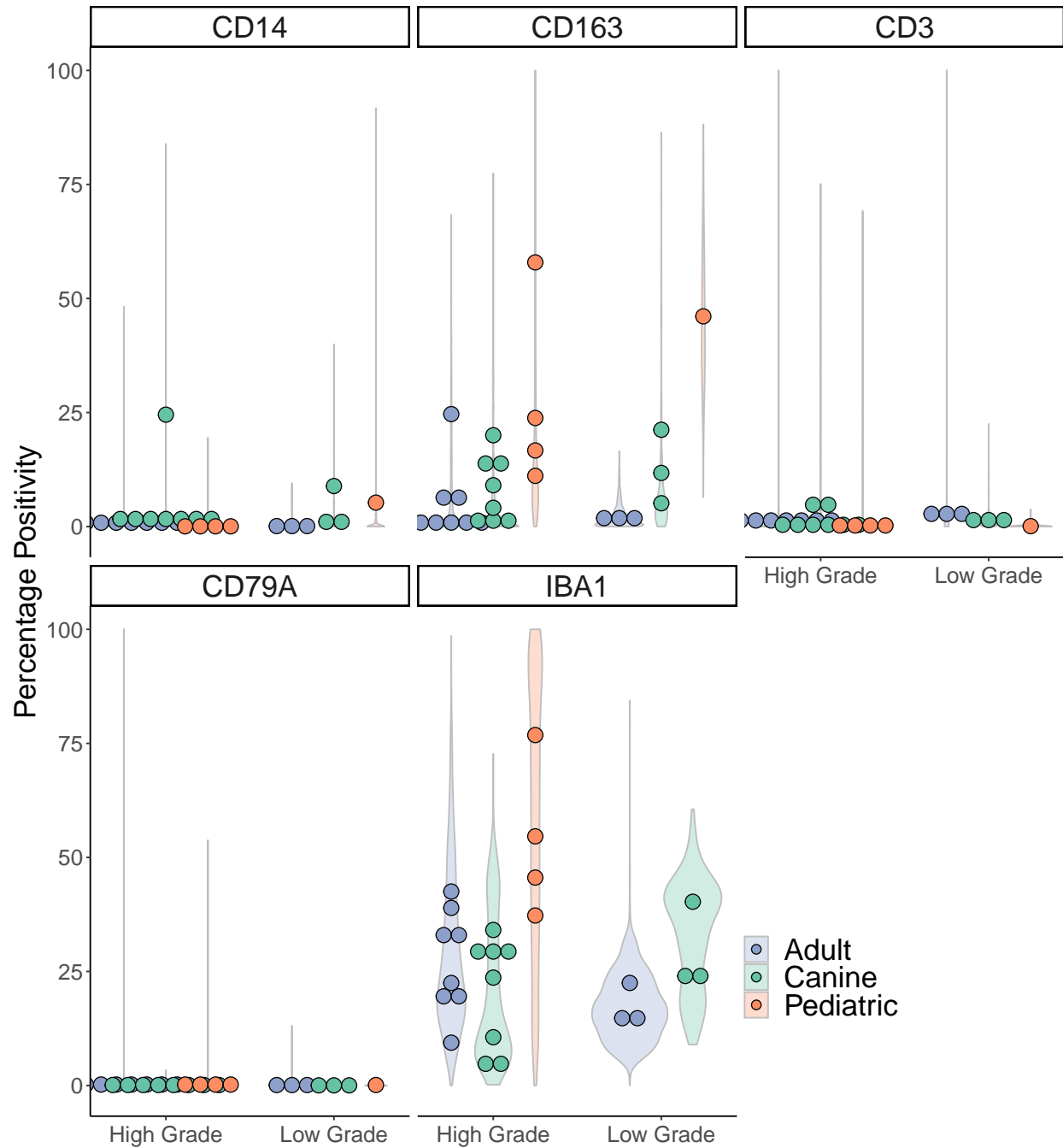
The violin plots below show the distribution of percentage positivity. The violins are constructed using all the fields. The points are subject means. The markers CD14, CD3, and CD79A are low across grade and

subject type.

```
##
## *****
## Note: As of version 1.0.0, cowplot does not change the
##   default ggplot2 theme anymore. To recover the previous
##   behavior, execute:
##   theme_set(theme_cowplot())
## *****
## `stat_bindot()` using `bins = 30`. Pick better value with `binwidth`.
```



```
## `stat_bindot()` using `bins = 30`. Pick better value with `binwidth`.
```



```
## `stat_bindot()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## pdf
```

```
## 2
```

p-values

For CD163 and IBA1, mean percentage positivities are compared across sample types (Pediatric, Adult, Canine) within high grade patients. Specifically a Wilcoxon two sample p-value is computed for Pediatric vs. Canine subject means and Pediatric vs. Adult subject means.

Marker	Group 1	Group 2	p-value
IBA1	Pediatric	Canine	0.0040
IBA1	Pediatric	Adult	0.0162
CD163	Pediatric	Canine	0.0485
CD163	Pediatric	Adult	0.0283