

Candidate Gene Analysis - Regression method (without controls)

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These analyses examine the relationship between expression levels and viral titer for a set of genes that we hypothesize have a relationship with viral infection. The overall strategy is to:

1. Identify a list of candidate genes based on the literature and previous analyses.
2. Subset our overall set of genes/transcripts to include only those with an annotation containing the name of the candidate gene in the SwissProt gene name, SwissProt gene function, KEGG pathway, or EggNOG gene orthology annotations.
3. Manually filter search results to remove non-target inclusions
4. Remove genes/transcripts with no variation in expression for each comparison (e.g., bursa at transcript-level)
5. Remove control samples.
6. Use a linear mixed effects model to assess the relationship between $\log(\text{expression})$ and $\log(\text{viral titer})$ for each candidate gene/transcript in each tissue (bursa and ileum). The model structure is $\text{expression} \sim \text{virus shedding group} + \text{sex} + \text{weight on day 55} + \text{age}$ with the sequencing pool as a random effect. The model is run on the entire set, as well as just the LPAIV-infected groups I1, I3, I5, and I14.
7. Correct the p-values for multiple testing using a false discovery rate approach with adjusted p-values (i.e., q-value) cutoff of 0.05. Corrections are used for just the test that incorporates all LPAIV-infected groups because that is the only one used for filtering.
8. Plot the results.

Summarize results

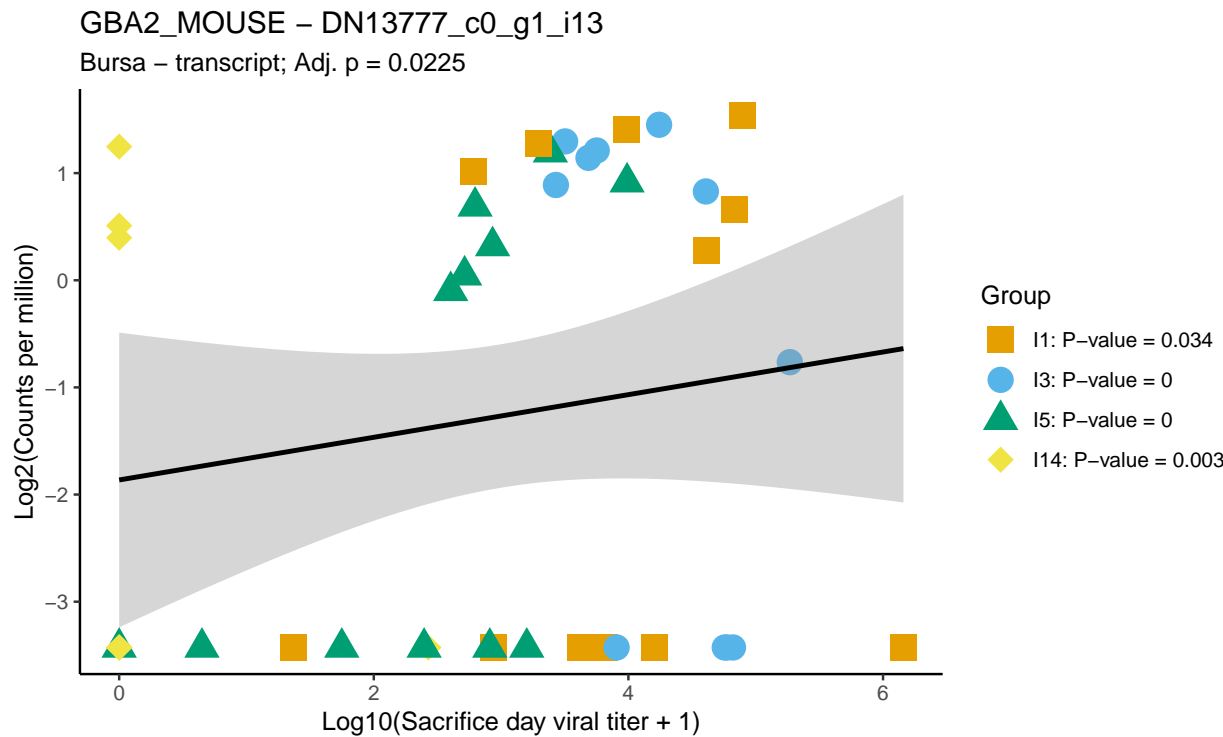
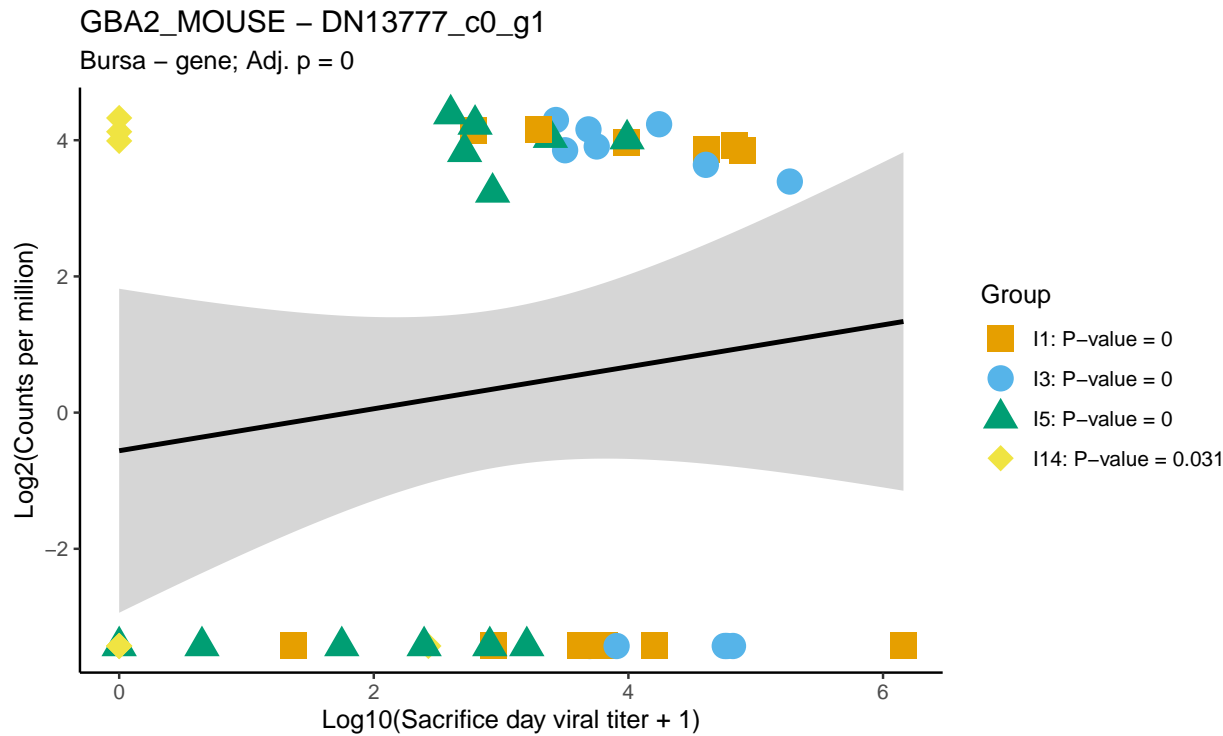
Table 1: Significant candidate genes when excluding control samples. In comparison column, BG = Bursa-gene, BT = Bursa-transcript, IG = Ileum-gene, and IT = Ileum-transcript

identifier	geneName	comparison	Overall	I1	I3	I5	I14
DN13777_c0_g1	GBA2_MOUSE	BG	0e+00	0.0003	0.0000	0.0000	0.0306
DN13777_c0_g1_i13	GBA2_MOUSE	BT	0e+00	0.0339	0.0002	0.0000	0.0026
DN12298_c0_g1	CC4L_HUMAN	IG	6e-04	0.6845	0.7211	0.9252	NA
DN13777_c0_g1	GBA2_MOUSE	IG	0e+00	0.0012	0.0007	0.0000	NA
DN1500_c0_g1	DDX58_MOUSE	IG	0e+00	0.0562	0.0913	0.1672	NA
DN15121_c0_g1	DHX58_MOUSE	IG	0e+00	0.4594	0.7631	0.1109	NA
DN161_c0_g1	PARP9_HUMAN	IG	3e-04	0.1017	0.4409	0.1759	NA
DN164_c3_g1	DHX58_HUMAN	IG	0e+00	0.0671	0.5401	0.0812	NA
DN17675_c0_g2	CCL4_PIG	IG	6e-04	0.0557	0.0753	0.9218	NA
DN18052_c0_g1	STAT1_PIG	IG	0e+00	0.0182	0.9708	0.5177	NA
DN1920_c0_g1	RSAD2_BOVIN	IG	1e-04	0.1570	0.1803	0.9361	NA
DN1934_c0_g1	IRF3_CHICK	IG	4e-04	0.1098	0.6869	0.8259	NA
DN2085_c0_g2	MX_ANAPL	IG	1e-04	0.1517	0.5003	0.2840	NA
DN20874_c0_g1	PAR12_MOUSE	IG	5e-04	0.0799	0.3355	0.3000	NA
DN2932_c0_g1	.	IG	0e+00	0.0289	0.7016	0.0057	NA
DN5594_c0_g1	PAR12_HUMAN	IG	3e-04	0.1609	0.4136	0.9055	NA
DN6170_c0_g1	IN35_HUMAN	IG	2e-04	0.0398	0.8808	0.9645	NA
DN6178_c0_g1	UBP34_HUMAN	IG	0e+00	0.0615	0.5533	0.6988	NA
DN6190_c0_g1	OASL1_RAT	IG	1e-04	0.0452	0.2804	0.7680	NA
DN7889_c0_g1	LY6E_CHICK	IG	6e-04	0.0250	0.3423	0.7674	NA
DN7889_c0_g2	LY6E_CHICK	IG	4e-04	0.1462	0.5200	0.8463	NA
DN876_c0_g1	E2AK2_HUMAN	IG	1e-04	0.0368	0.2899	0.0260	NA
DN1500_c0_g1_i13	DDX58_HUMAN	IT	0e+00	0.0444	0.0986	0.6248	NA
DN1500_c0_g1_i23	DDX58_MOUSE	IT	5e-04	0.2030	0.2754	0.4768	NA
DN15121_c0_g1_i1	DHX58_MOUSE	IT	1e-04	0.1964	0.6627	0.0547	NA
DN1551_c1_g1_i6	CD59_PAPSP	IT	5e-04	0.2445	0.3054	0.7555	NA
DN164_c3_g1_i7	DHX58_HUMAN	IT	1e-04	0.0115	0.3558	0.9633	NA
DN17675_c0_g2_i1	CCL4_PIG	IT	5e-04	0.0447	0.0768	0.9965	NA
DN18052_c0_g1_i2	STAT1_PIG	IT	1e-04	0.0578	0.6712	0.5381	NA
DN1920_c0_g1_i11	RSAD2_PIG	IT	1e-04	0.1225	0.1629	0.9904	NA
DN1920_c0_g1_i9	RSAD2_BOVIN	IT	1e-04	0.1793	0.2258	0.7768	NA
DN1934_c0_g1_i11	IRF3_CHICK	IT	7e-04	0.1199	0.7910	0.4930	NA
DN2085_c0_g2_i1	MX_ANAPL	IT	1e-04	0.0258	0.5067	0.7737	NA
DN2085_c0_g2_i10	MX_ANAPL	IT	0e+00	0.1471	0.6951	0.3135	NA
DN2085_c0_g2_i11	MX_ANAPL	IT	0e+00	0.0762	0.7381	0.3330	NA
DN2085_c0_g2_i12	MX_ANAPL	IT	0e+00	0.0662	0.4441	0.1079	NA
DN2085_c0_g2_i13	MX_ANAPL	IT	0e+00	0.2720	0.8115	0.8687	NA
DN2085_c0_g2_i14	MX_ANAPL	IT	4e-04	0.1342	0.6011	0.6029	NA
DN2085_c0_g2_i15	MX_ANAPL	IT	1e-04	0.0129	0.7511	0.3448	NA
DN2085_c0_g2_i16	MX_ANAPL	IT	0e+00	0.0624	0.6056	0.3375	NA
DN2085_c0_g2_i5	MX_ANAPL	IT	0e+00	0.1240	0.7713	0.0353	NA
DN20874_c0_g1_i10	PAR12_HUMAN	IT	1e-04	0.0239	0.6225	0.2167	NA
DN20874_c0_g1_i9	PAR12_MOUSE	IT	1e-04	0.0761	0.5307	0.2622	NA

Table 1: Significant candidate genes when excluding control samples. In comparison column, BG = Bursa-gene, BT = Bursa-transcript, IG = Ileum-gene, and IT = Ileum-transcript (*continued*)

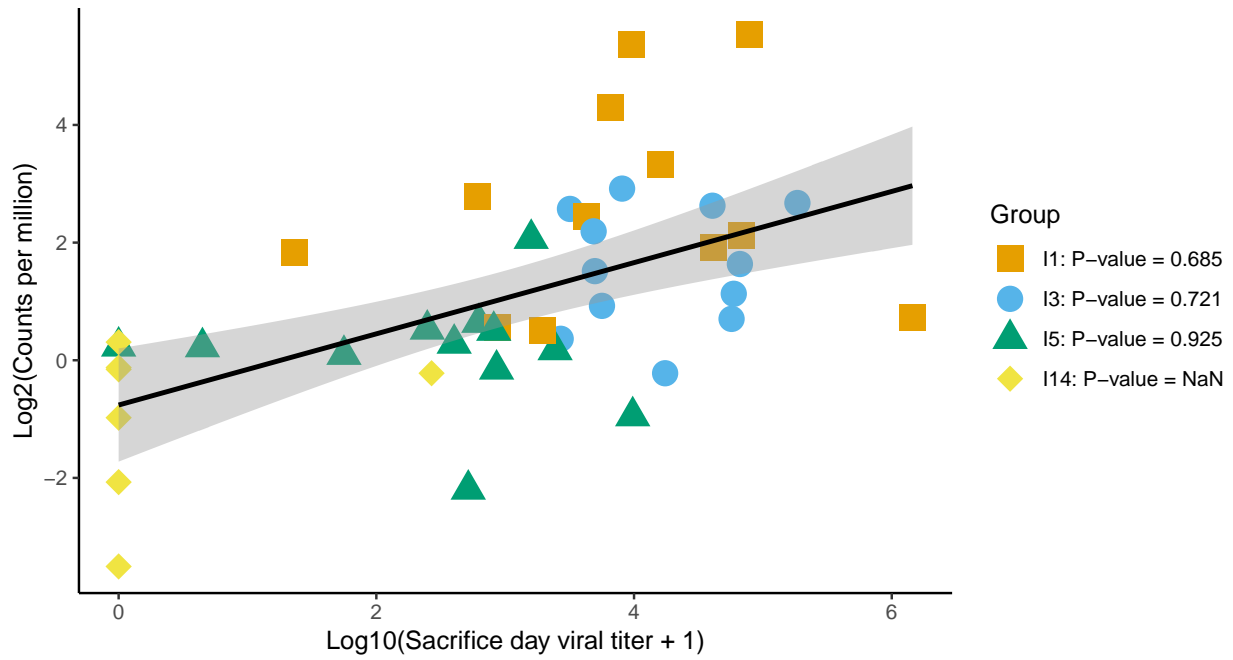
identifier	geneName	comparison	Overall	I1	I3	I5	I14
DN22_c0_g1_i12	MIRO1_CHICK	IT	3e-04	0.0482	0.7854	0.2819	NA
DN2413_c0_g1_i2	STAT1_PIG	IT	0e+00	0.0258	0.8808	0.1339	NA
DN2413_c0_g1_i6	STAT1_PIG	IT	1e-04	0.0422	0.9285	0.2417	NA
DN2578_c0_g1_i3	CCR5_BOVIN	IT	6e-04	0.6714	0.2849	0.0023	NA
DN2932_c0_g1_i6	IFI6_BOVIN	IT	0e+00	0.0282	0.6990	0.0073	NA
DN3089_c0_g1_i6	NLRC5_HUMAN	IT	3e-04	0.0541	0.4608	0.3641	NA
DN3236_c0_g1_i10	TAP1_GORGO	IT	4e-04	0.0308	0.8002	0.2340	NA
DN5474_c0_g1_i1	NFKB1_CHICK	IT	4e-04	0.0122	0.3256	0.0116	NA
DN5594_c0_g1_i10	PAR12_HUMAN	IT	3e-04	0.1109	0.5193	0.9086	NA
DN6170_c0_g1_i10	IN35_HUMAN	IT	2e-04	0.0353	0.9412	0.6482	NA
DN6170_c0_g1_i5	IN35_HUMAN	IT	6e-04	0.0356	0.4454	0.3397	NA
DN6178_c0_g1_i1	IFIT5_HUMAN	IT	0e+00	0.0480	0.6270	0.8630	NA
DN6190_c0_g1_i1	OASL1_RAT	IT	0e+00	0.0545	0.0306	0.8147	NA
DN6190_c0_g1_i2	OASL1_RAT	IT	3e-04	0.0454	0.8031	0.7403	NA
DN6190_c0_g1_i4	OASL2_MOUSE	IT	1e-04	0.0788	0.3436	0.3769	NA
DN718_c0_g1_i3	IFM5_HUMAN	IT	4e-04	0.2313	0.8060	0.7601	NA

Plotting significant results



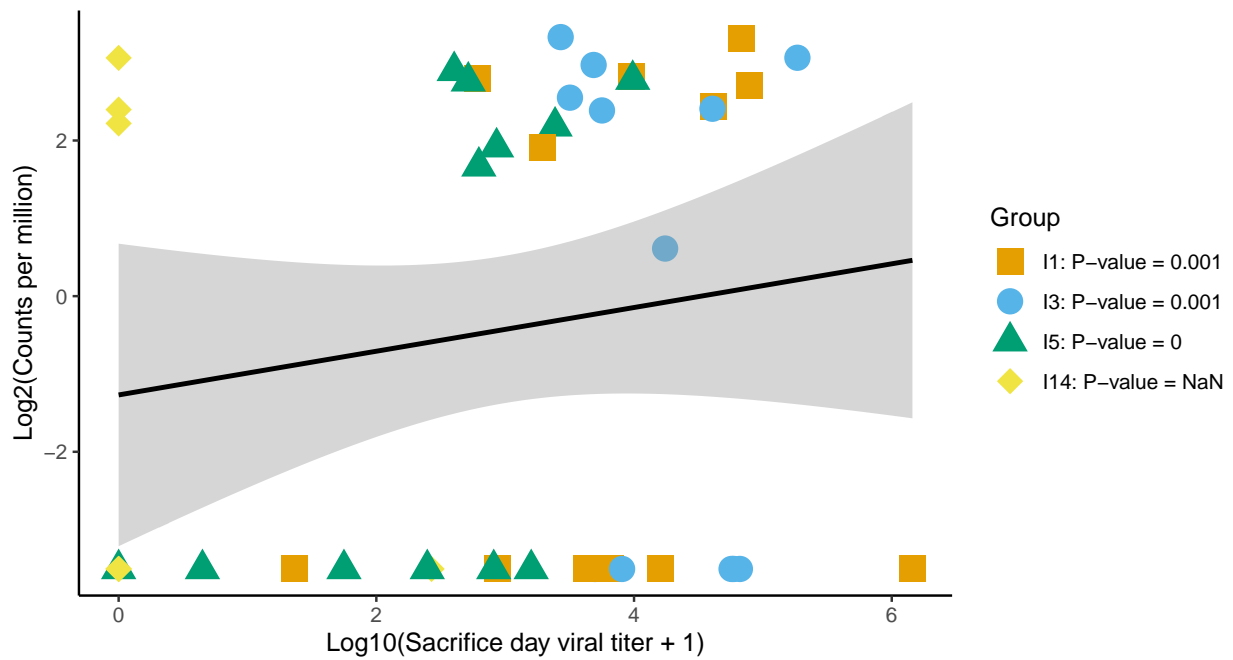
CC4L_HUMAN – DN12298_c0_g1

Ileum – gene; Adj. p = 0.02597



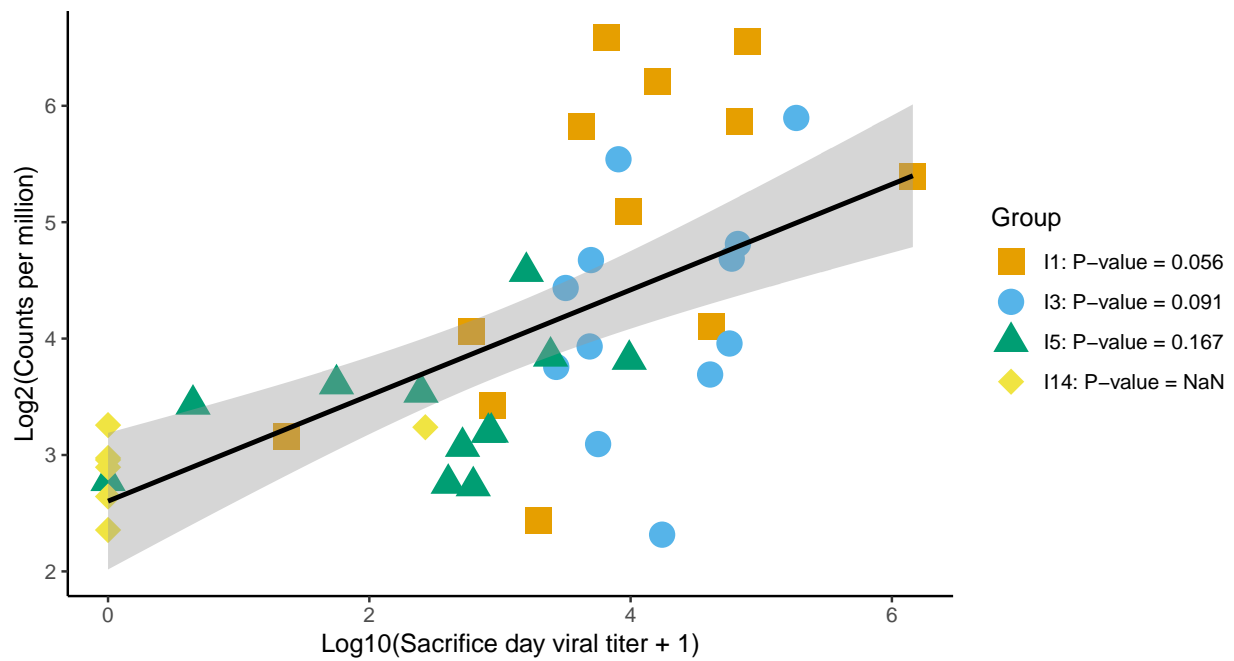
GBA2_MOUSE – DN13777_c0_g1

Ileum – gene; Adj. p = 0



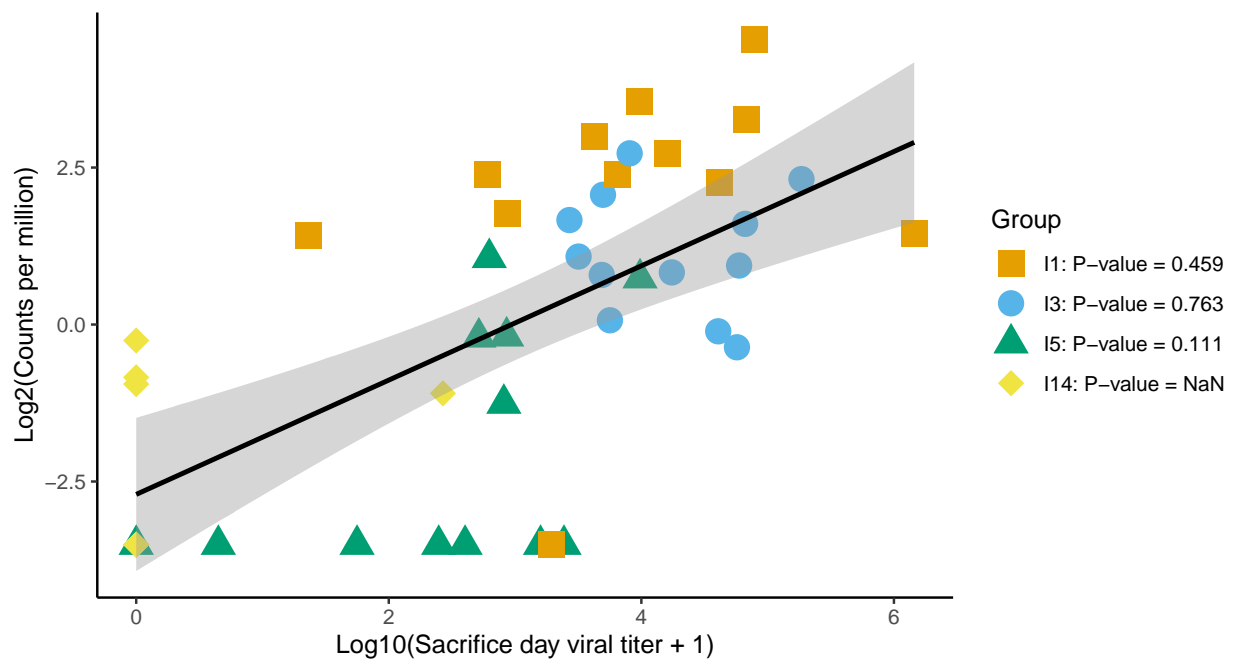
DDX58_MOUSE – DN1500_c0_g1

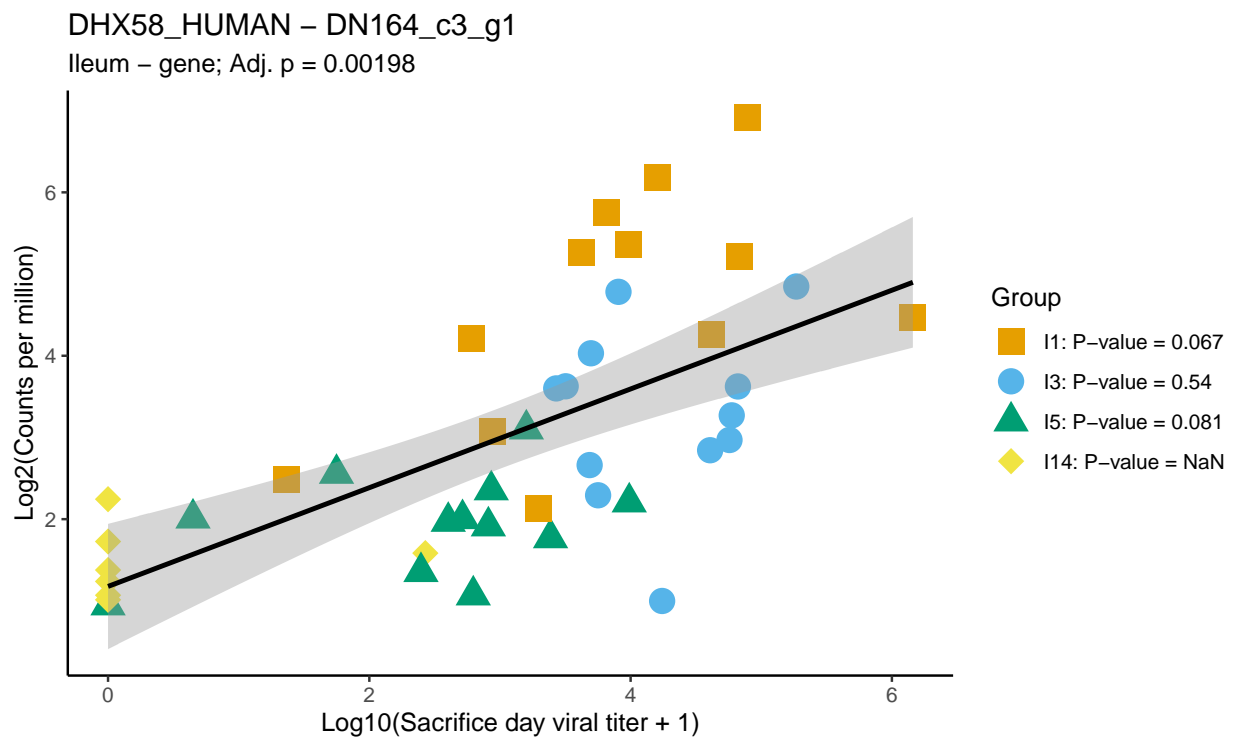
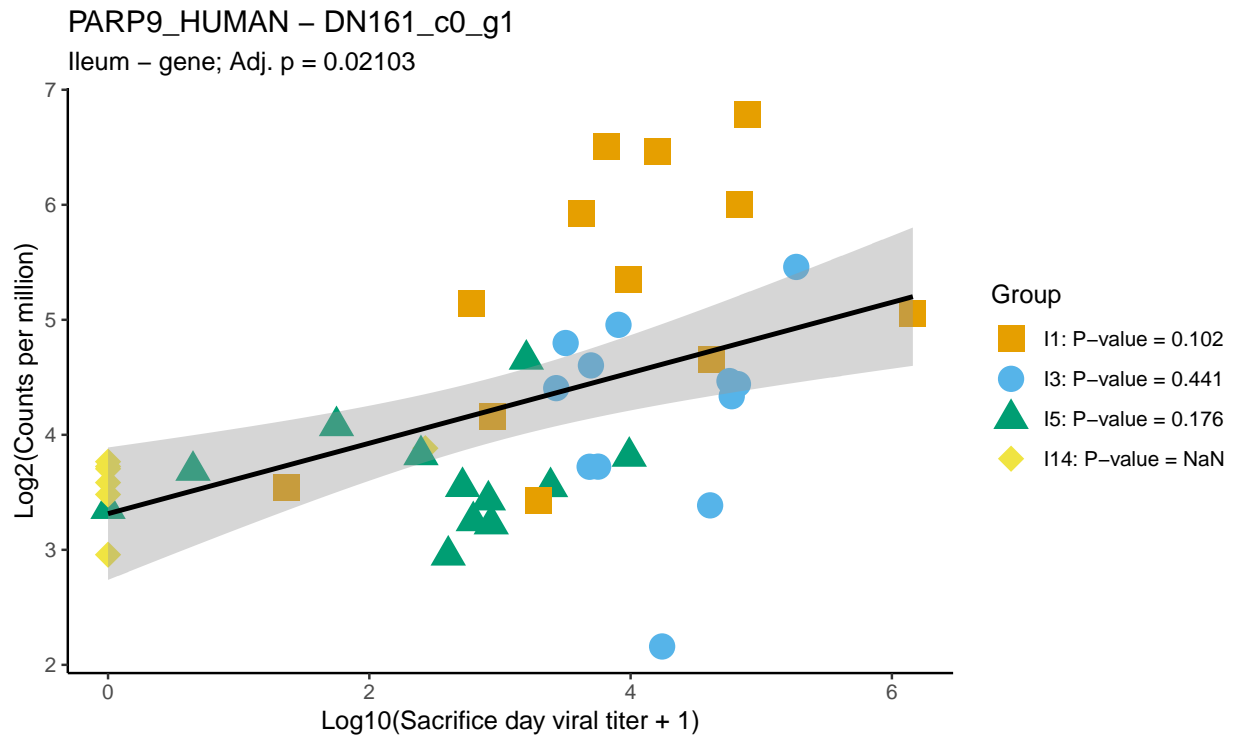
Ileum – gene; Adj. p = 8e-04

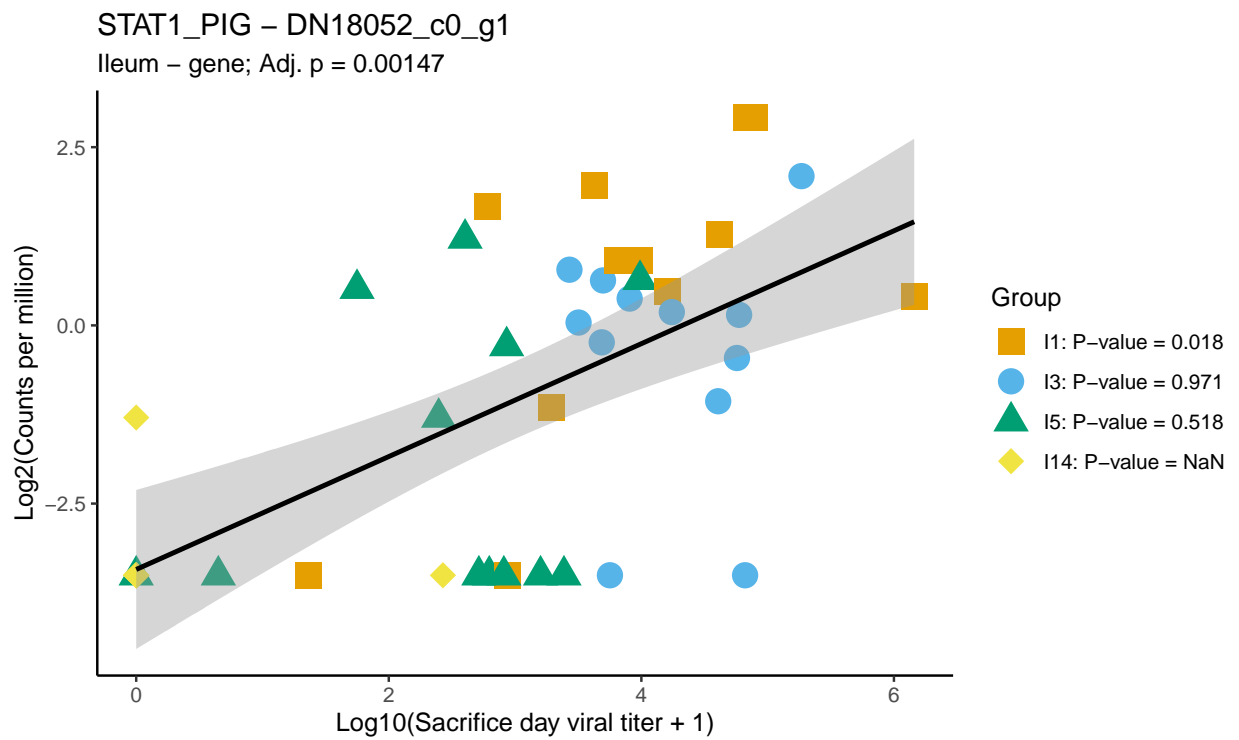
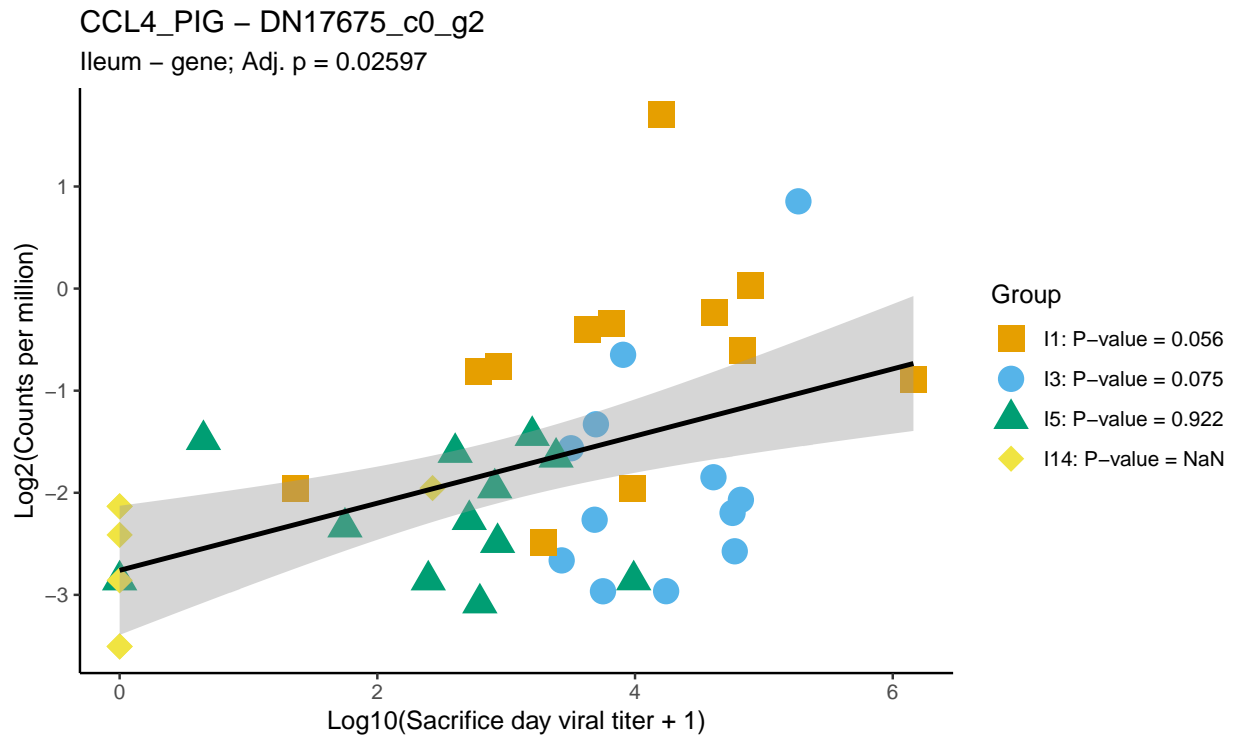


DHX58_MOUSE – DN15121_c0_g1

Ileum – gene; Adj. p = 0.00207

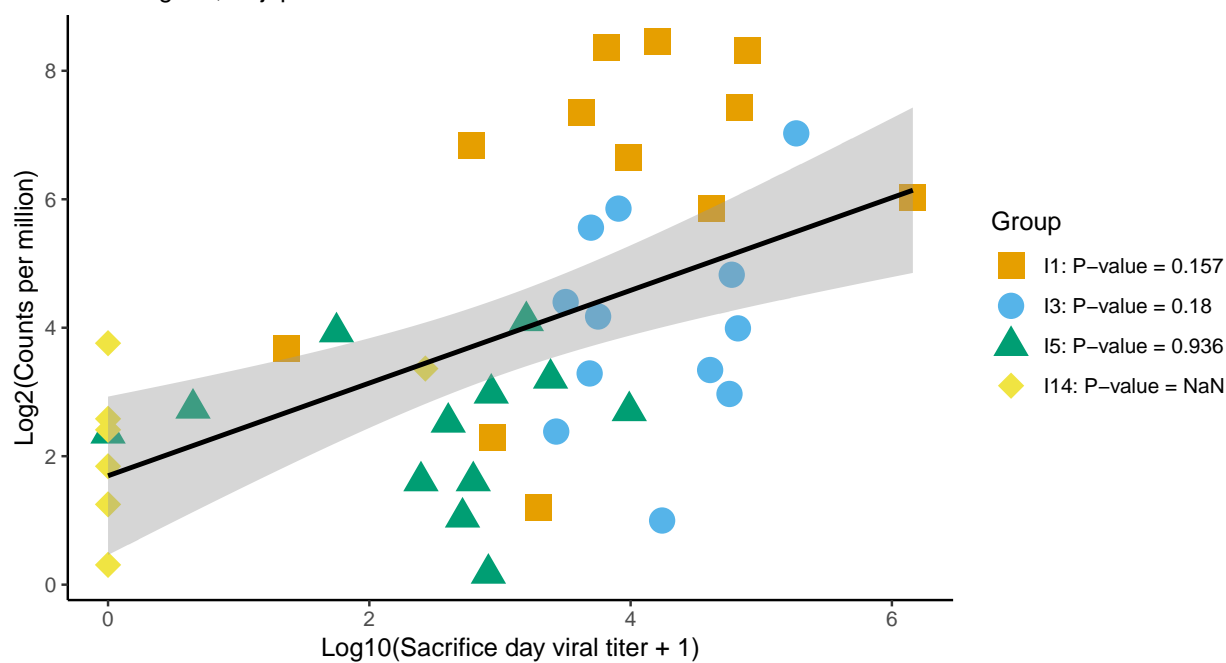






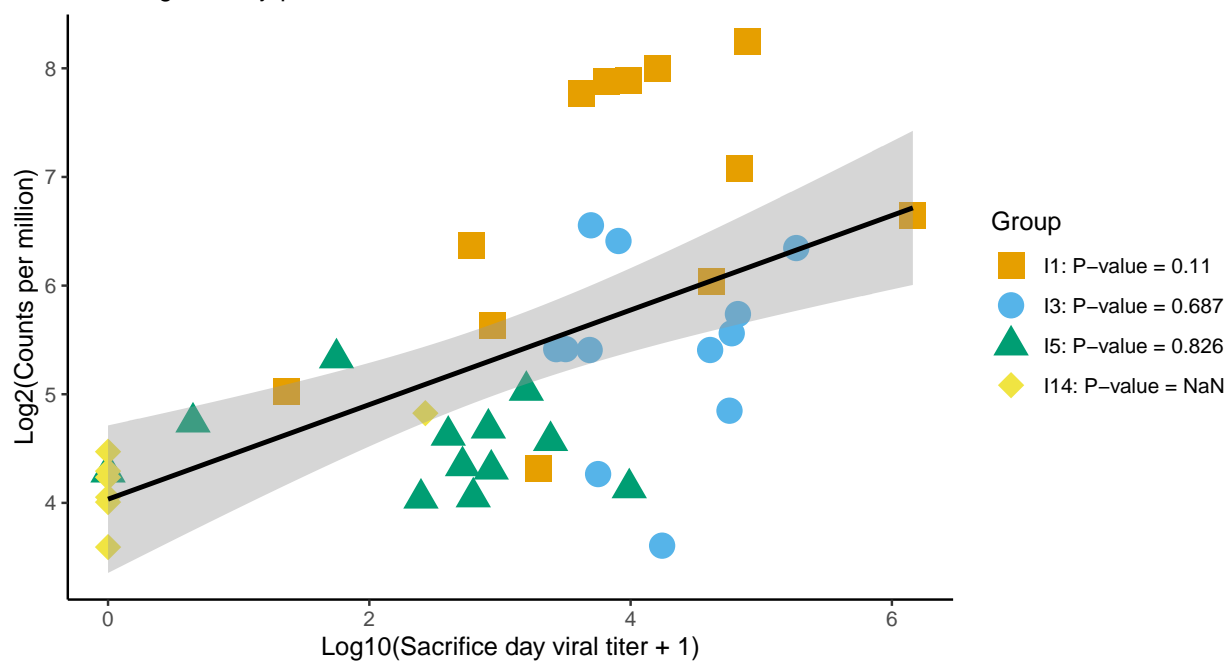
RSAD2_BOVIN – DN1920_c0_g1

Ileum – gene; Adj. p = 0.00773



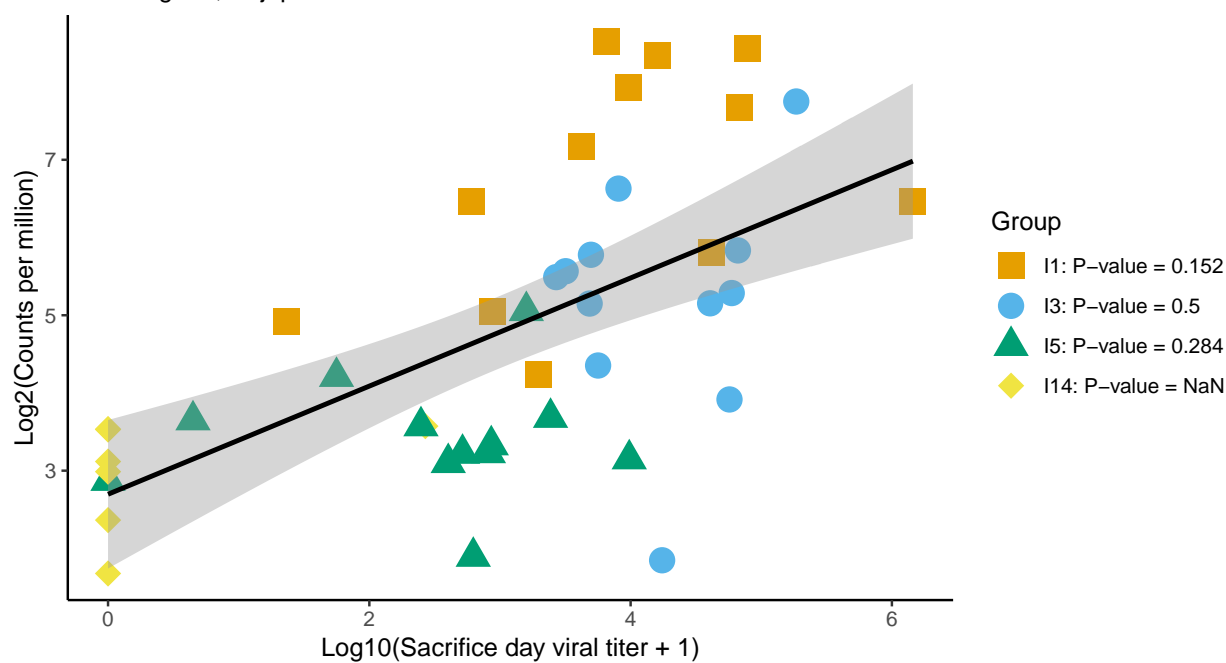
IRF3_CHICK – DN1934_c0_g1

Ileum – gene; Adj. p = 0.02249



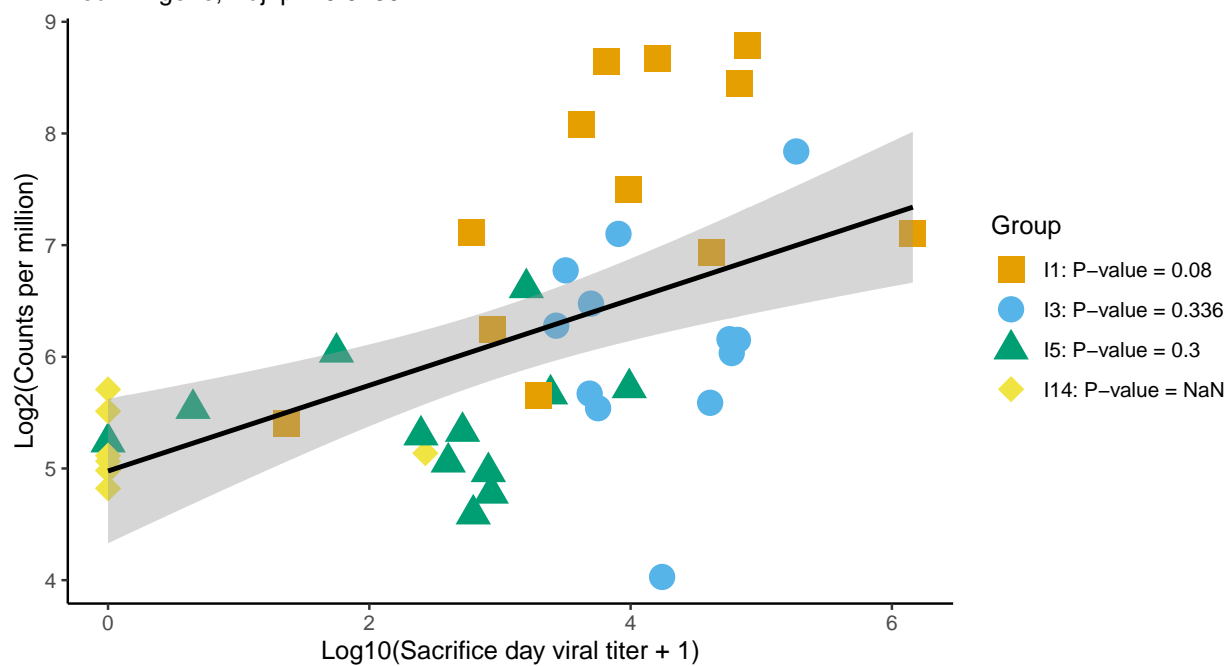
MX_ANAPL – DN2085_c0_g2

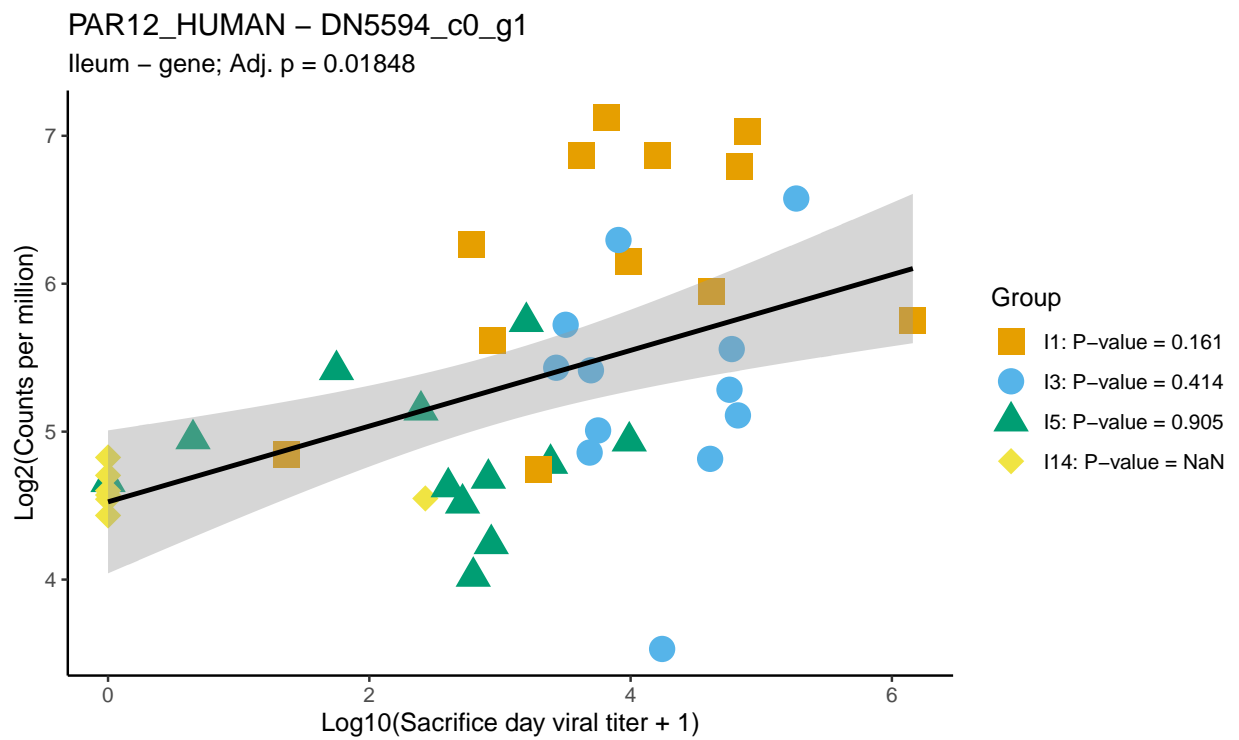
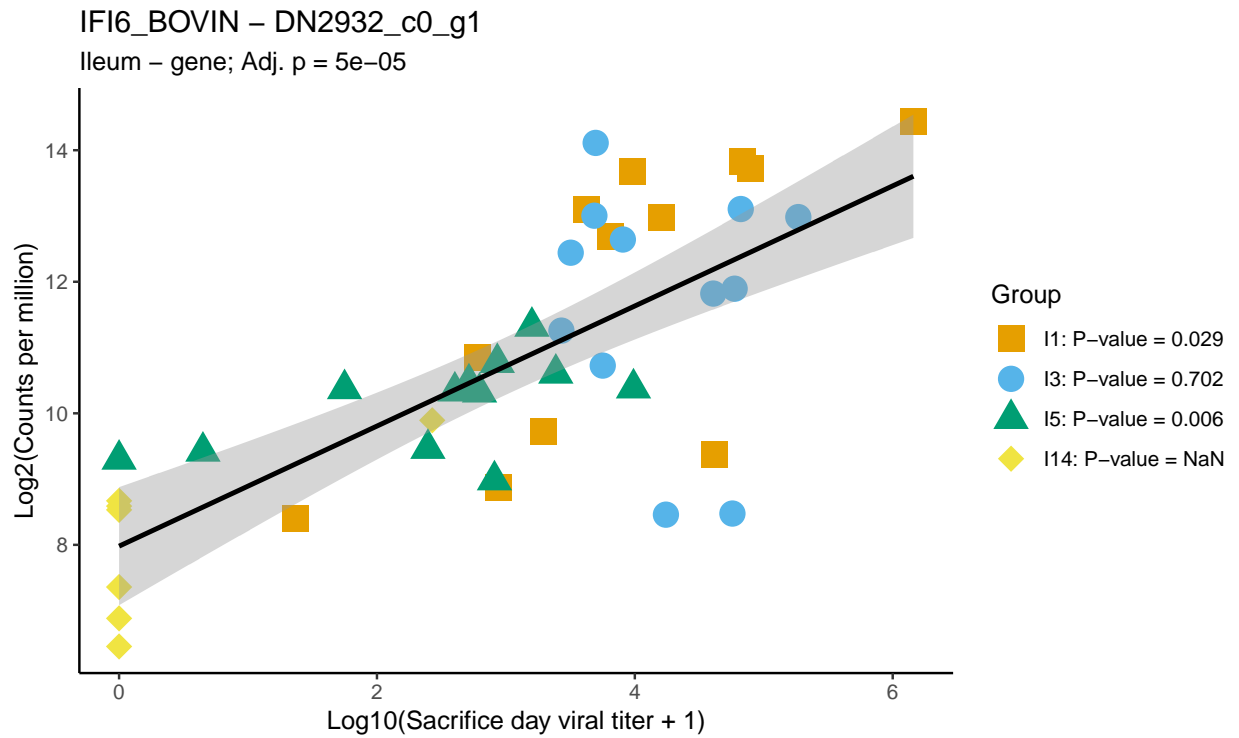
Ileum – gene; Adj. p = 0.00534



PAR12_MOUSE – DN20874_c0_g1

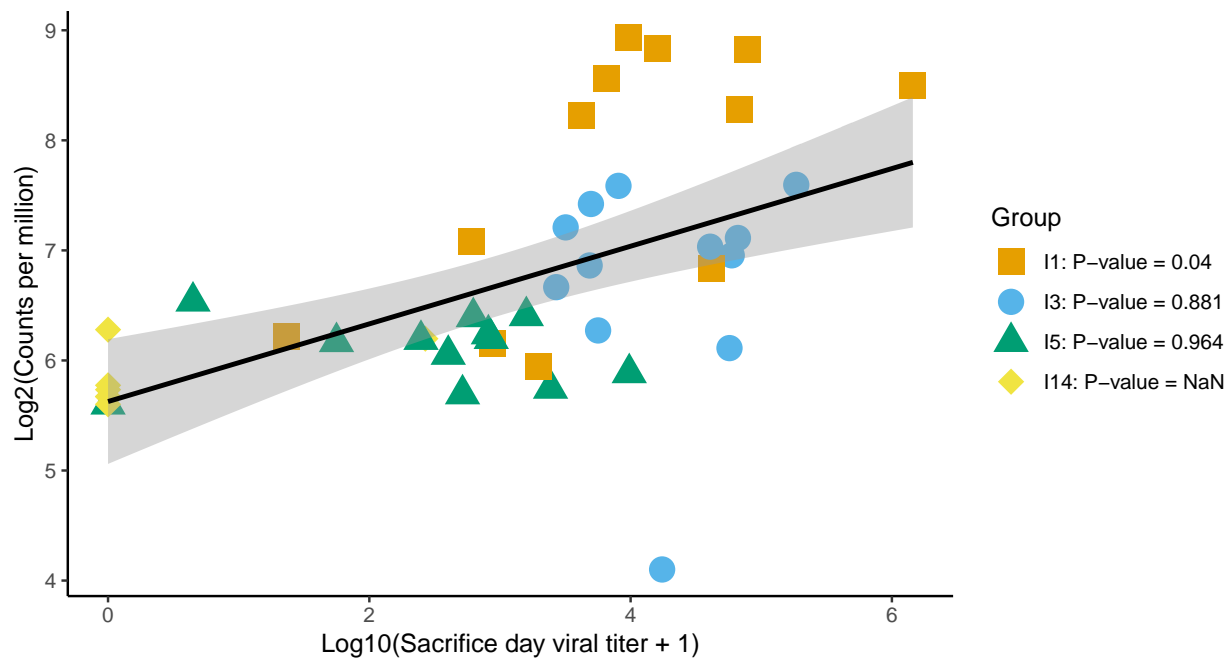
Ileum – gene; Adj. p = 0.02597





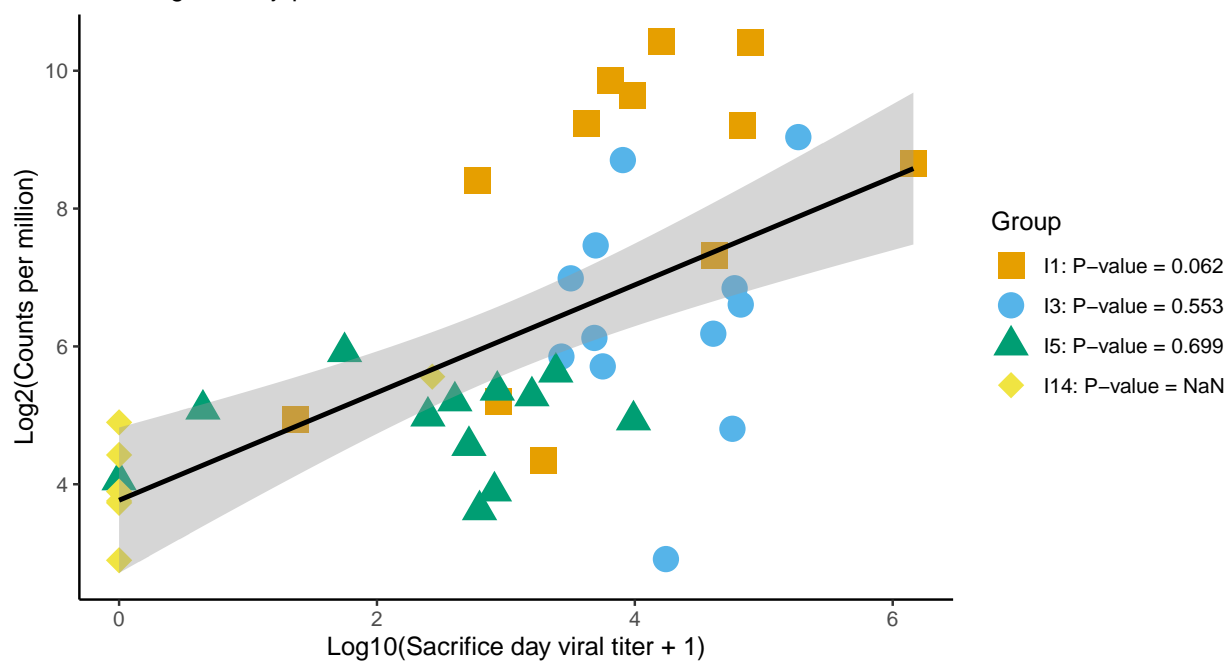
IN35_HUMAN – DN6170_c0_g1

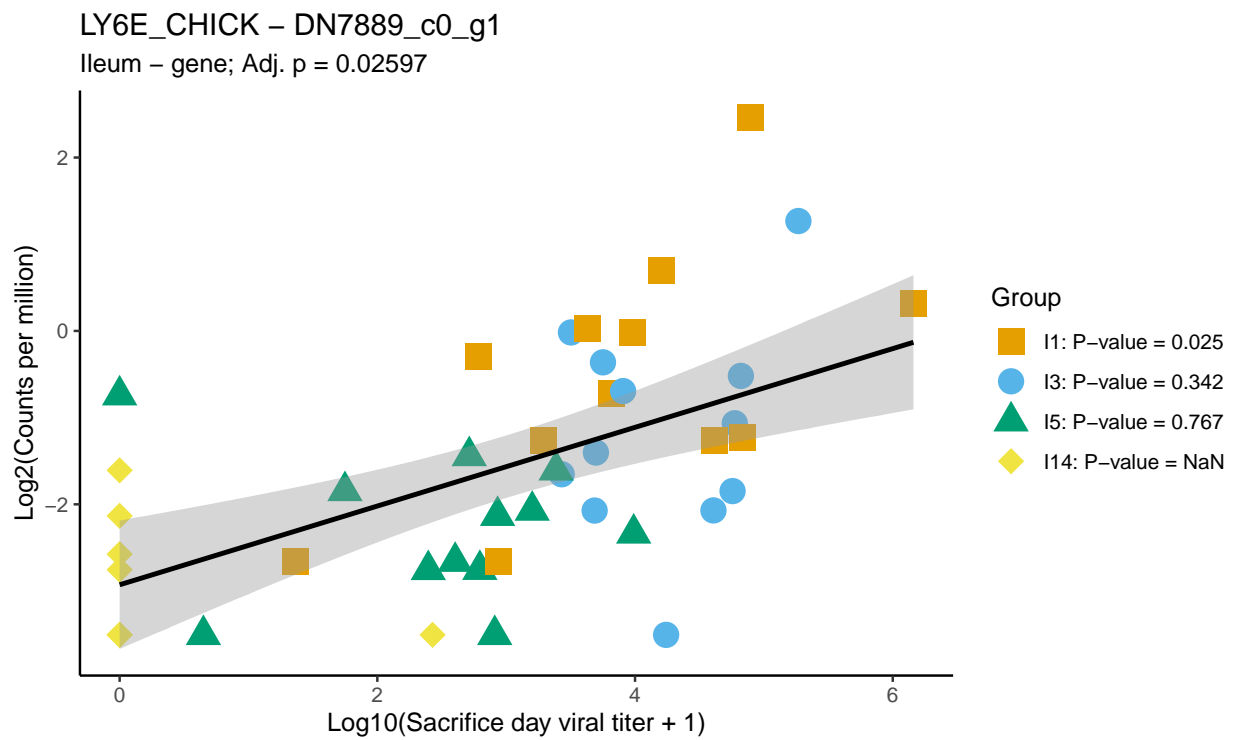
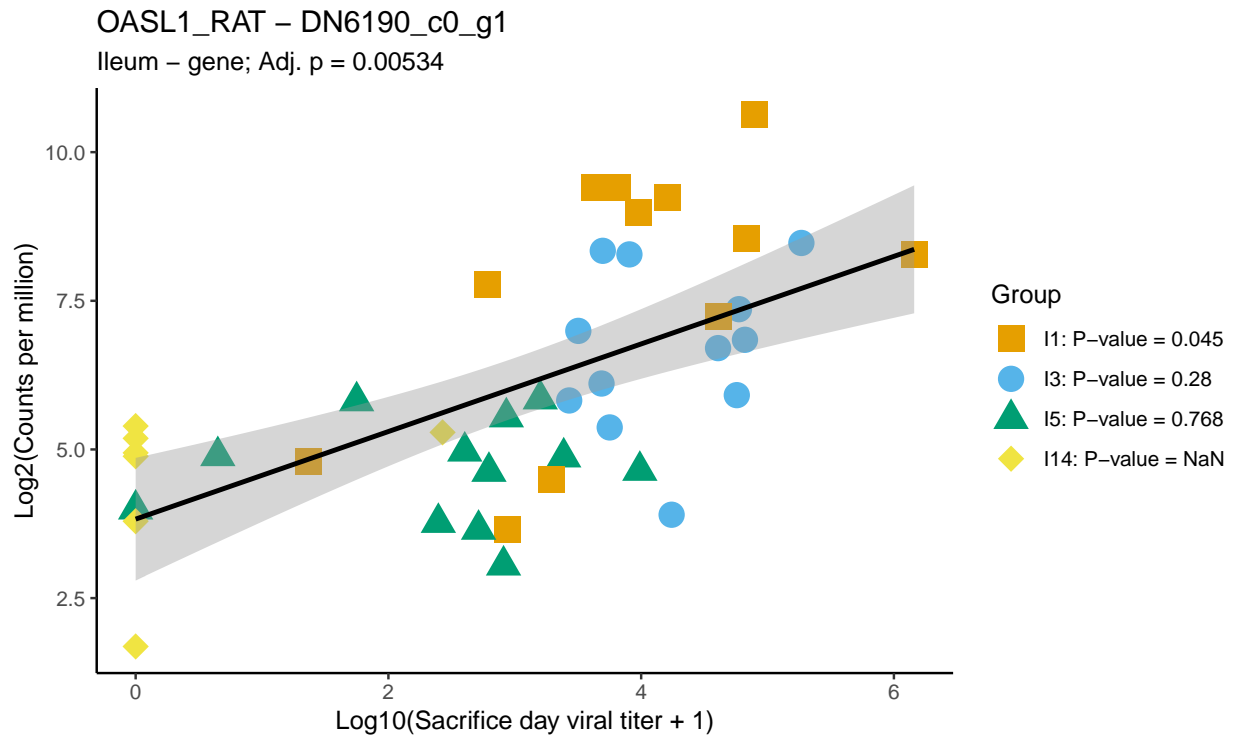
Ileum – gene; Adj. p = 0.01546

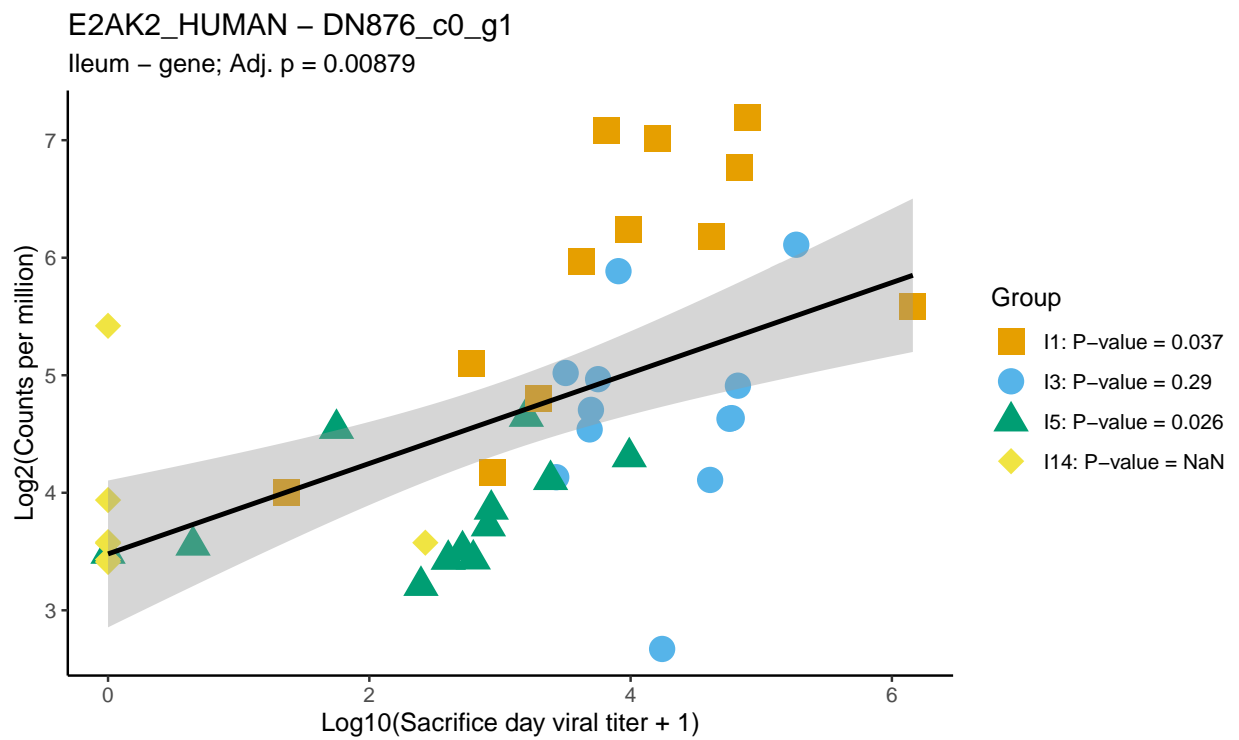
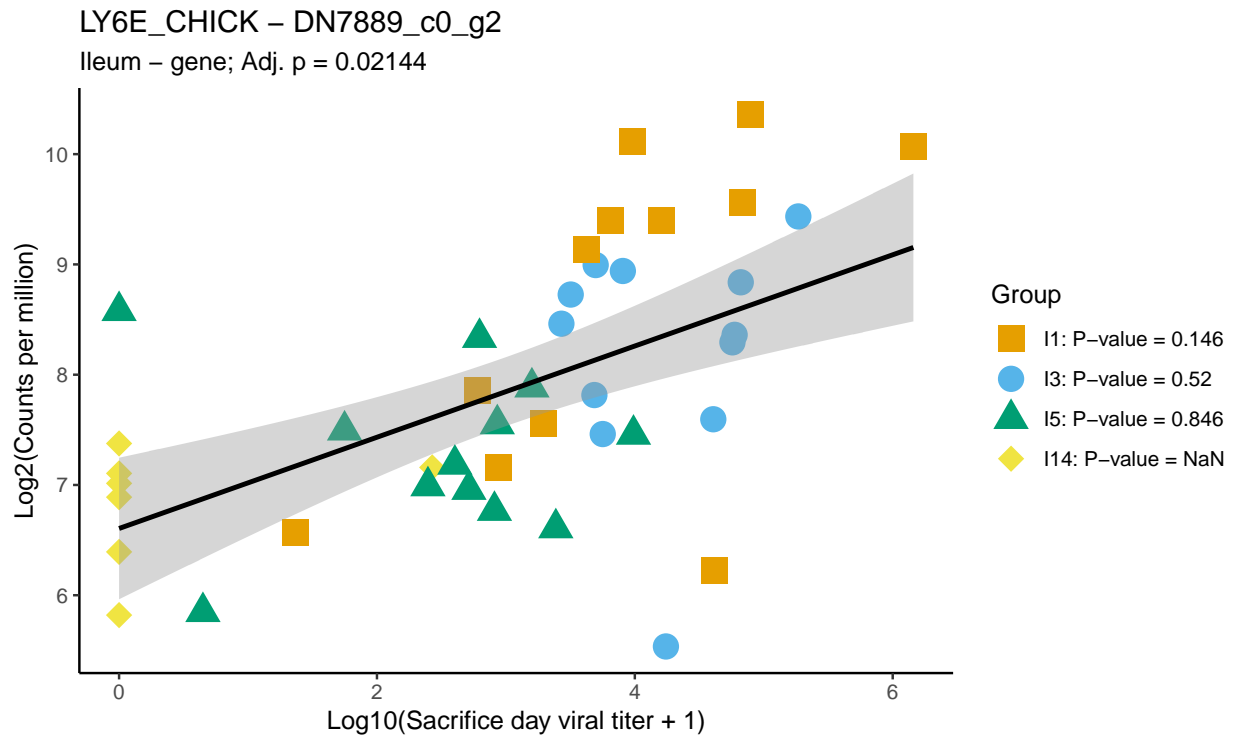


UBP34_HUMAN – DN6178_c0_g1

Ileum – gene; Adj. p = 0.00337

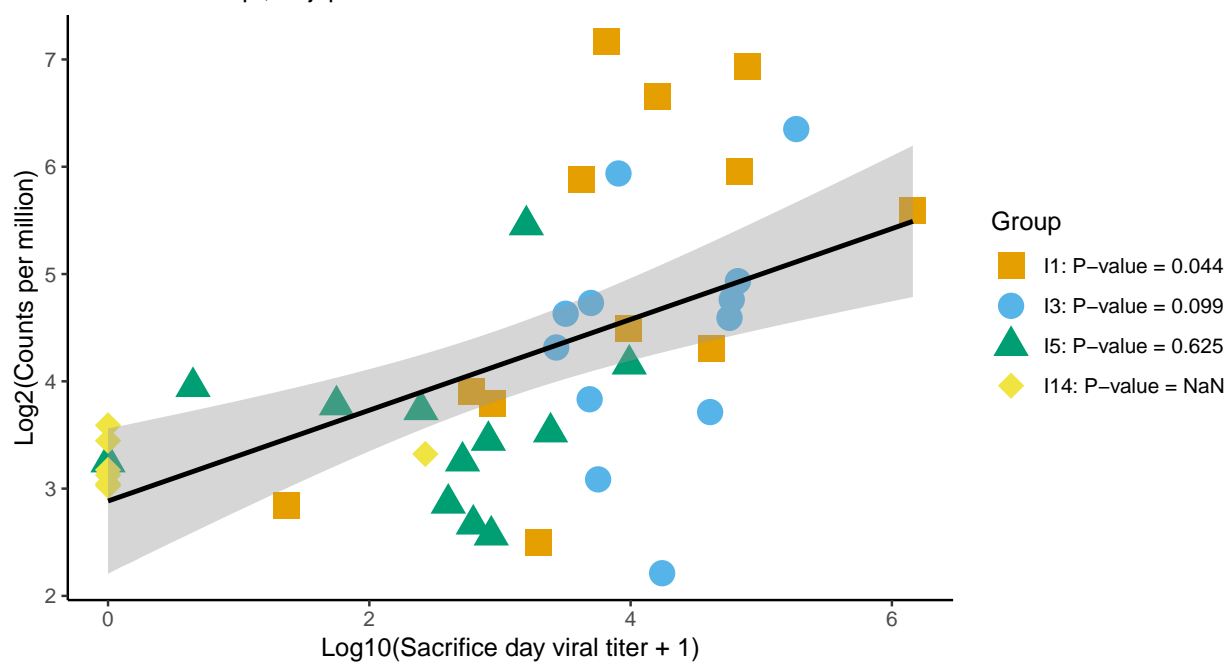






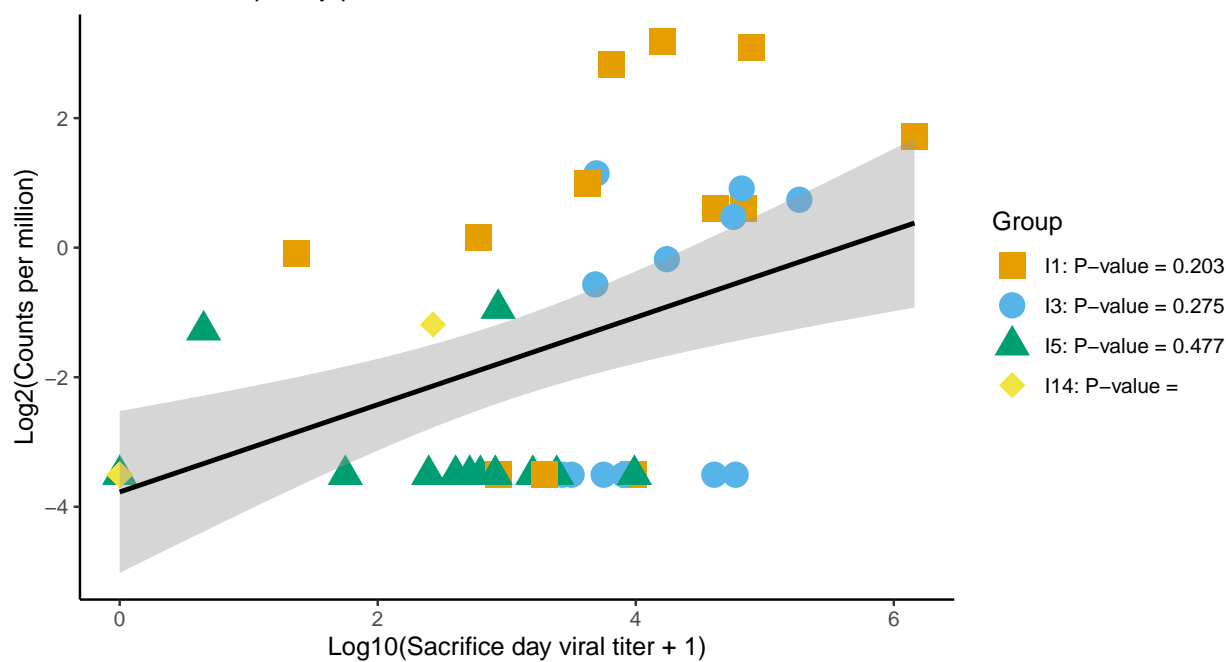
DDX58_HUMAN – DN1500_c0_g1_i13

Ileum – transcript; Adj. p = 0.00304



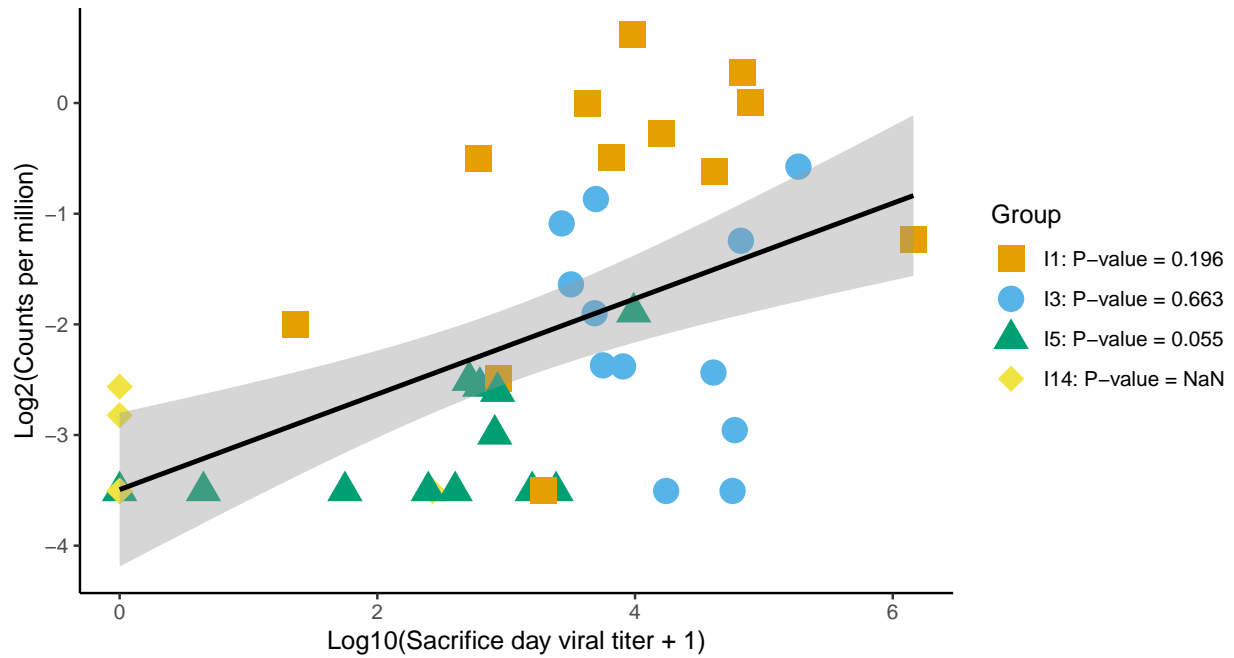
DDX58_MOUSE – DN1500_c0_g1_i23

Ileum – transcript; Adj. p = 0.03169



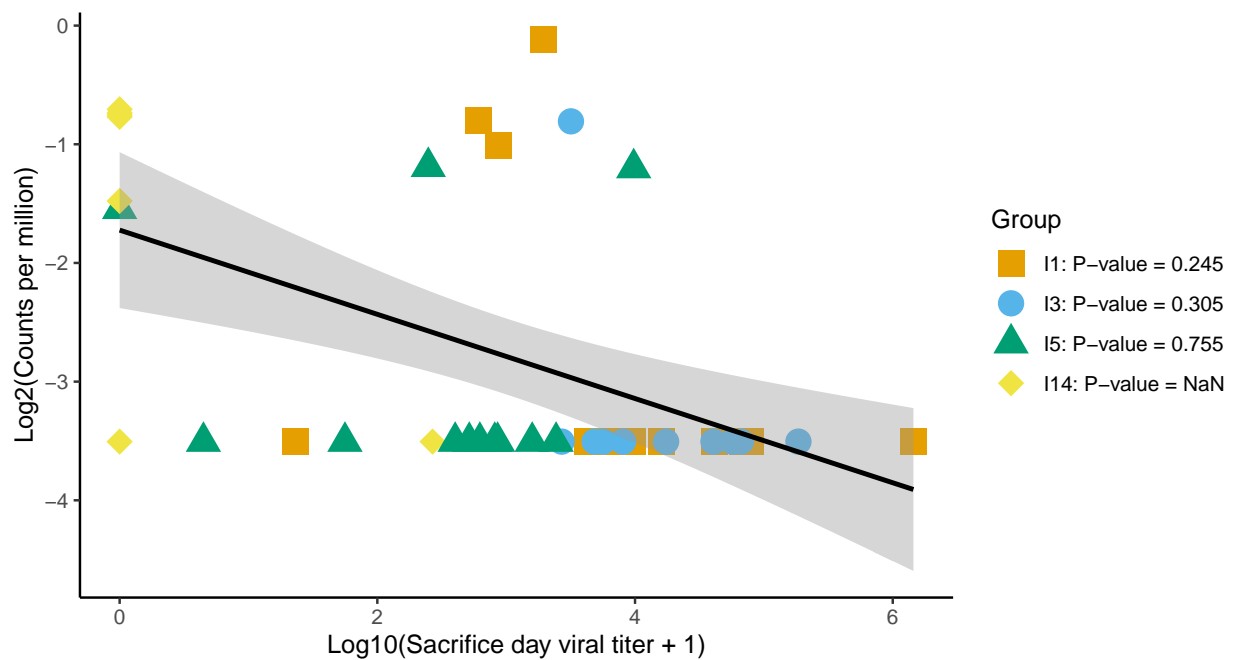
DHX58_MOUSE – DN15121_c0_g1_i1

Ileum – transcript; Adj. p = 0.01224



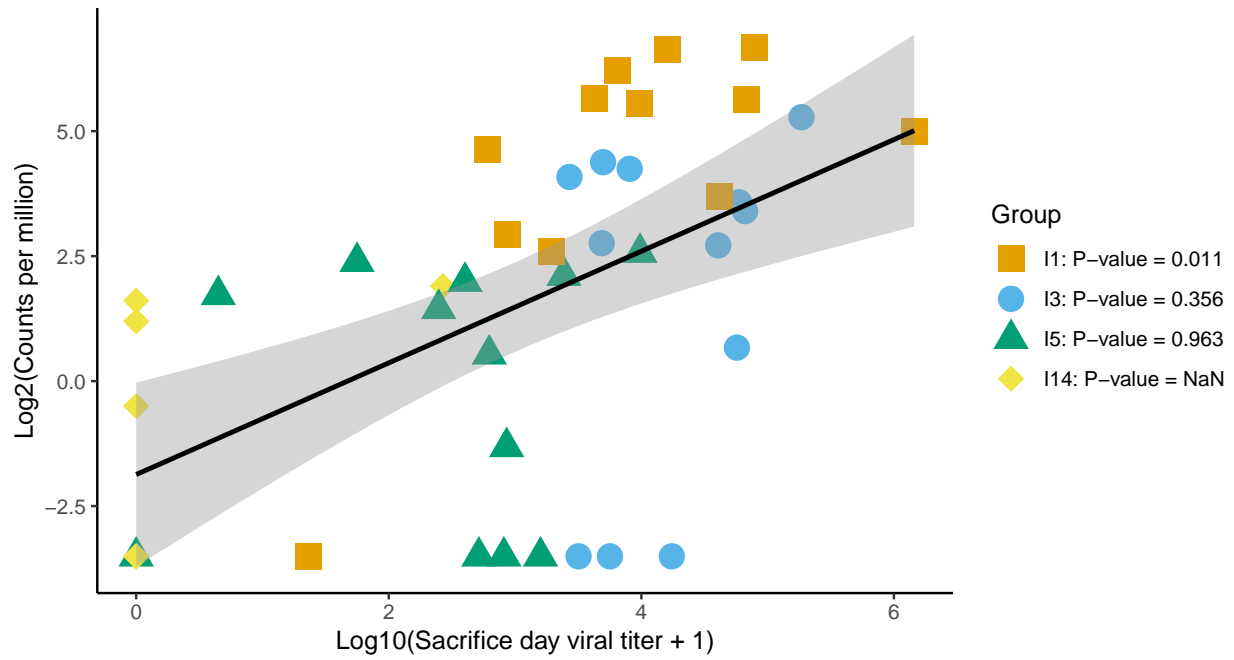
CD59_PAPSP – DN1551_c1_g1_i6

Ileum – transcript; Adj. p = 0.03169



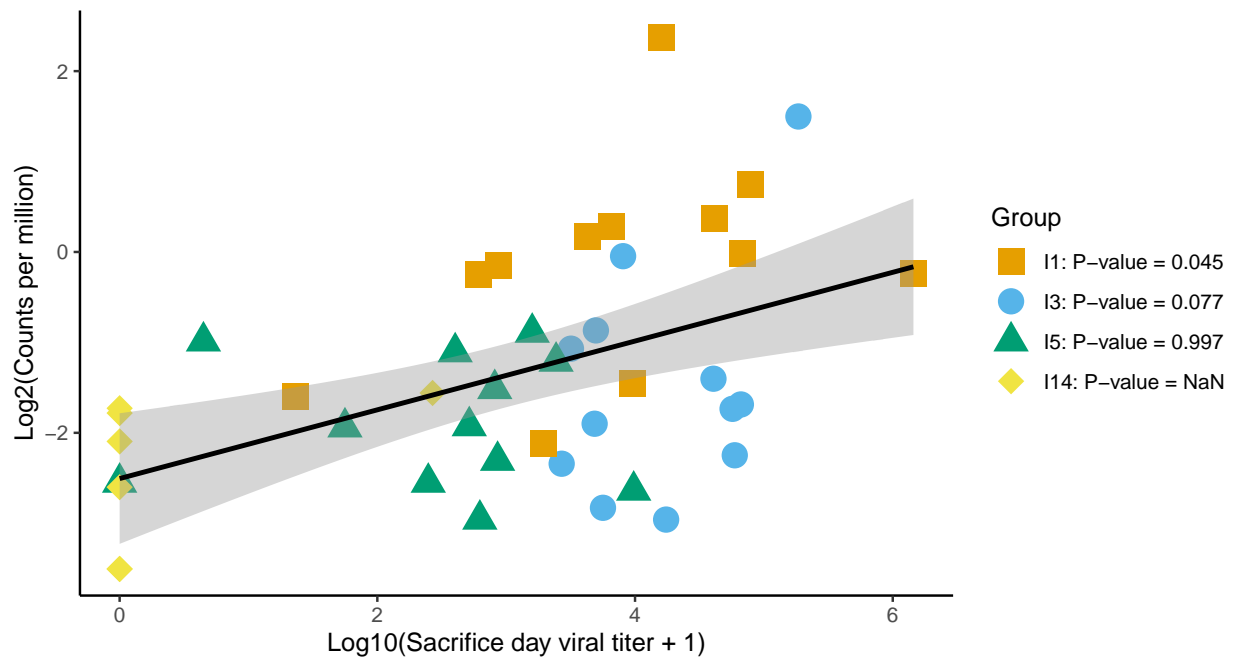
DHX58_HUMAN – DN164_c3_g1_i7

Ileum – transcript; Adj. p = 0.0106



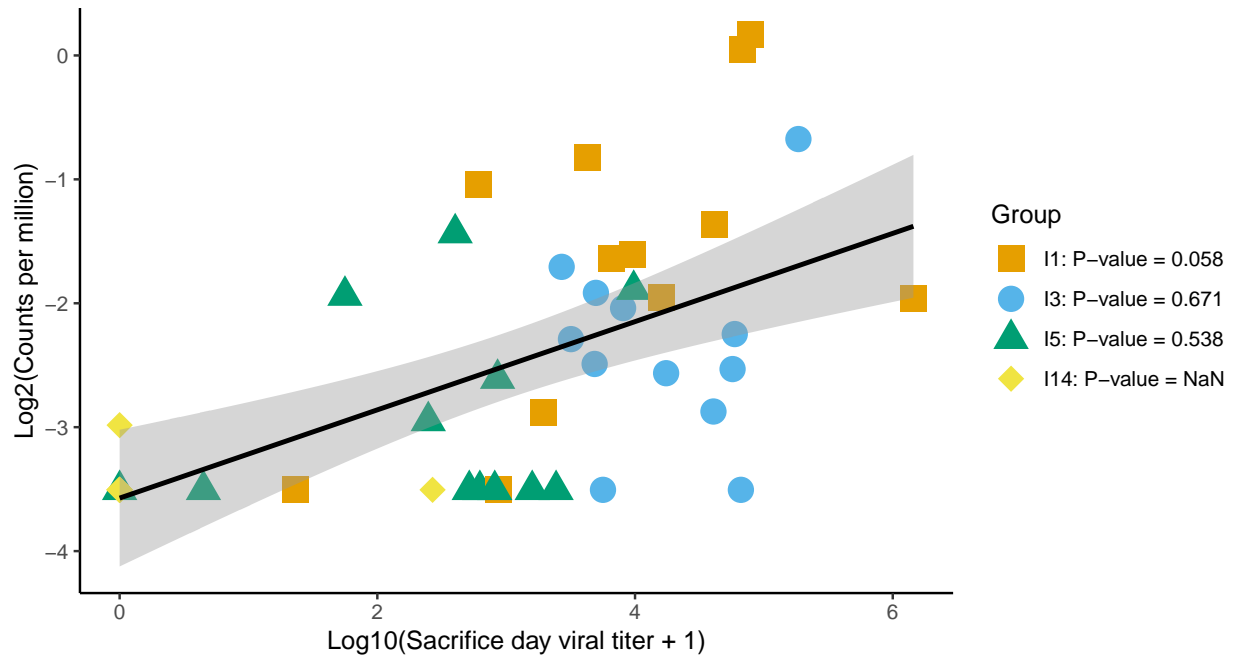
CCL4_PIG – DN17675_c0_g2_i1

Ileum – transcript; Adj. p = 0.03169



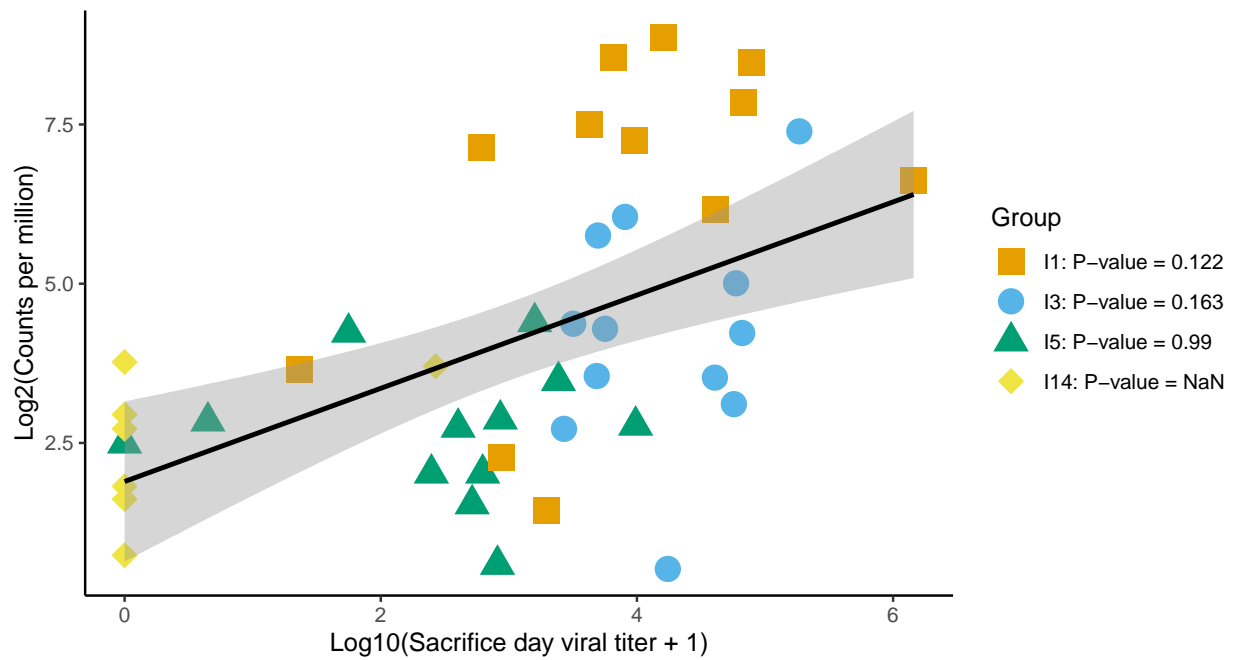
STAT1_PIG – DN18052_c0_g1_i2

Ileum – transcript; Adj. p = 0.01064



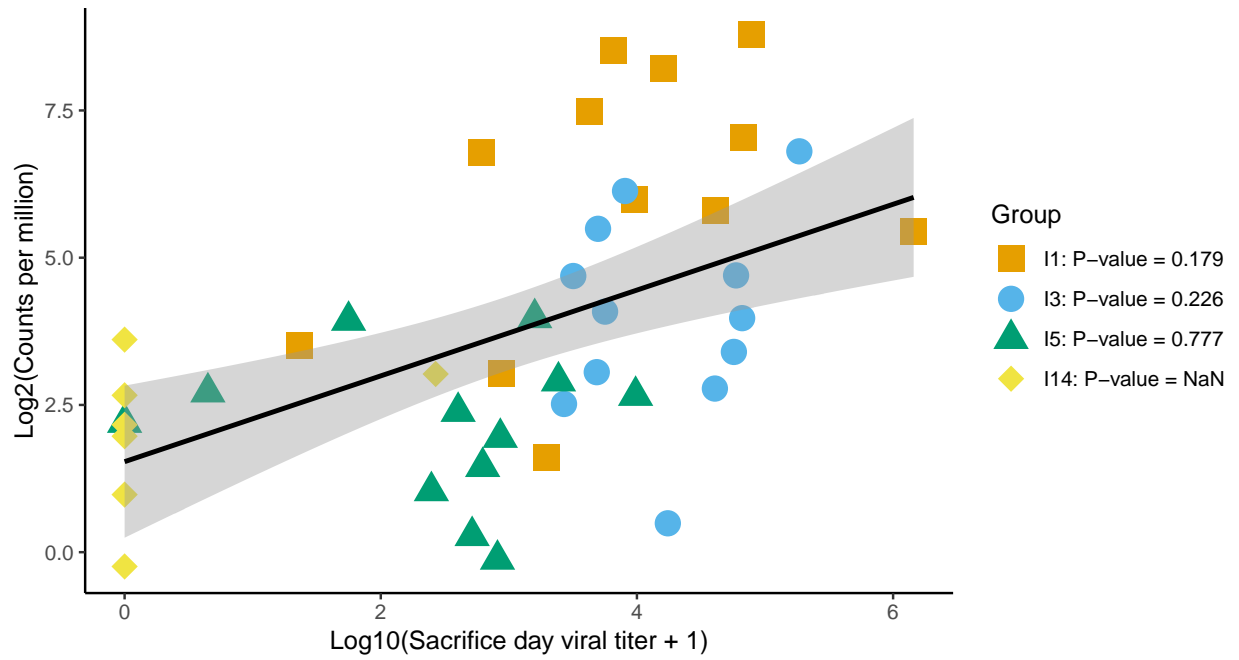
RSAD2_PIG – DN1920_c0_g1_i11

Ileum – transcript; Adj. p = 0.00878



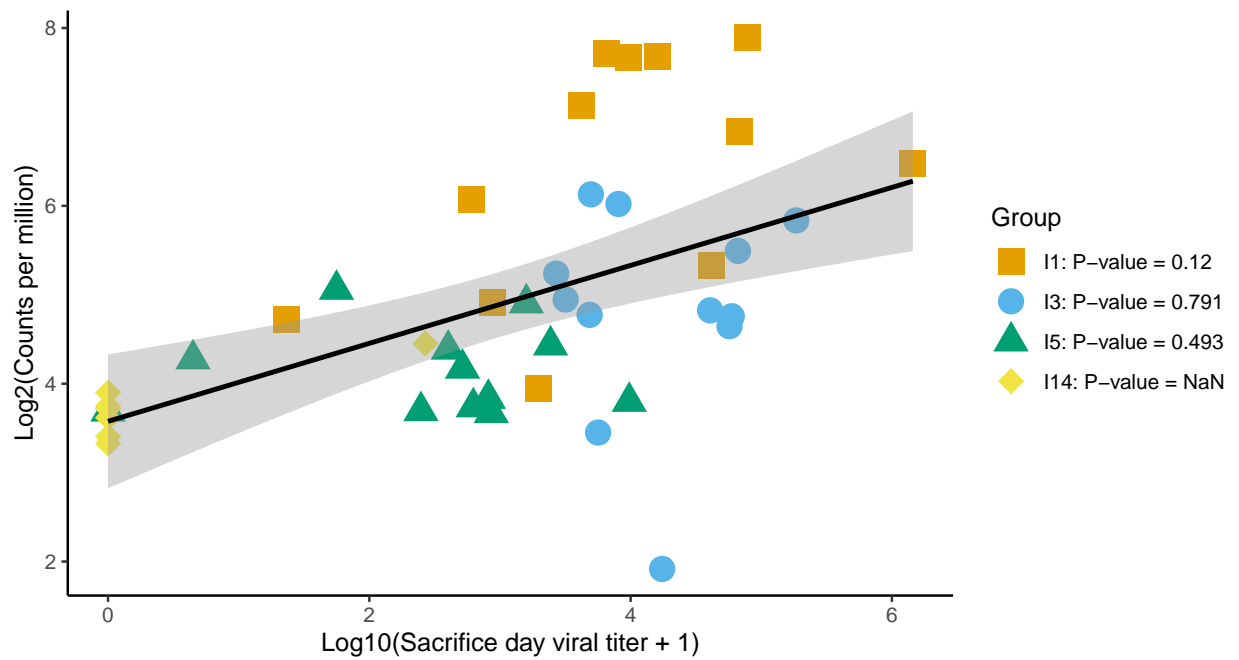
RSAD2_BOVIN – DN1920_c0_g1_i9

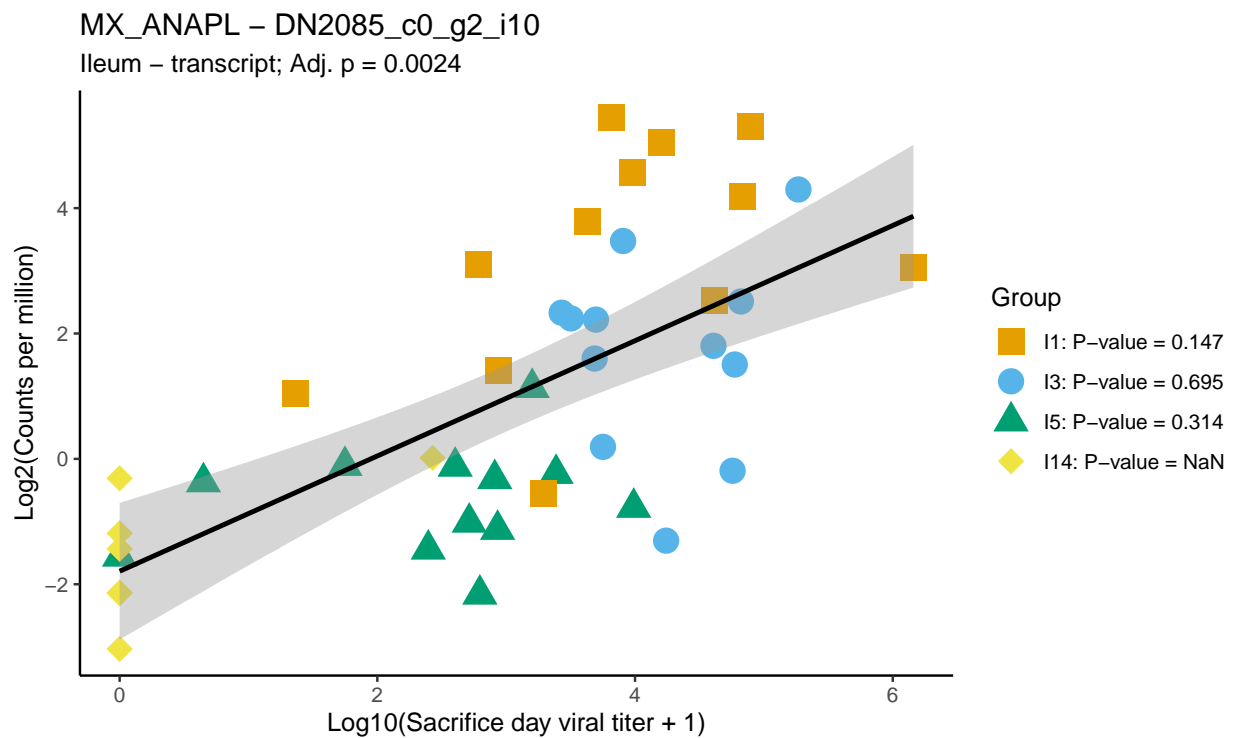
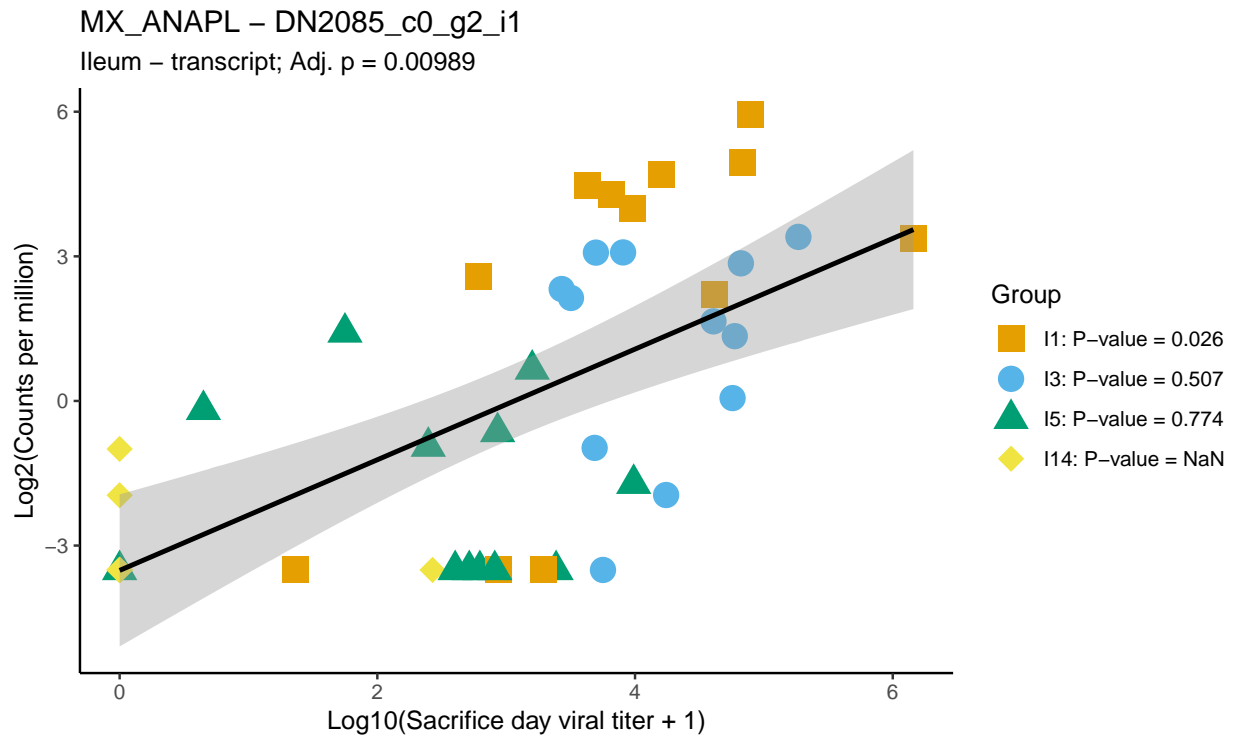
Ileum – transcript; Adj. p = 0.01269

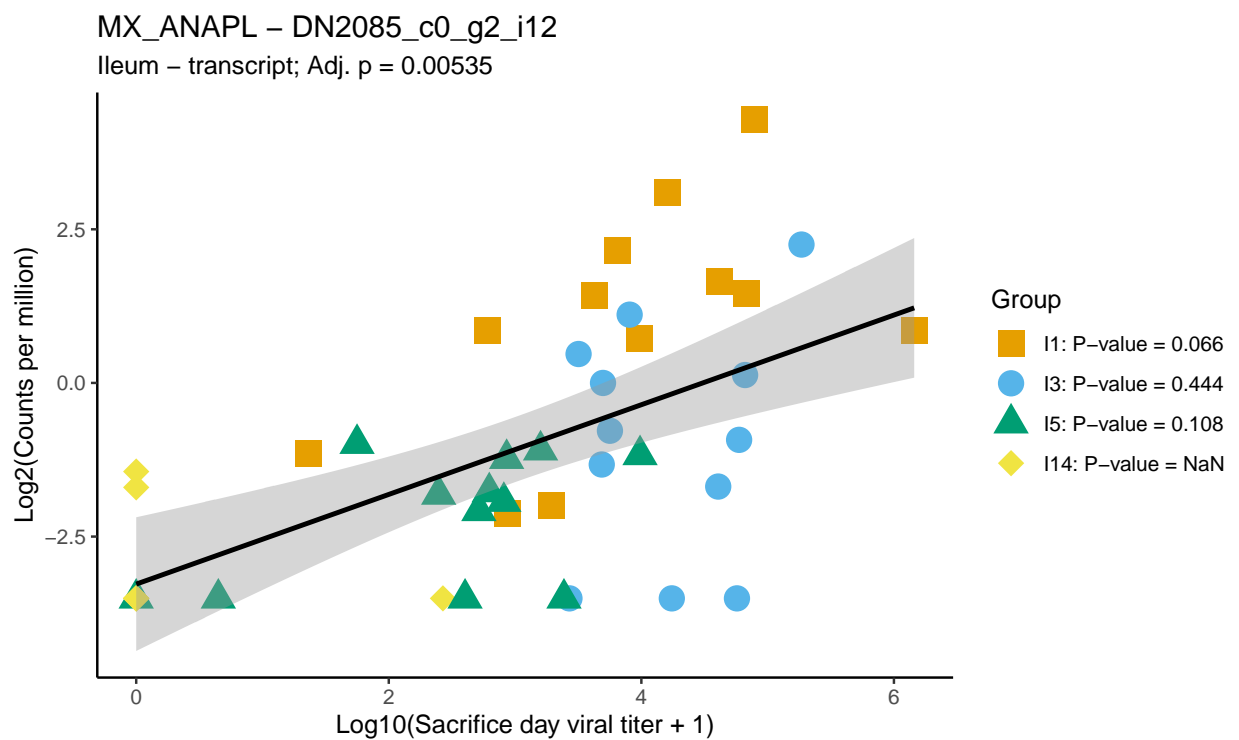
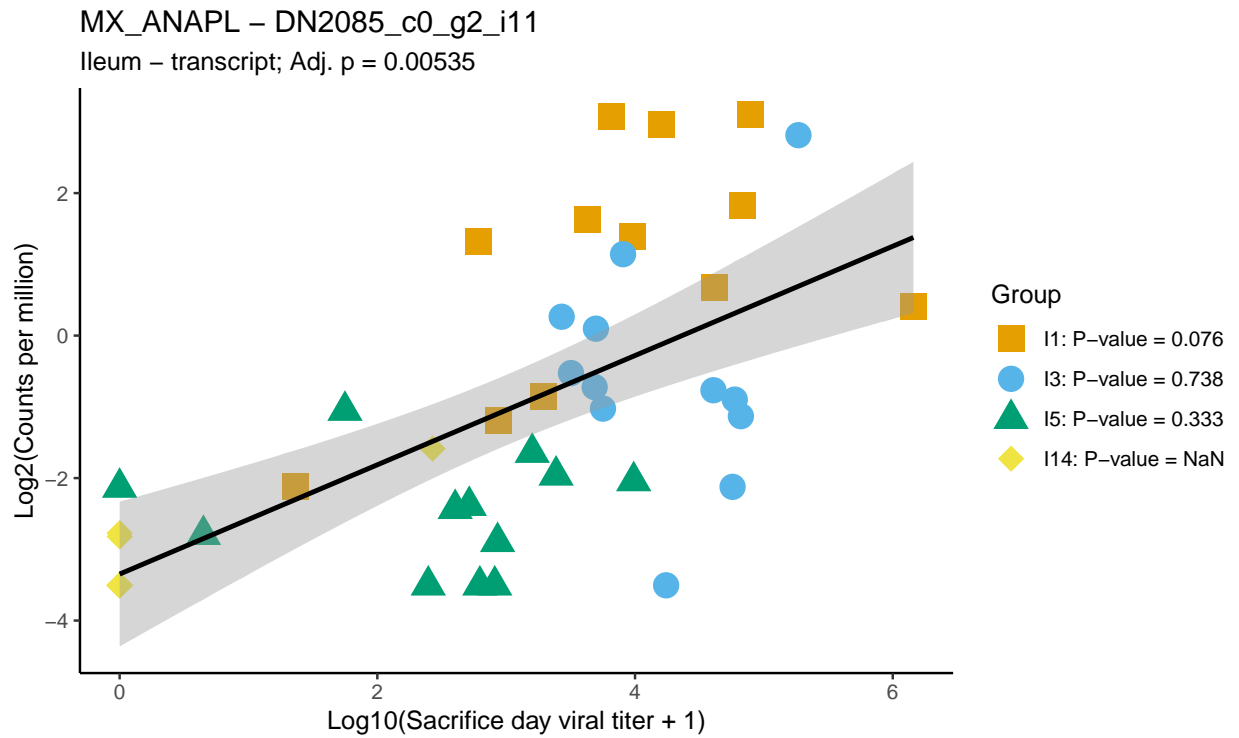


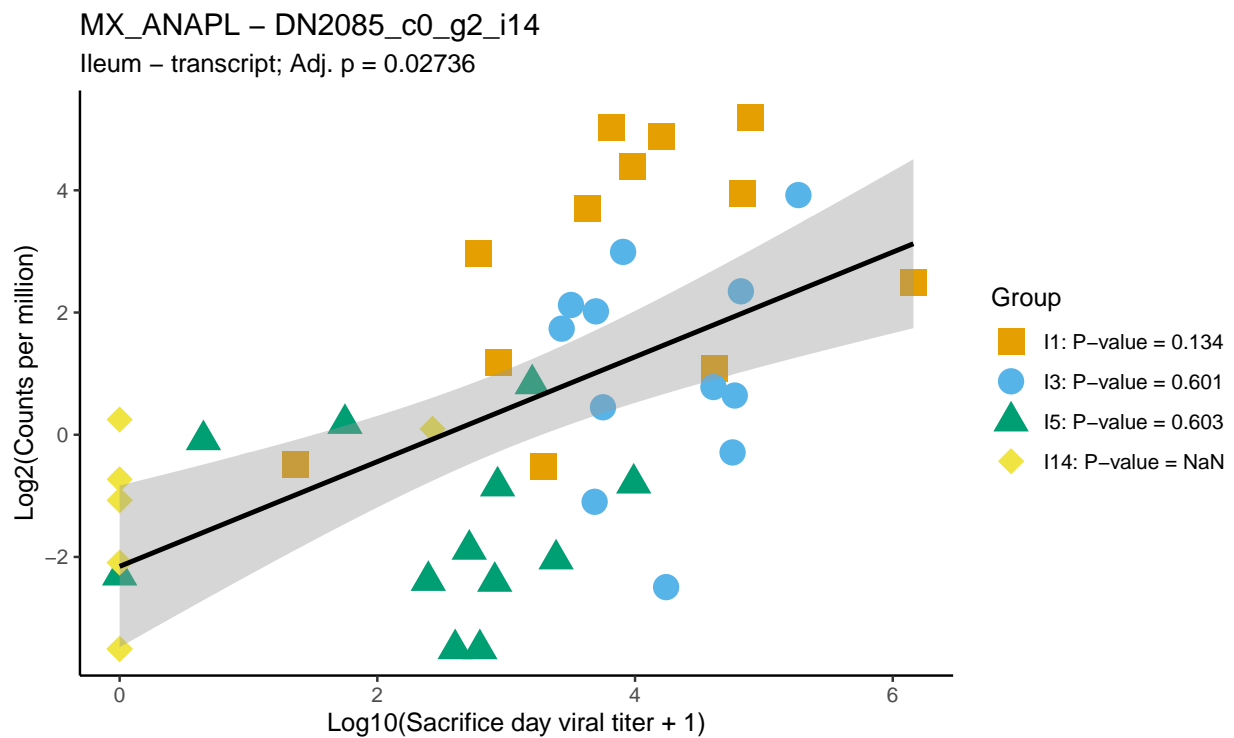
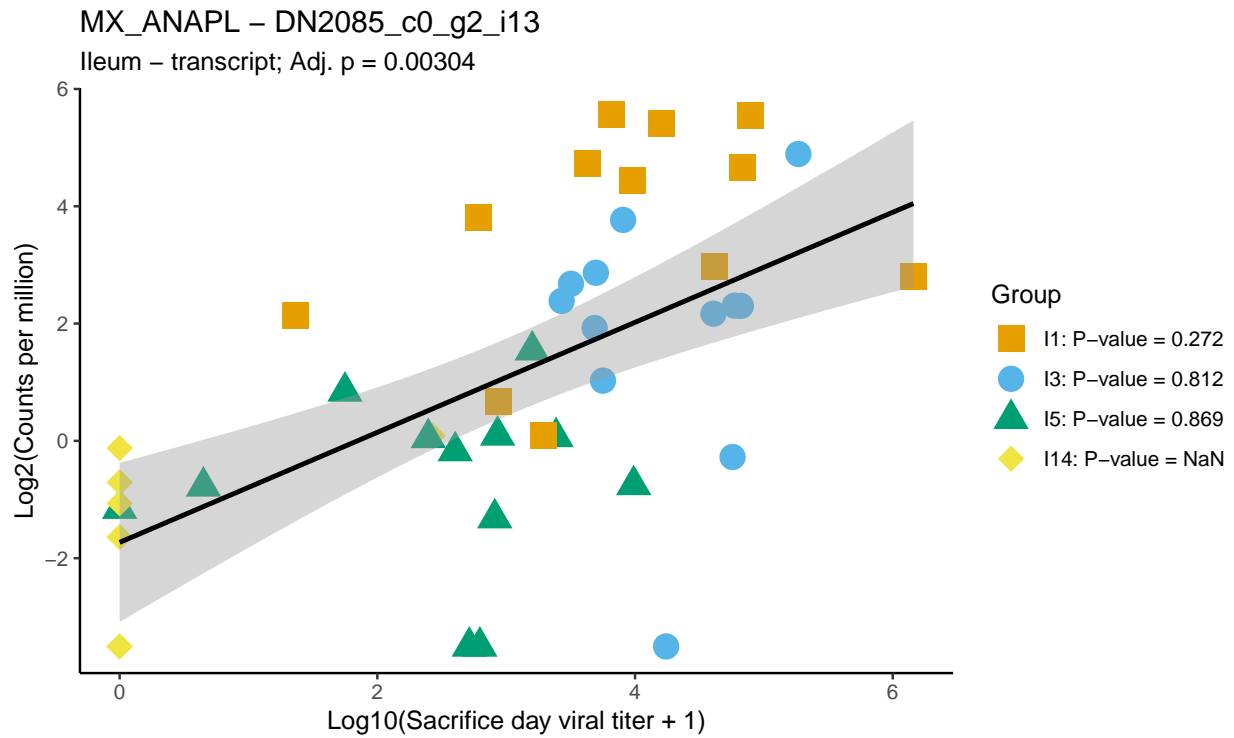
IRF3_CHICK – DN1934_c0_g1_i11

Ileum – transcript; Adj. p = 0.03995



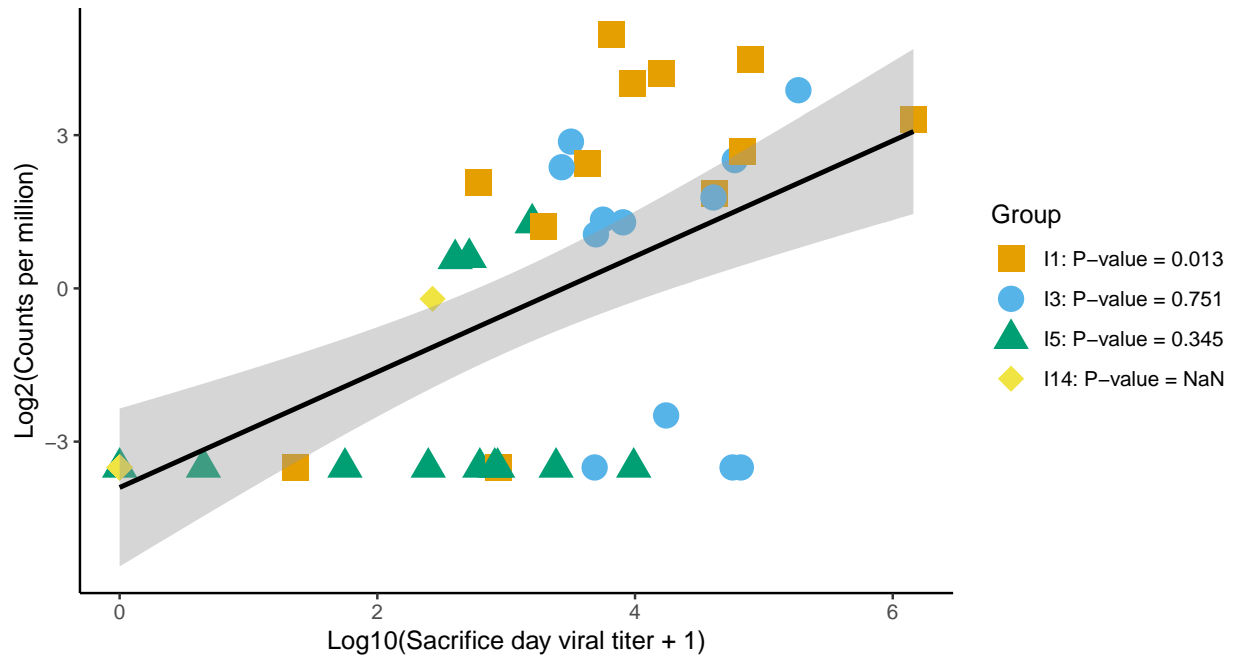






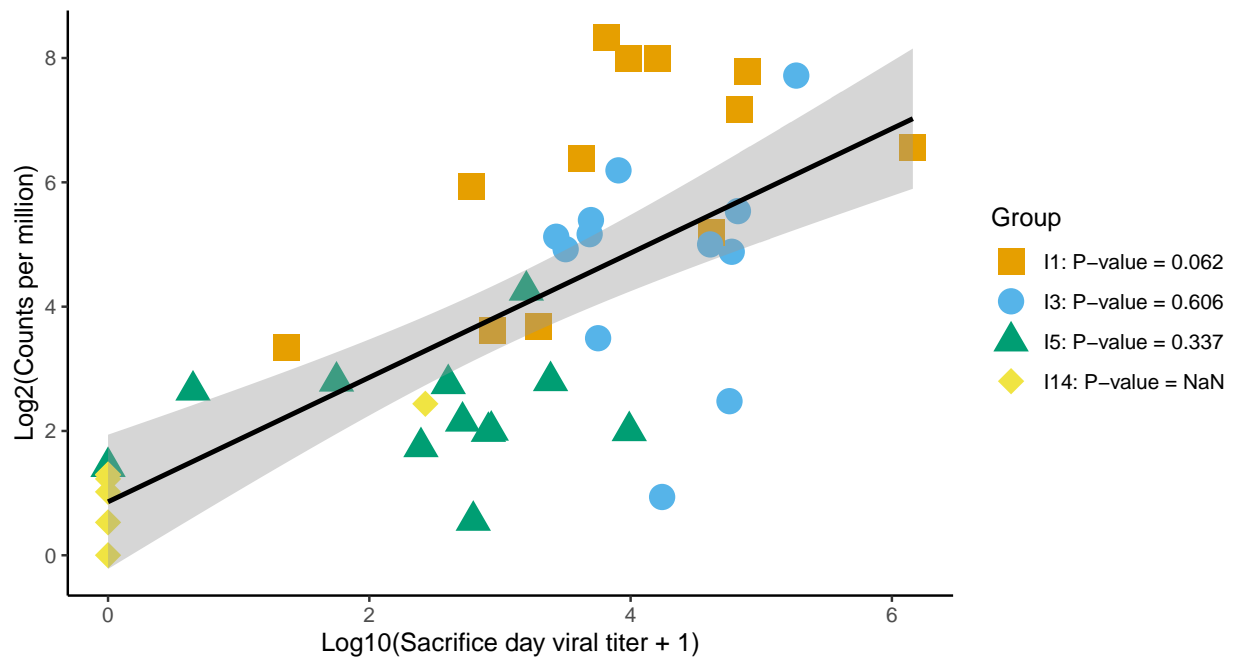
MX_ANAPL – DN2085_c0_g2_i15

Ileum – transcript; Adj. p = 0.00989



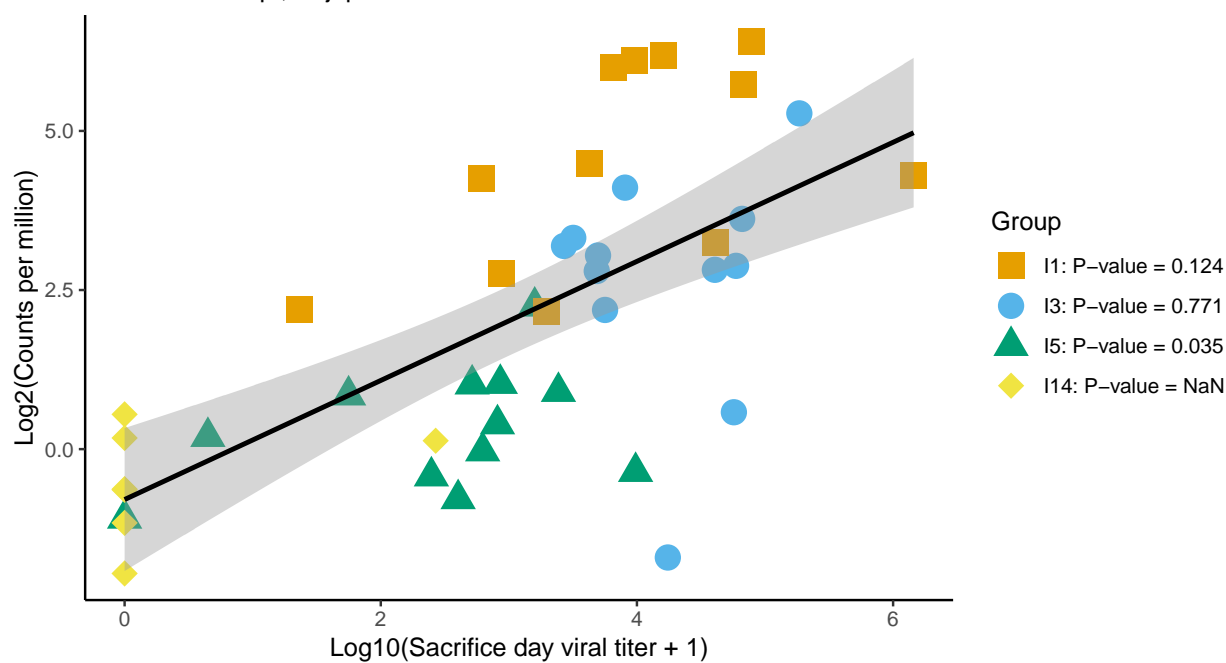
MX_ANAPL – DN2085_c0_g2_i16

Ileum – transcript; Adj. p = 0.00098



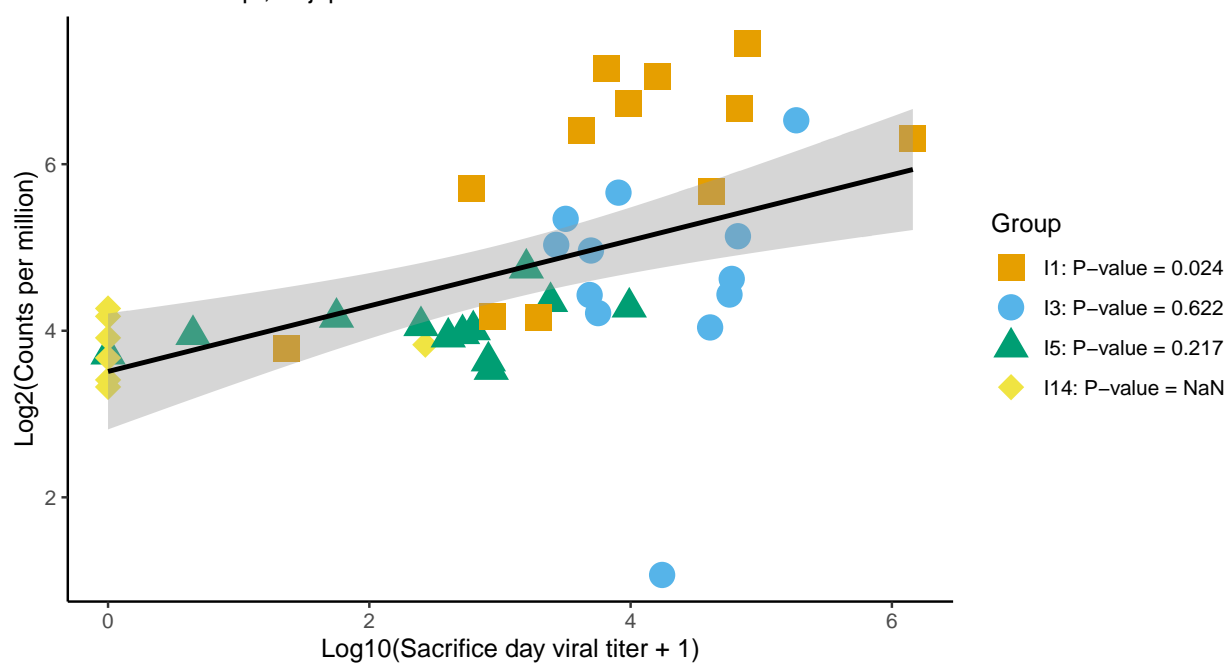
MX_ANAPL – DN2085_c0_g2_i5

Ileum – transcript; Adj. p = 0.00304



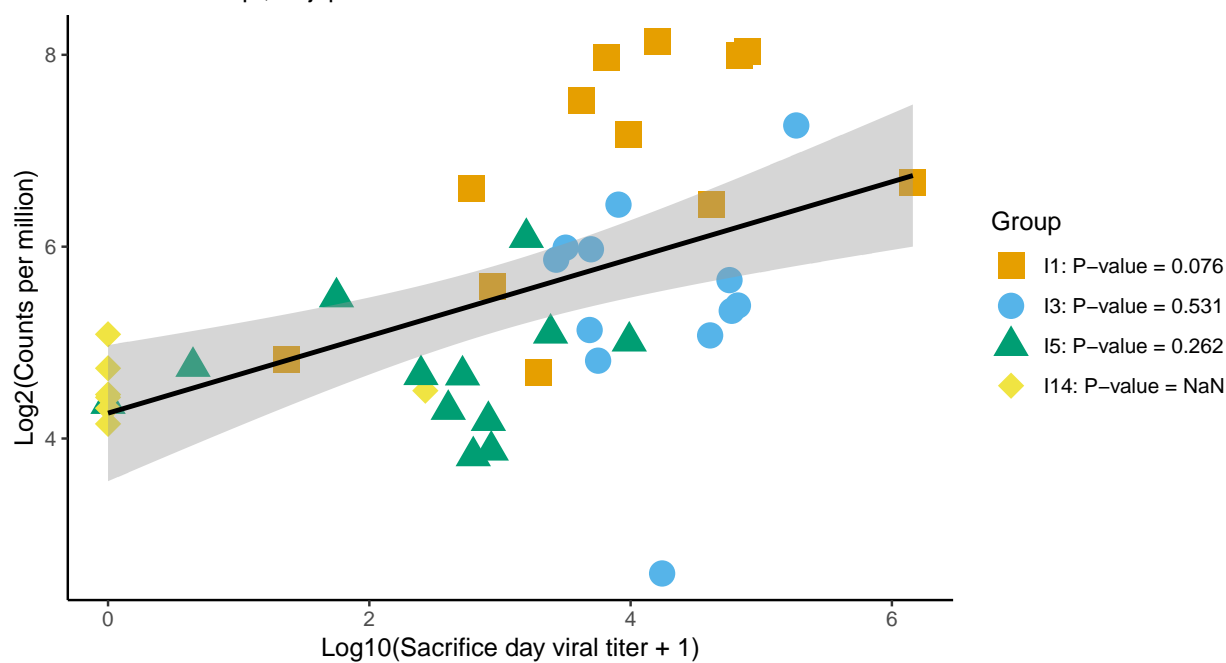
PAR12_HUMAN – DN20874_c0_g1_i10

Ileum – transcript; Adj. p = 0.01013



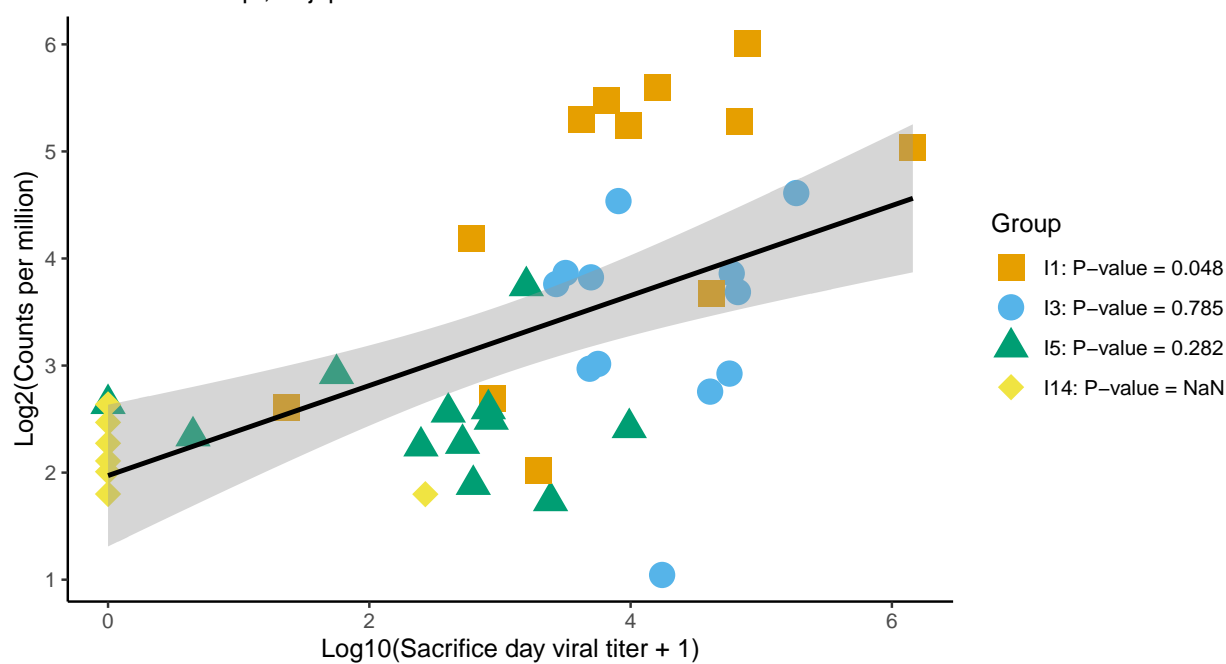
PAR12_MOUSE – DN20874_c0_g1_i9

Ileum – transcript; Adj. p = 0.0106



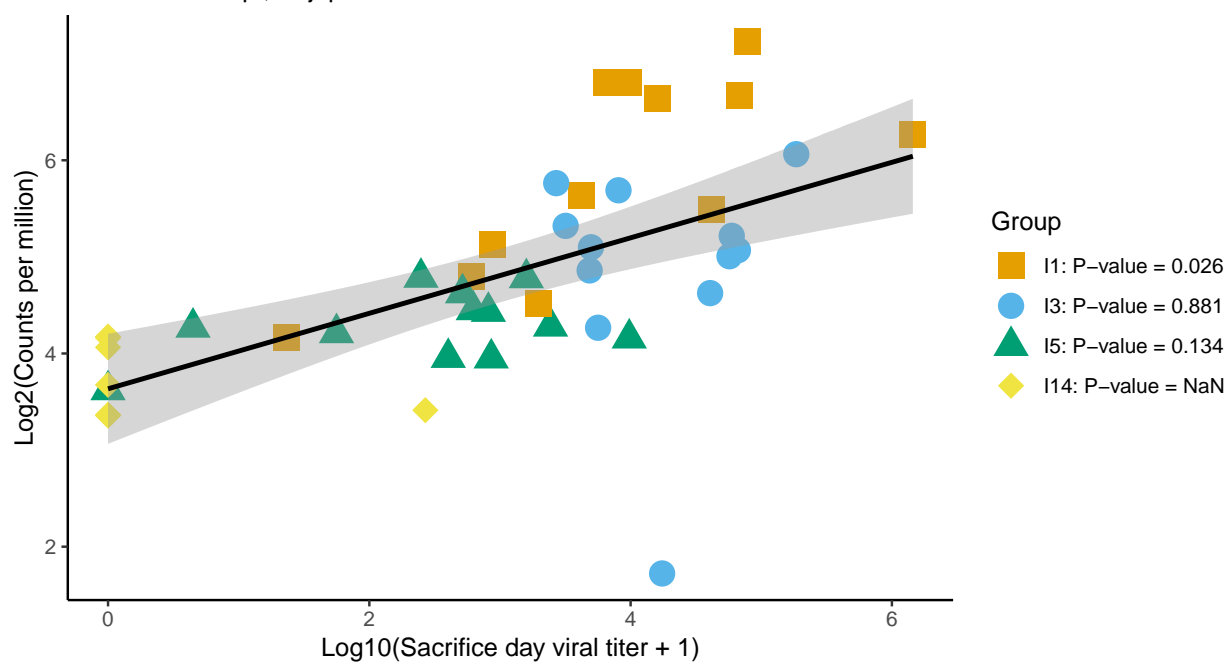
MIRO1_CHICK – DN22_c0_g1_i12

Ileum – transcript; Adj. p = 0.02223



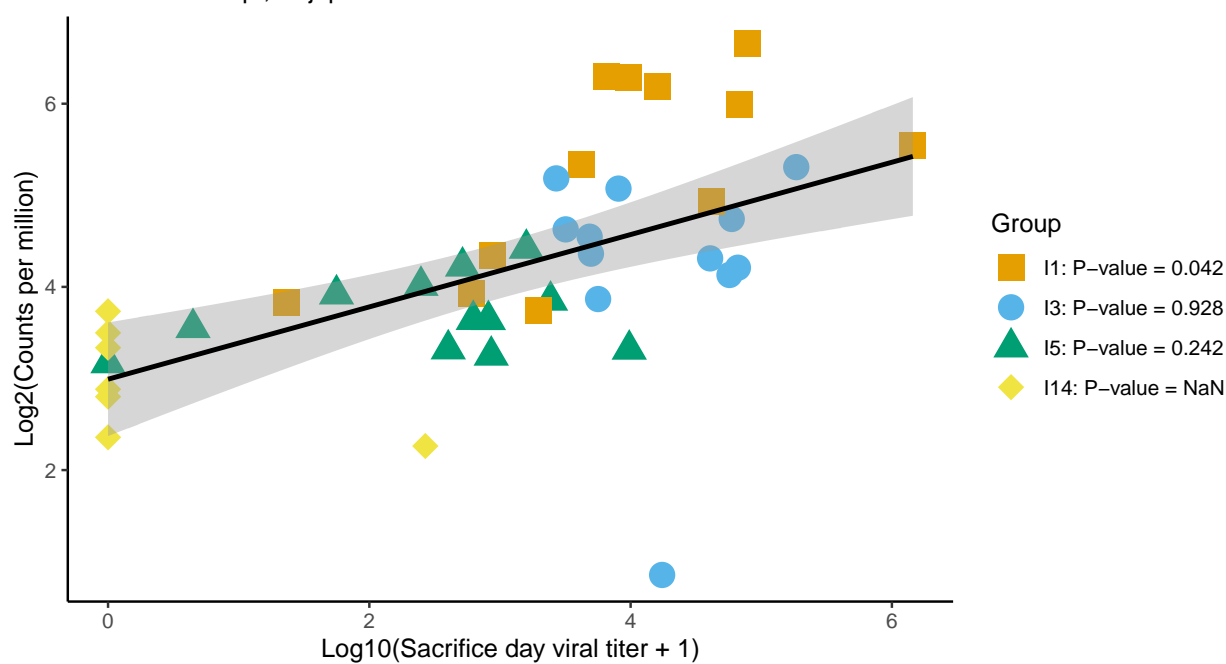
STAT1_PIG – DN2413_c0_g1_i2

Ileum – transcript; Adj. p = 0.00399



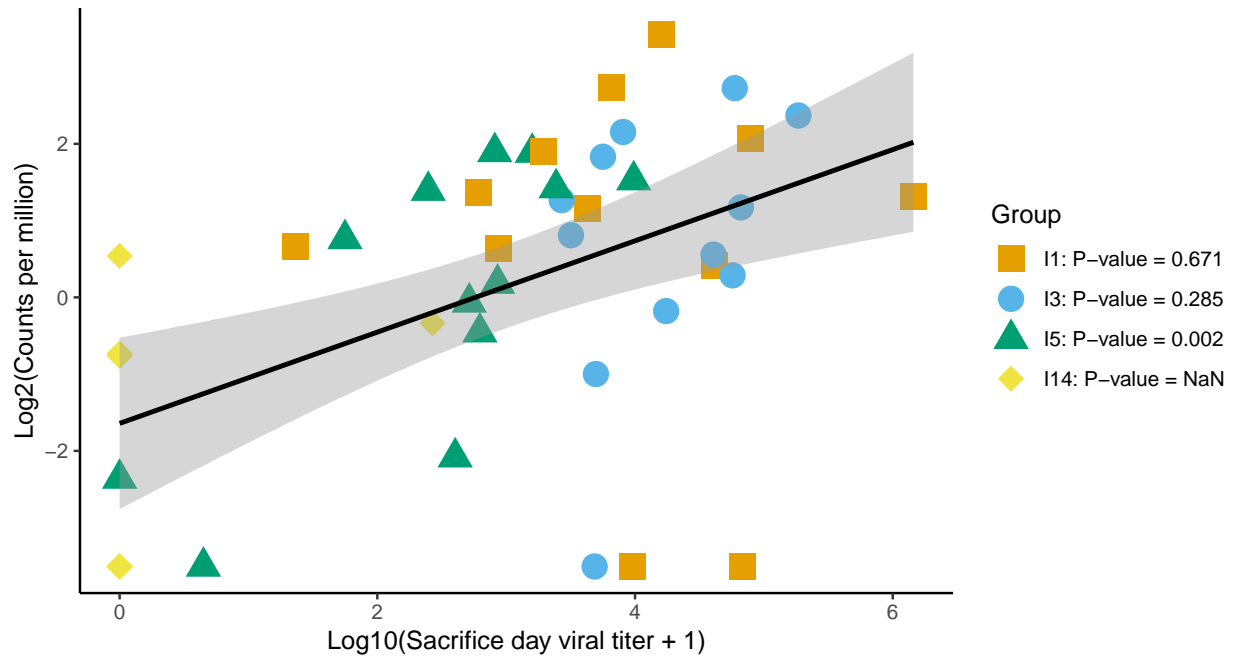
STAT1_PIG – DN2413_c0_g1_i6

Ileum – transcript; Adj. p = 0.00989



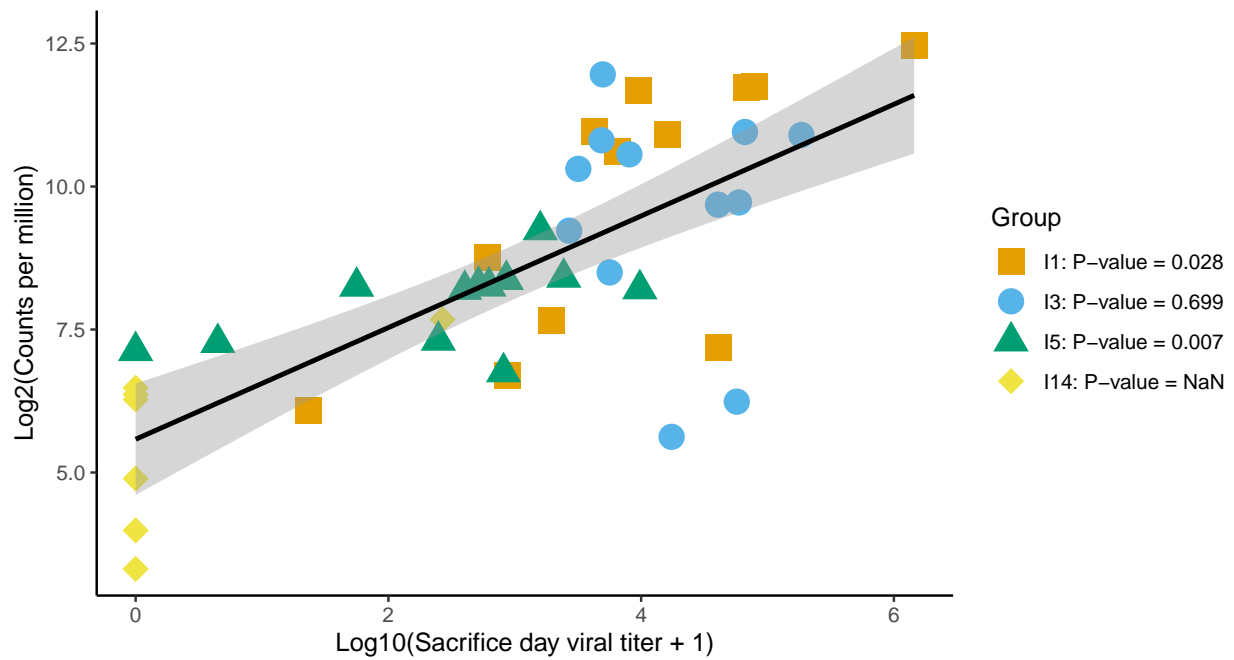
CCR5_BOVIN – DN2578_c0_g1_i3

Ileum – transcript; Adj. p = 0.03489



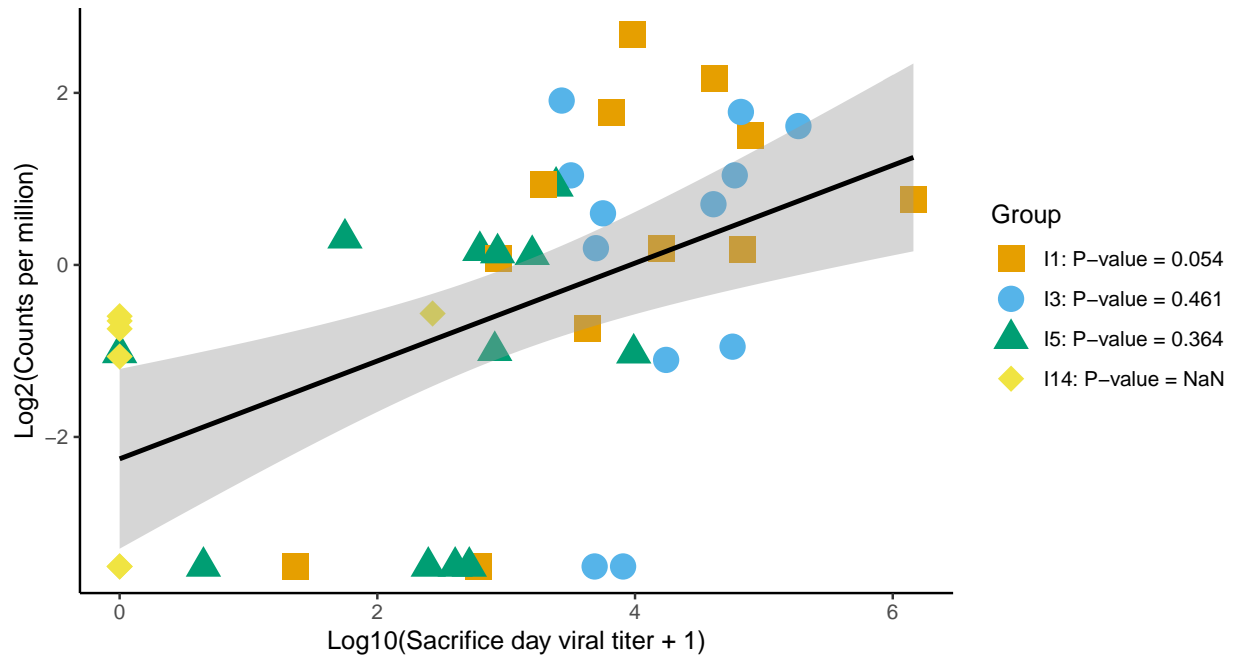
IFI6_BOVIN – DN2932_c0_g1_i6

Ileum – transcript; Adj. p = 0.00028



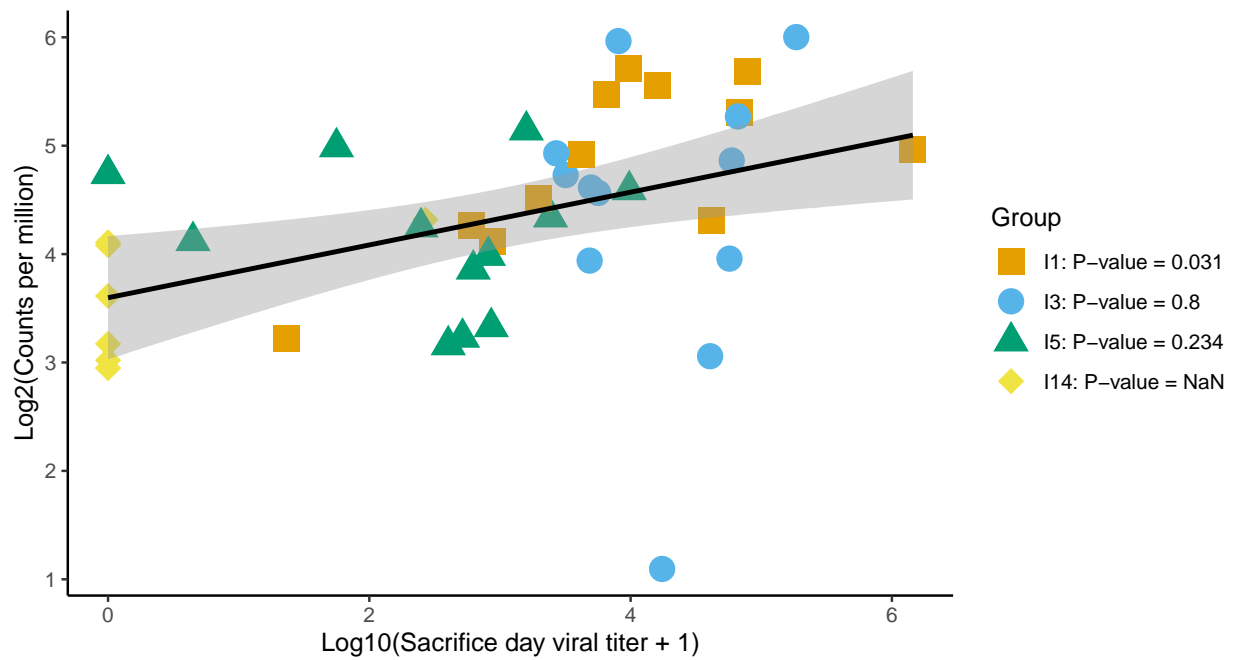
NLRC5_HUMAN – DN3089_c0_g1_i6

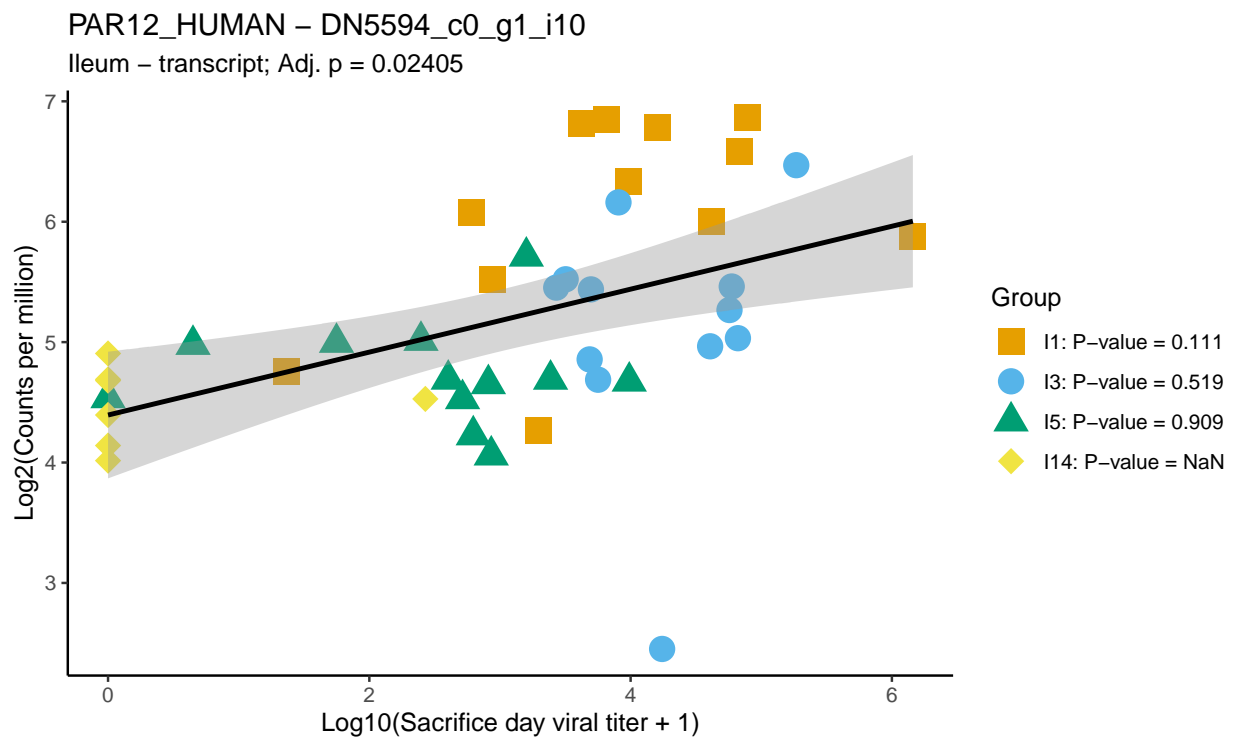
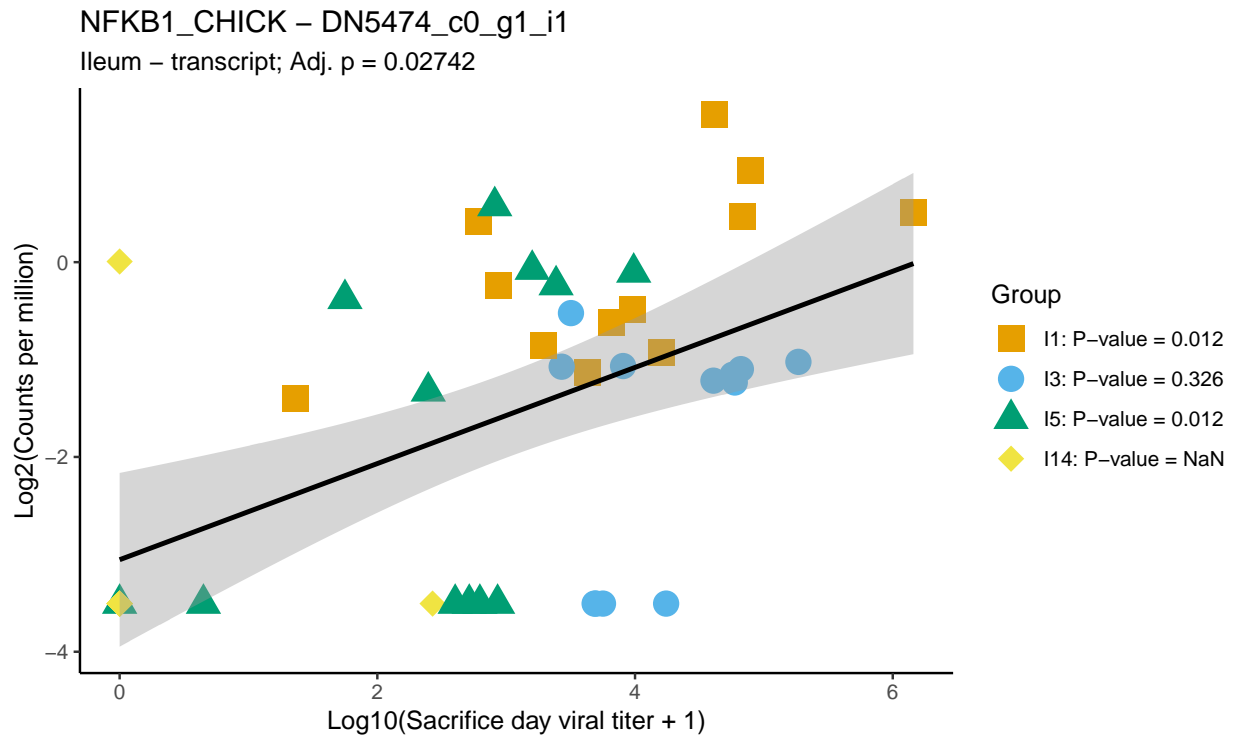
Ileum – transcript; Adj. p = 0.02405



TAP1_GORGO – DN3236_c0_g1_i10

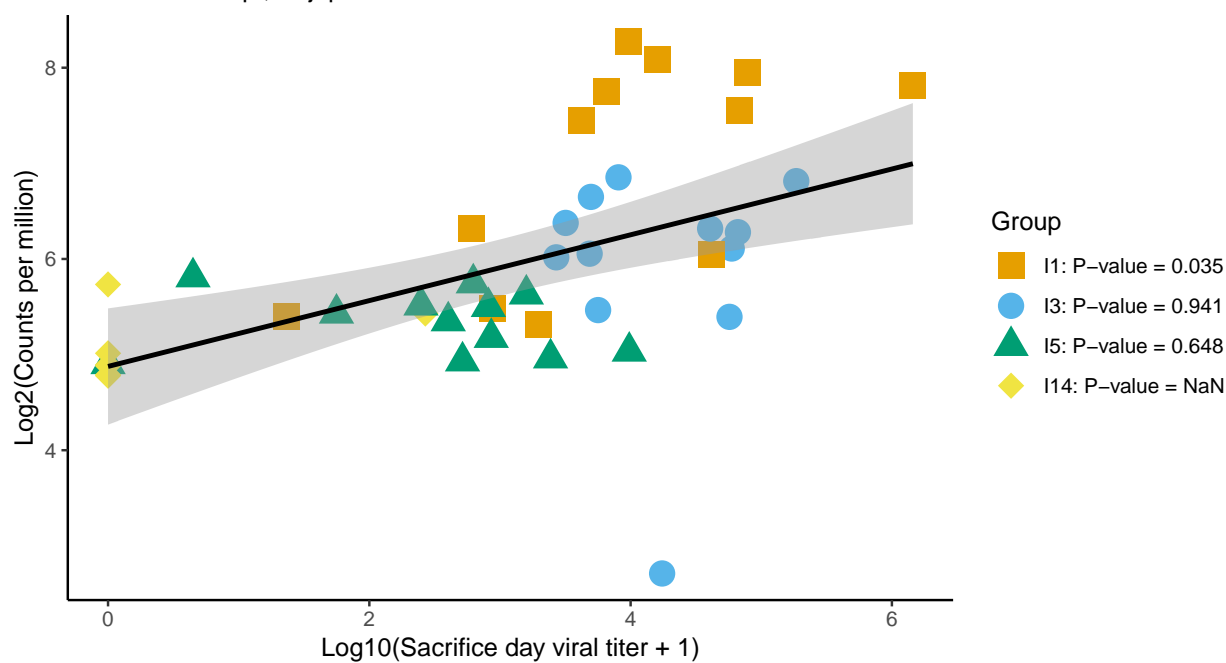
Ileum – transcript; Adj. p = 0.02736





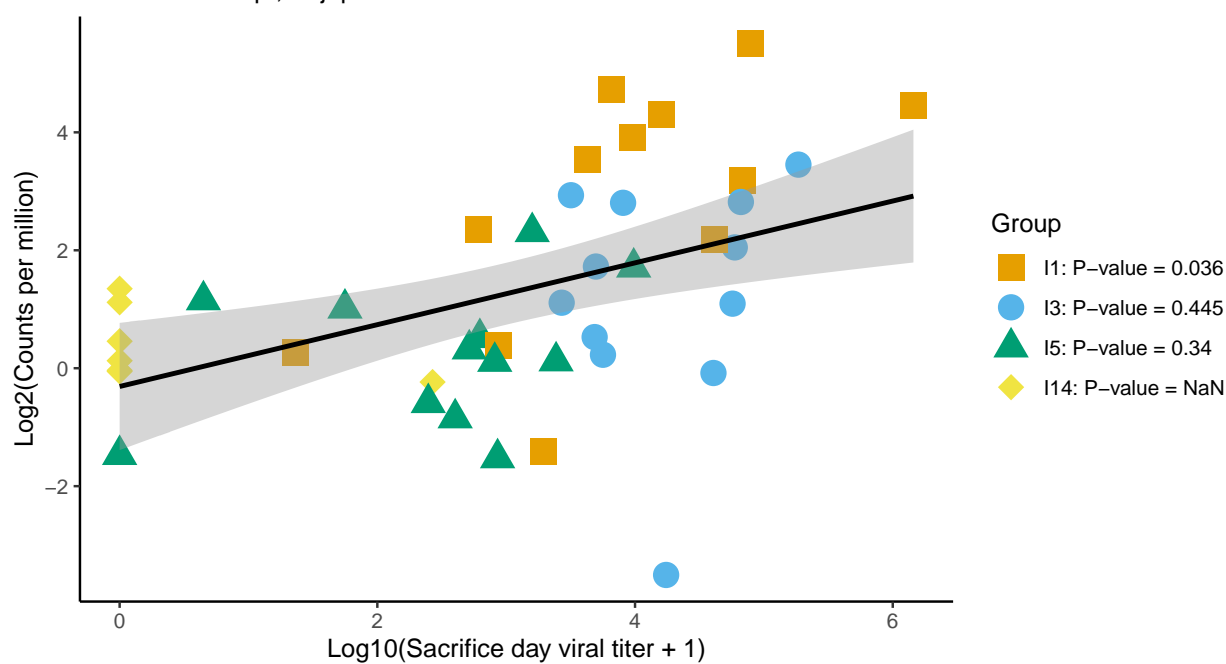
IN35_HUMAN – DN6170_c0_g1_i10

Ileum – transcript; Adj. p = 0.01357



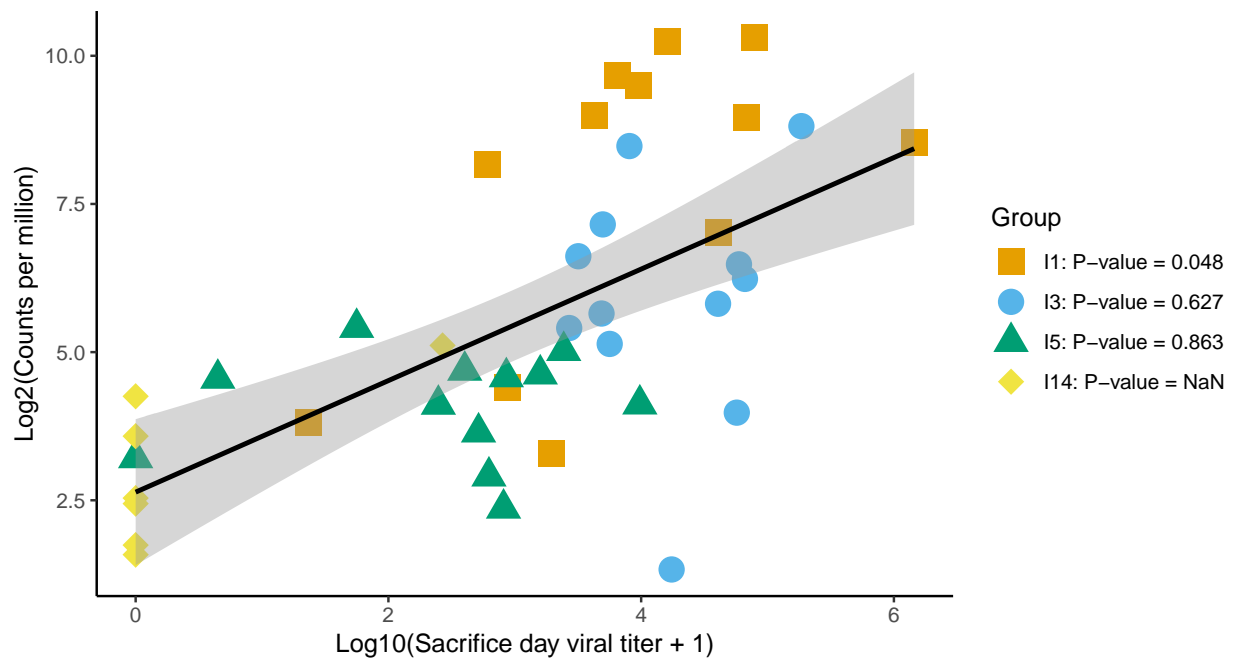
IN35_HUMAN – DN6170_c0_g1_i5

Ileum – transcript; Adj. p = 0.03658



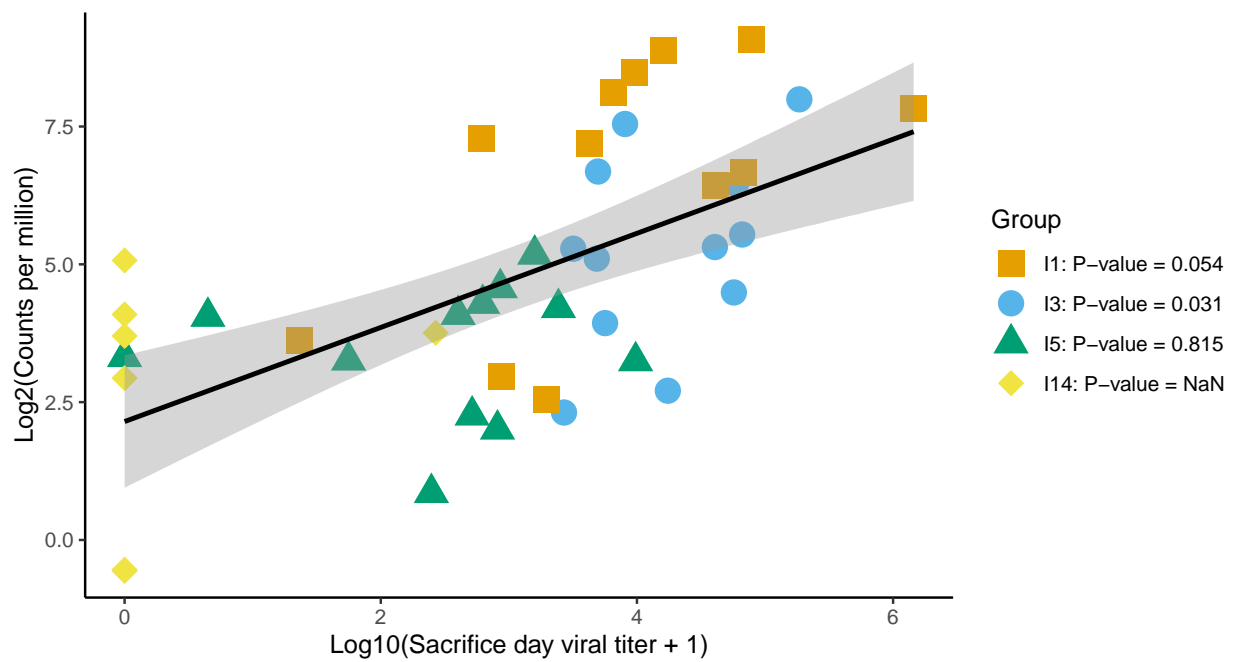
IFIT5_HUMAN – DN6178_c0_g1_i1

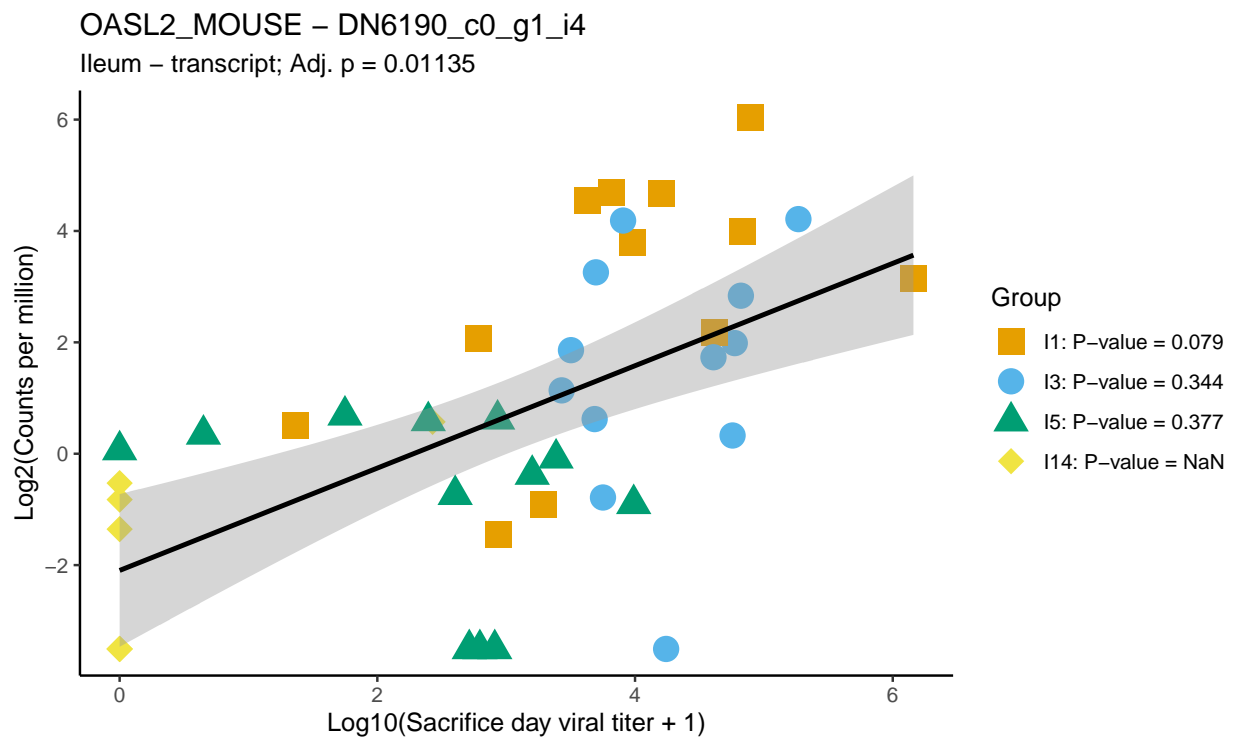
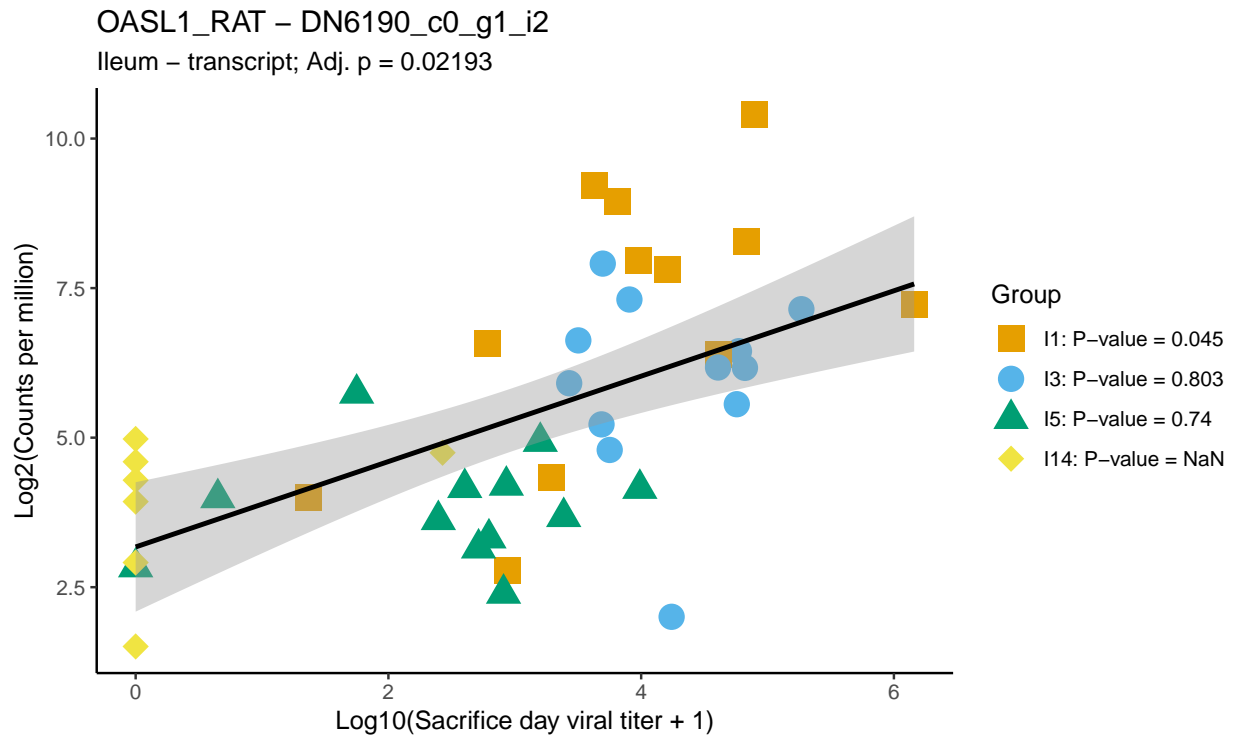
Ileum – transcript; Adj. p = 0.00304



OASL1_RAT – DN6190_c0_g1_i1

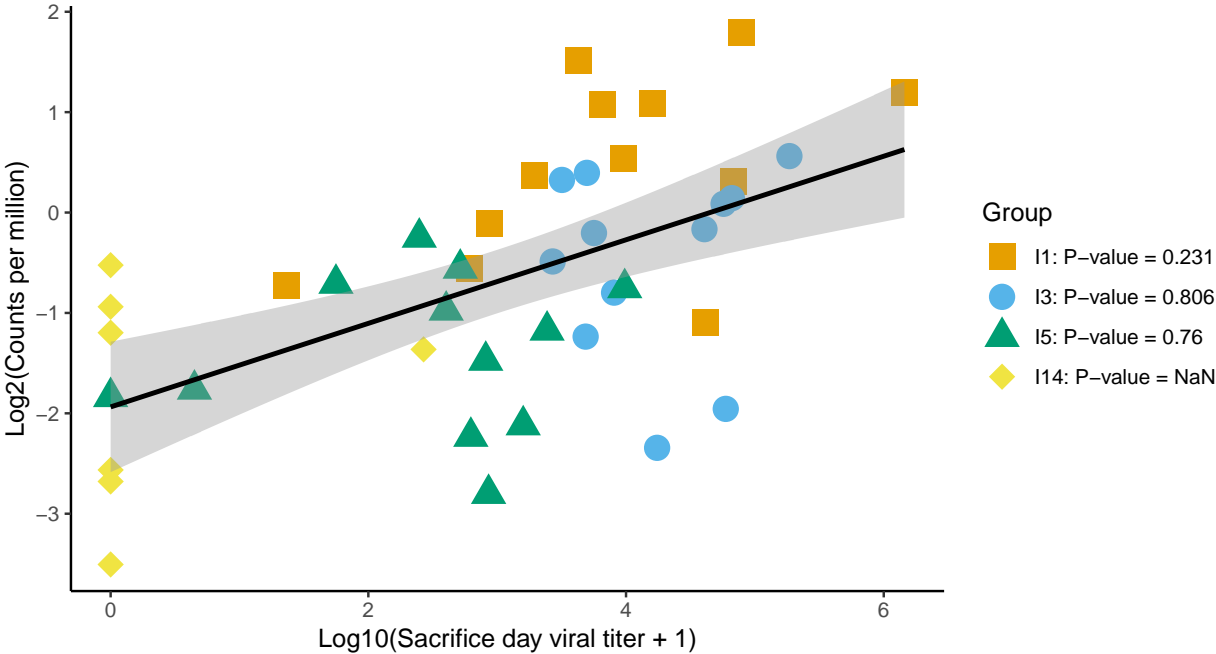
Ileum – transcript; Adj. p = 0.0024





IFM5_HUMAN – DN718_c0_g1_i3

Ileum – transcript; Adj. p = 0.02736



Candidate Gene Analysis - Regression method (with controls)

Amanda Dolinski & Jared J. Homola

22 April, 2021

Summarize results

Table 1: Significant candidate genes when including control samples. In comparison column, BG = Bursa-gene, BT = Bursa-transcript, IG = Ileum-gene, and IT = Ileum-transcript

identifier	geneName	comparison	Overall	I1	I3	I5	I14
DN13777_c0_g1	GBA2_MOUSE	BG	0.0000	0.0003	0.0000	0.0000	0.0306
DN1920_c0_g1	RSAD2_BOVIN	BG	0.0001	0.0423	0.1785	0.3894	0.1915
DN2085_c0_g2	MX_ANAPL	BG	0.0002	0.0357	0.2493	0.5569	0.1064
DN1920_c0_g1_i6	RSAD2_BOVIN	BT	0.0000	0.0076	0.9442	0.7194	NA
DN2085_c0_g2_i11	MX_ANAPL	BT	0.0001	0.0083	0.2464	0.5447	0.0458
DN2085_c0_g2_i16	MX_ANAPL	BT	0.0001	0.0476	0.3003	0.3855	0.0355
DN6190_c0_g1_i1	OASL1_RAT	BT	0.0001	0.1523	0.9104	0.4416	0.4909
DN100201_c0_g1	FGFR3_MOUSE	IG	0.0009	0.9730	0.3054	0.8941	NA
DN110170_c0_g1	MX_ANAPL	IG	0.0001	0.1973	0.0818	0.5408	NA
DN12243_c0_g1	IL18_CHICK	IG	0.0012	0.8042	0.8925	0.0999	NA
DN12298_c0_g1	CC4L_HUMAN	IG	0.0000	0.6845	0.7211	0.9252	NA
DN13002_c0_g1	SIA4A_CHICK	IG	0.0017	0.8466	0.8501	0.7086	NA
DN13412_c0_g1	.	IG	0.0001	0.0556	0.5543	0.2650	NA
DN13777_c0_g1	GBA2_MOUSE	IG	0.0000	0.0012	0.0007	0.0000	NA
DN1500_c0_g1	DDX58_MOUSE	IG	0.0000	0.0562	0.0913	0.1672	NA
DN15121_c0_g1	DHX58_MOUSE	IG	0.0000	0.4594	0.7631	0.1109	NA
DN15388_c0_g1	FOXC2_RAT	IG	0.0004	0.1013	0.6492	0.2211	NA
DN15488_c0_g1	OASL2_RAT	IG	0.0011	0.3482	0.7349	0.1266	NA
DN15589_c0_g1	SIA7C_HUMAN	IG	0.0002	0.8888	0.5540	0.6239	NA
DN161_c0_g1	PARP9_HUMAN	IG	0.0000	0.1017	0.4409	0.1759	NA
DN1634_c0_g1	IRF1_CHICK	IG	0.0001	0.0640	0.5753	0.6263	NA
DN164_c3_g1	DHX58_HUMAN	IG	0.0000	0.0671	0.5401	0.0812	NA
DN16598_c0_g1	IFM5_HUMAN	IG	0.0001	0.1913	0.5308	0.7553	NA
DN17675_c0_g2	CCL4_PIG	IG	0.0003	0.0557	0.0753	0.9218	NA
DN178217_c0_g1	IFNA2_HORSE	IG	0.0001	0.1591	0.6435	0.8380	NA
DN18052_c0_g1	STAT1_PIG	IG	0.0000	0.0182	0.9708	0.5177	NA
DN186640_c0_g2	IL10_CHICK	IG	0.0016	0.7285	0.6579	0.8620	NA
DN1920_c0_g1	RSAD2_BOVIN	IG	0.0000	0.1570	0.1803	0.9361	NA
DN1934_c0_g1	IRF3_CHICK	IG	0.0000	0.1098	0.6869	0.8259	NA
DN20116_c0_g1	PDE4D_MOUSE	IG	0.0003	0.1246	0.4351	0.0237	NA
DN2085_c0_g2	MX_ANAPL	IG	0.0000	0.1517	0.5003	0.2840	NA

Table 1: Significant candidate genes when including control samples. In comparison column, BG = Bursa-gene, BT = Bursa-transcript, IG = Ileum-gene, and IT = Ileum-transcript (*continued*)

identifier	geneName	comparison	Overall	I1	I3	I5	I14
DN20874_c0_g1	PAR12_MOUSE	IG	0.0000	0.0799	0.3355	0.3000	NA
DN24849_c0_g1	IFIH1_HUMAN	IG	0.0012	0.2547	0.2569	0.7508	NA
DN2578_c0_g1	CCR5_BOVIN	IG	0.0024	0.1873	0.5844	0.9451	NA
DN2677_c0_g1	.	IG	0.0003	0.2946	0.5781	0.3928	NA
DN28958_c0_g1	FGF4_CHICK	IG	0.0001	0.6291	0.3322	0.4044	NA
DN2932_c0_g1	.	IG	0.0000	0.0289	0.7016	0.0057	NA
DN30475_c0_g1	IFNL3_CHICK	IG	0.0004	0.4764	0.9857	0.2483	NA
DN3126_c0_g1	IFRD1_HUMAN	IG	0.0027	0.3404	0.4766	0.9526	NA
DN313_c0_g5	BMP6_RAT	IG	0.0002	0.4672	0.8040	0.2334	NA
DN3236_c0_g1	TAP1_GORGO	IG	0.0000	0.0319	0.8350	0.0563	NA
DN51353_c2_g1	STAT1_HUMAN	IG	0.0005	0.0071	0.2976	0.6665	NA
DN55170_c0_g1	DHX58_HUMAN	IG	0.0012	0.1310	0.1173	0.0374	NA
DN5594_c0_g1	PAR12_HUMAN	IG	0.0001	0.1609	0.4136	0.9055	NA
DN6170_c0_g1	IN35_HUMAN	IG	0.0000	0.0398	0.8808	0.9645	NA
DN6178_c0_g1	UBP34_HUMAN	IG	0.0000	0.0615	0.5533	0.6988	NA
DN6190_c0_g1	OASL1_RAT	IG	0.0000	0.0452	0.2804	0.7680	NA
DN71517_c0_g1	FGFR2_CHICK	IG	0.0014	0.1810	0.7788	0.6792	NA
DN718_c0_g1	IFM5_HUMAN	IG	0.0000	0.0523	0.4675	0.5576	NA
DN7889_c0_g1	LY6E_CHICK	IG	0.0001	0.0250	0.3423	0.7674	NA
DN7889_c0_g2	LY6E_CHICK	IG	0.0000	0.1462	0.5200	0.8463	NA
DN7919_c0_g1	.	IG	0.0005	0.6722	0.6806	0.5478	NA
DN7951_c0_g1	IL8H_GAHVM	IG	0.0022	0.9885	0.8394	0.0939	NA
DN861_c0_g1	IL8_CHICK	IG	0.0000	0.2766	0.8187	0.4468	NA
DN876_c0_g1	E2AK2_HUMAN	IG	0.0004	0.0368	0.2899	0.0260	NA
DN9204_c0_g1	.	IG	0.0005	0.5735	0.6287	0.1250	NA
DN100201_c0_g1_i1	FGFR3_MOUSE	IT	0.0010	0.9655	0.3054	0.8561	NA
DN110170_c0_g1_i1	MX_ANAPL	IT	0.0002	0.2451	0.0852	0.5294	NA
DN12243_c0_g1_i2	IL18_CHICK	IT	0.0009	0.5674	0.9202	0.0939	NA
DN12298_c0_g1_i2	CCL4_PIG	IT	0.0000	0.5594	0.7335	0.7421	NA
DN13412_c0_g1_i3	CCL13_HUMAN	IT	0.0002	0.0794	0.5731	0.5736	NA
DN1500_c0_g1_i13	DDX58_HUMAN	IT	0.0000	0.0444	0.0986	0.6248	NA
DN1500_c0_g1_i23	DDX58_MOUSE	IT	0.0002	0.2030	0.2754	0.4768	NA
DN15121_c0_g1_i1	DHX58_MOUSE	IT	0.0000	0.1964	0.6627	0.0547	NA
DN161_c0_g1_i6	PARP9_HUMAN	IT	0.0002	0.0871	0.4269	0.9707	NA
DN1634_c0_g1_i9	IRF1_CHICK	IT	0.0005	0.0532	0.6417	0.7364	NA
DN164_c3_g1_i7	DHX58_HUMAN	IT	0.0001	0.0115	0.3558	0.9633	NA
DN16598_c0_g1_i1	IFM5_HUMAN	IT	0.0002	0.1680	0.5928	0.8963	NA
DN17675_c0_g2_i1	CCL4_PIG	IT	0.0003	0.0447	0.0768	0.9965	NA
DN178217_c0_g1_i1	IFNA2_HORSE	IT	0.0001	0.1660	0.6241	0.7848	NA
DN18052_c0_g1_i2	STAT1_PIG	IT	0.0000	0.0578	0.6712	0.5381	NA
DN1920_c0_g1_i1	RSAD2_BOVIN	IT	0.0002	0.1755	0.5713	0.1546	NA
DN1920_c0_g1_i11	RSAD2_PIG	IT	0.0000	0.1225	0.1629	0.9904	NA
DN1920_c0_g1_i6	RSAD2_BOVIN	IT	0.0010	0.2638	0.0409	0.9171	NA
DN1920_c0_g1_i9	RSAD2_BOVIN	IT	0.0000	0.1793	0.2258	0.7768	NA
DN1934_c0_g1_i11	IRF3_CHICK	IT	0.0000	0.1199	0.7910	0.4930	NA

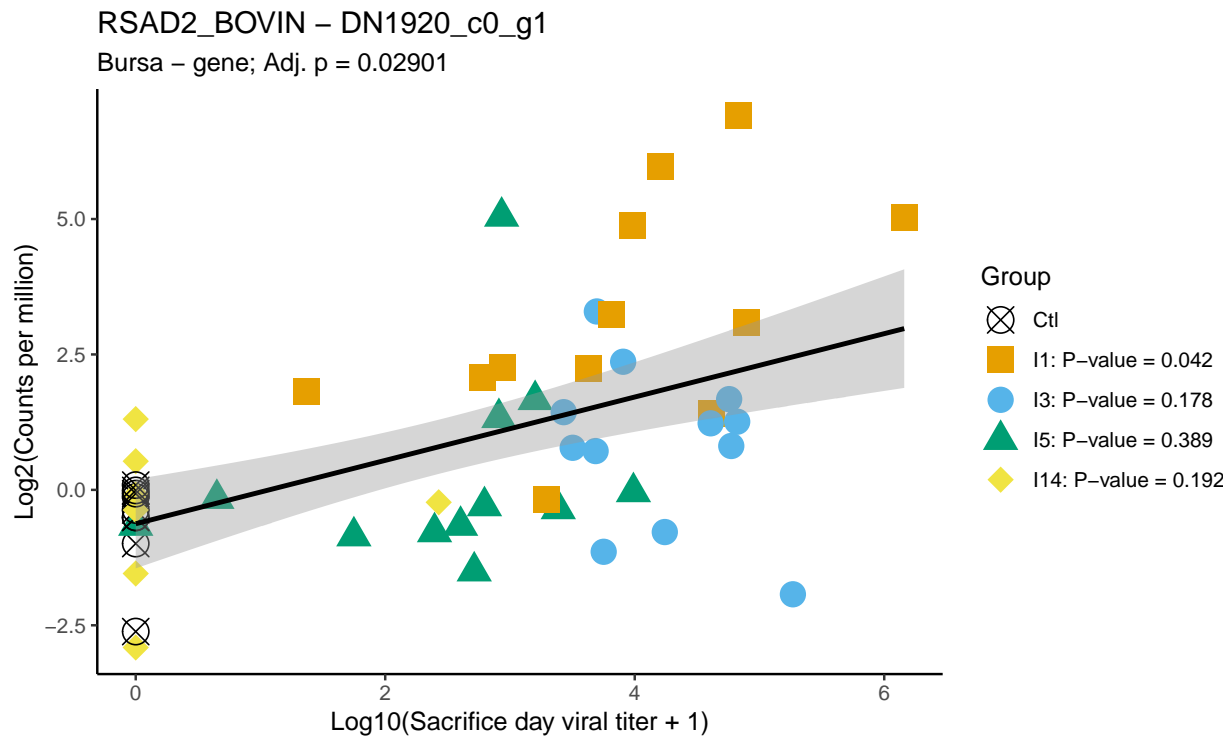
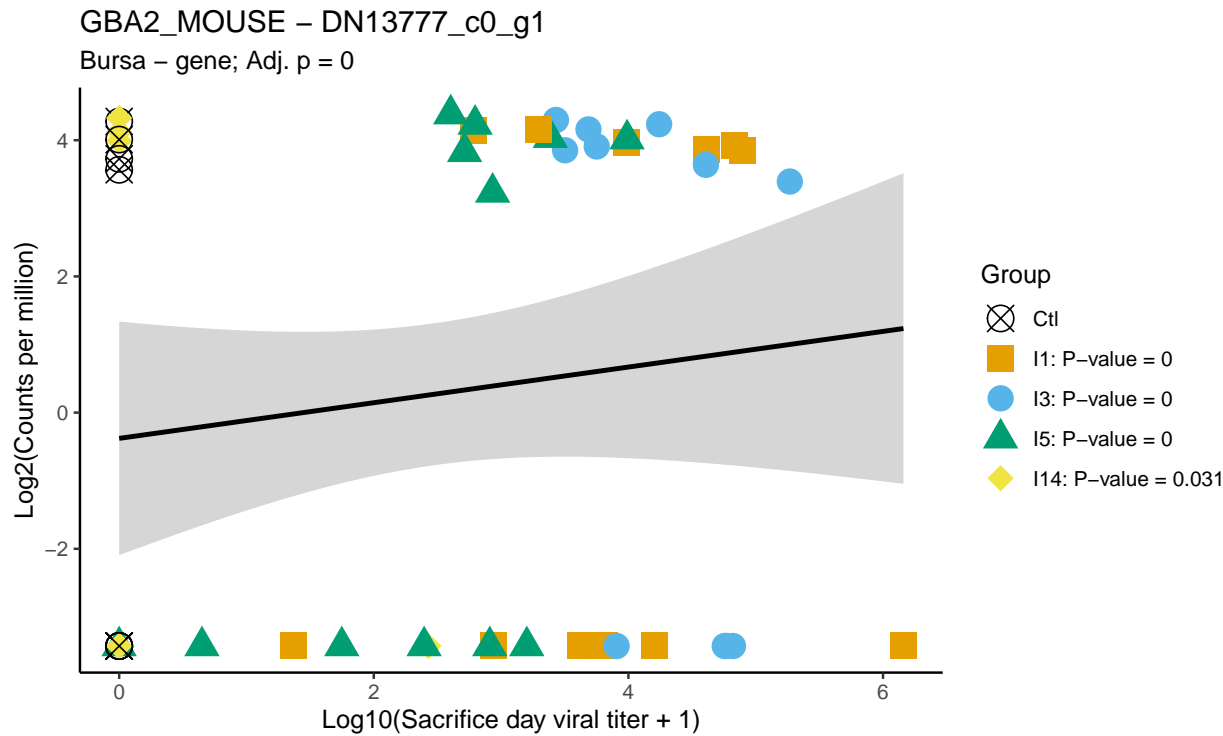
Table 1: Significant candidate genes when including control samples. In comparison column, BG = Bursa-gene, BT = Bursa-transcript, IG = Ileum-gene, and IT = Ileum-transcript (*continued*)

identifier	geneName	comparison	Overall	I1	I3	I5	I14
DN1934_c0_g1_i16	IRF3_CHICK	IT	0.0000	0.1560	0.7870	0.3695	NA
DN1934_c0_g1_i9	IRF3_CHICK	IT	0.0002	0.0053	0.3137	0.2173	NA
DN2085_c0_g2_i1	MX_ANAPL	IT	0.0000	0.0258	0.5067	0.7737	NA
DN2085_c0_g2_i10	MX_ANAPL	IT	0.0000	0.1471	0.6951	0.3135	NA
DN2085_c0_g2_i11	MX_ANAPL	IT	0.0000	0.0762	0.7381	0.3330	NA
DN2085_c0_g2_i12	MX_ANAPL	IT	0.0000	0.0662	0.4441	0.1079	NA
DN2085_c0_g2_i13	MX_ANAPL	IT	0.0000	0.2720	0.8115	0.8687	NA
DN2085_c0_g2_i14	MX_ANAPL	IT	0.0000	0.1342	0.6011	0.6029	NA
DN2085_c0_g2_i15	MX_ANAPL	IT	0.0000	0.0129	0.7511	0.3448	NA
DN2085_c0_g2_i16	MX_ANAPL	IT	0.0000	0.0624	0.6056	0.3375	NA
DN2085_c0_g2_i5	MX_ANAPL	IT	0.0000	0.1240	0.7713	0.0353	NA
DN2085_c0_g2_i6	MX_ANAPL	IT	0.0000	0.2992	0.6503	0.9063	NA
DN20874_c0_g1_i10	PAR12_HUMAN	IT	0.0000	0.0239	0.6225	0.2167	NA
DN20874_c0_g1_i11	PAR12_HUMAN	IT	0.0000	0.2434	0.5541	0.8095	NA
DN20874_c0_g1_i8	PAR12_MOUSE	IT	0.0010	0.1139	0.4795	0.7656	NA
DN20874_c0_g1_i9	PAR12_MOUSE	IT	0.0000	0.0761	0.5307	0.2622	NA
DN22_c0_g1_i12	MIRO1_CHICK	IT	0.0000	0.0482	0.7854	0.2819	NA
DN2413_c0_g1_i2	STAT1_PIG	IT	0.0000	0.0258	0.8808	0.1339	NA
DN2413_c0_g1_i3	STAT1_PIG	IT	0.0001	0.2557	0.4347	0.7171	NA
DN2413_c0_g1_i5	STAT1_PIG	IT	0.0004	0.1066	0.4841	0.2752	NA
DN2413_c0_g1_i6	STAT1_PIG	IT	0.0000	0.0422	0.9285	0.2417	NA
DN2413_c0_g1_i8	STAT1_PIG	IT	0.0000	0.0502	0.5902	0.6376	NA
DN2578_c0_g1_i3	CCR5_BOVIN	IT	0.0009	0.6714	0.2849	0.0023	NA
DN2677_c0_g1_i1	CCL4_PIG	IT	0.0006	0.1545	0.7123	0.9819	NA
DN2932_c0_g1_i6	IFI6_BOVIN	IT	0.0000	0.0282	0.6990	0.0073	NA
DN3089_c0_g1_i6	NLRC5_HUMAN	IT	0.0007	0.0541	0.4608	0.3641	NA
DN3236_c0_g1_i10	TAP1_GORGO	IT	0.0000	0.0308	0.8002	0.2340	NA
DN51353_c2_g1_i2	STAT1_HUMAN	IT	0.0005	0.0079	0.1517	0.6665	NA
DN5594_c0_g1_i10	PAR12_HUMAN	IT	0.0001	0.1109	0.5193	0.9086	NA
DN5715_c0_g1_i1	MXRA5_HUMAN	IT	0.0013	0.2870	0.3277	0.3635	NA
DN6170_c0_g1_i10	IN35_HUMAN	IT	0.0000	0.0353	0.9412	0.6482	NA
DN6170_c0_g1_i3	IN35_HUMAN	IT	0.0016	0.1421	0.1938	0.2763	NA
DN6170_c0_g1_i5	IN35_HUMAN	IT	0.0003	0.0356	0.4454	0.3397	NA
DN6178_c0_g1_i1	IFIT5_HUMAN	IT	0.0000	0.0480	0.6270	0.8630	NA
DN6190_c0_g1_i1	OASL1_RAT	IT	0.0000	0.0545	0.0306	0.8147	NA
DN6190_c0_g1_i2	OASL1_RAT	IT	0.0000	0.0454	0.8031	0.7403	NA
DN6190_c0_g1_i4	OASL2_MOUSE	IT	0.0000	0.0788	0.3436	0.3769	NA
DN6305_c0_g1_i8	IRF6_MOUSE	IT	0.0008	0.3215	0.7495	0.5615	NA
DN71517_c0_g1_i5	FGFR2_CHICK	IT	0.0015	0.2278	0.7757	0.5301	NA
DN718_c0_g1_i1	DSA2B_TORMA	IT	0.0001	0.0421	0.4829	0.6386	NA
DN718_c0_g1_i3	IFM5_HUMAN	IT	0.0000	0.2313	0.8060	0.7601	NA
DN7889_c0_g1_i1	LY6E_CHICK	IT	0.0006	0.0318	0.7902	0.8933	NA
DN7919_c0_g1_i9	IKBE_MOUSE	IT	0.0005	0.3605	0.7075	0.7314	NA
DN861_c0_g1_i1	IL8_CHICK	IT	0.0000	0.2624	0.8402	0.4510	NA
DN9204_c0_g1_i7	CCL26_CANLF	IT	0.0007	0.4486	0.6810	0.1538	NA

Table 1: Significant candidate genes when including control samples. In comparison column, BG = Bursa-gene, BT = Bursa-transcript, IG = Ileum-gene, and IT = Ileum-transcript (*continued*)

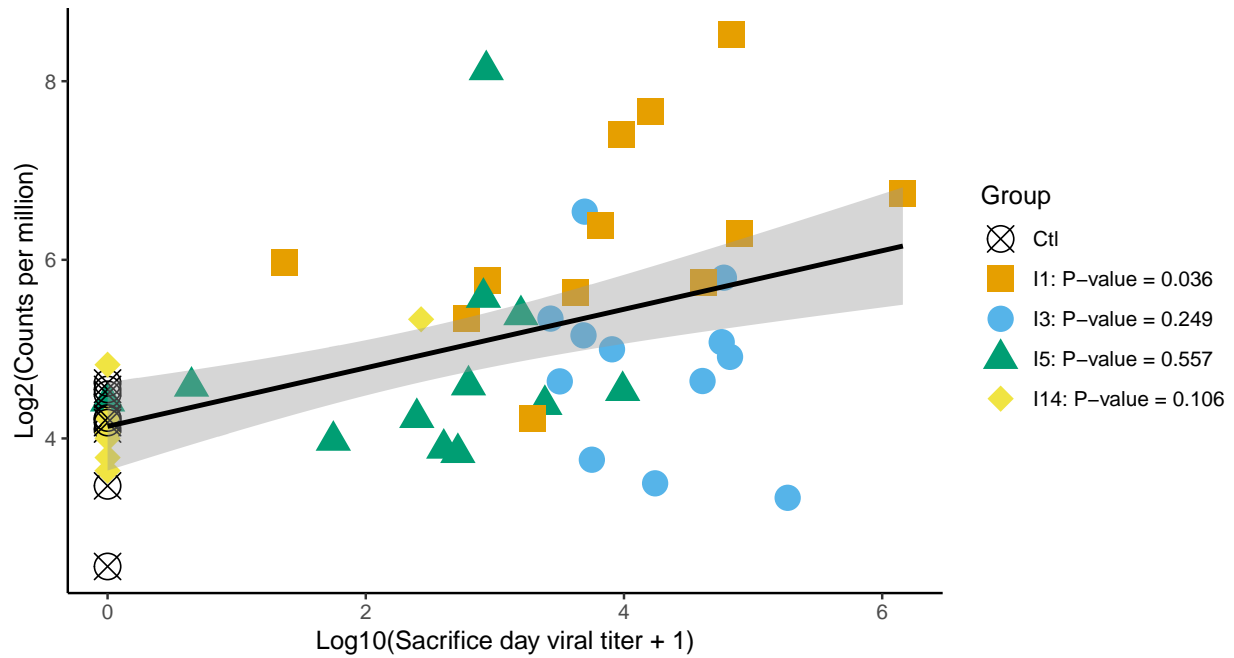
identifier	geneName	comparison	Overall	I1	I3	I5	I14
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Plotting significant results



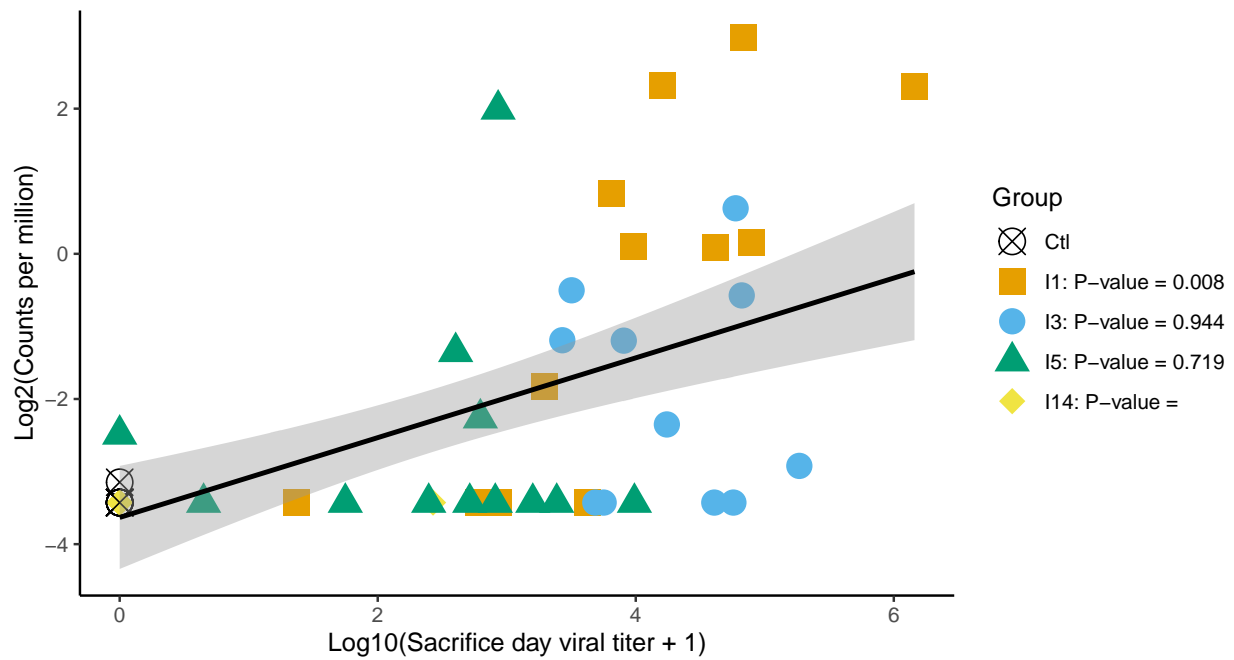
MX_ANAPL – DN2085_c0_g2

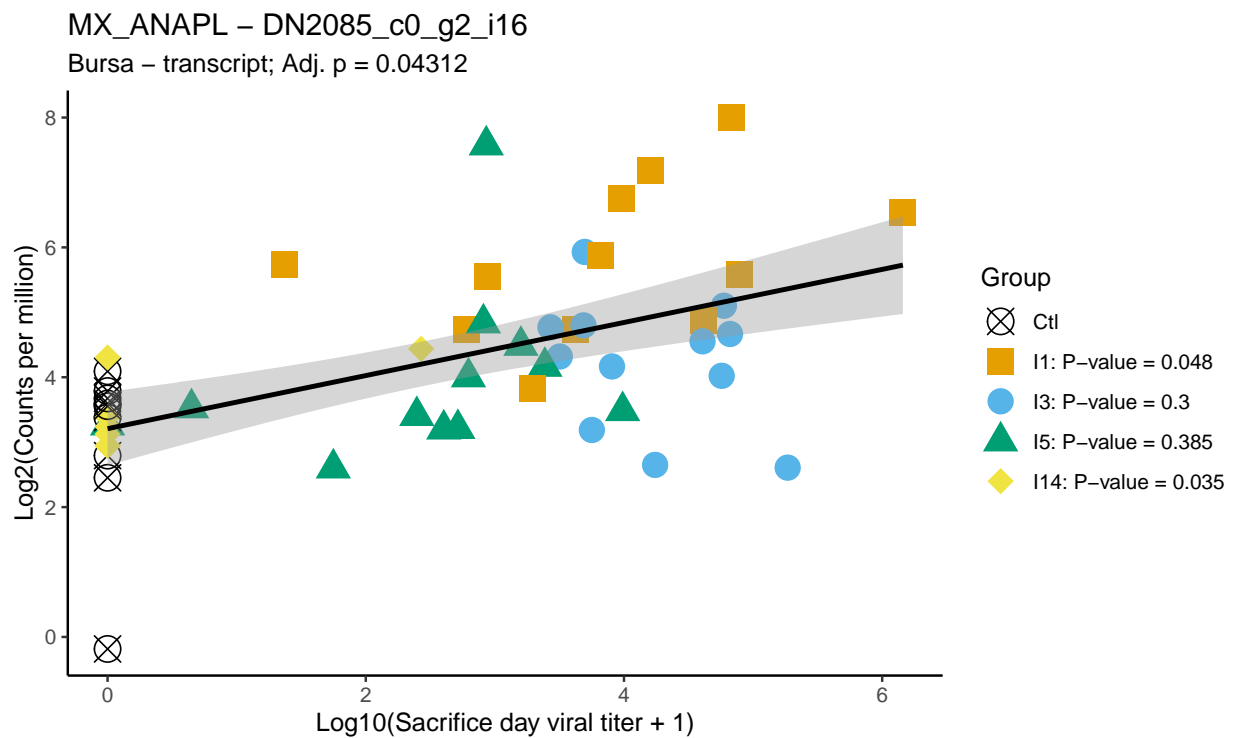
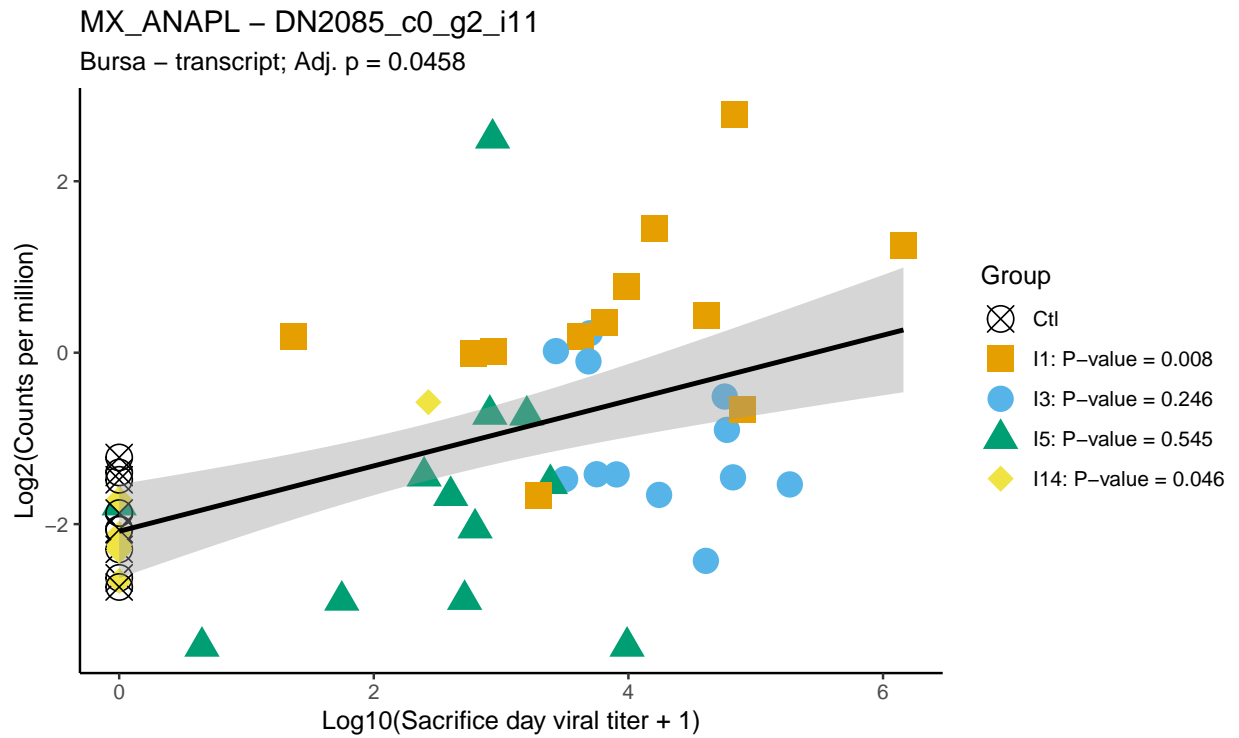
Bursa – gene; Adj. p = 0.04048

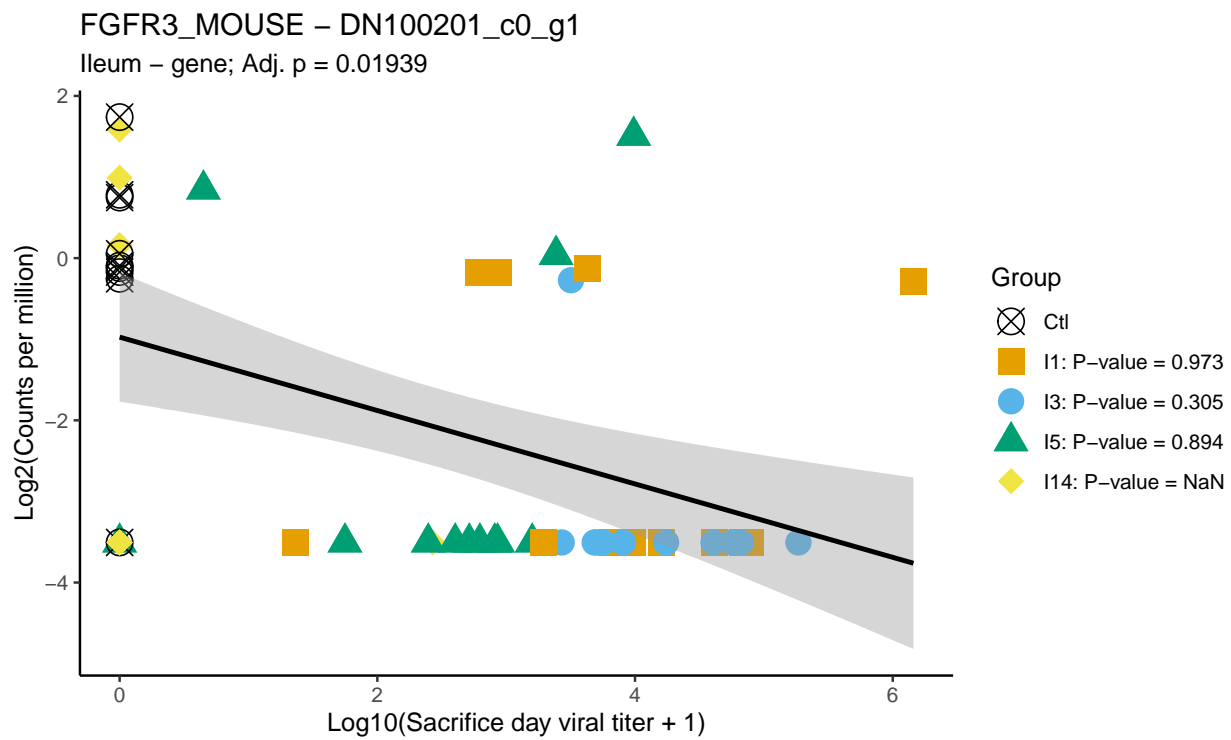
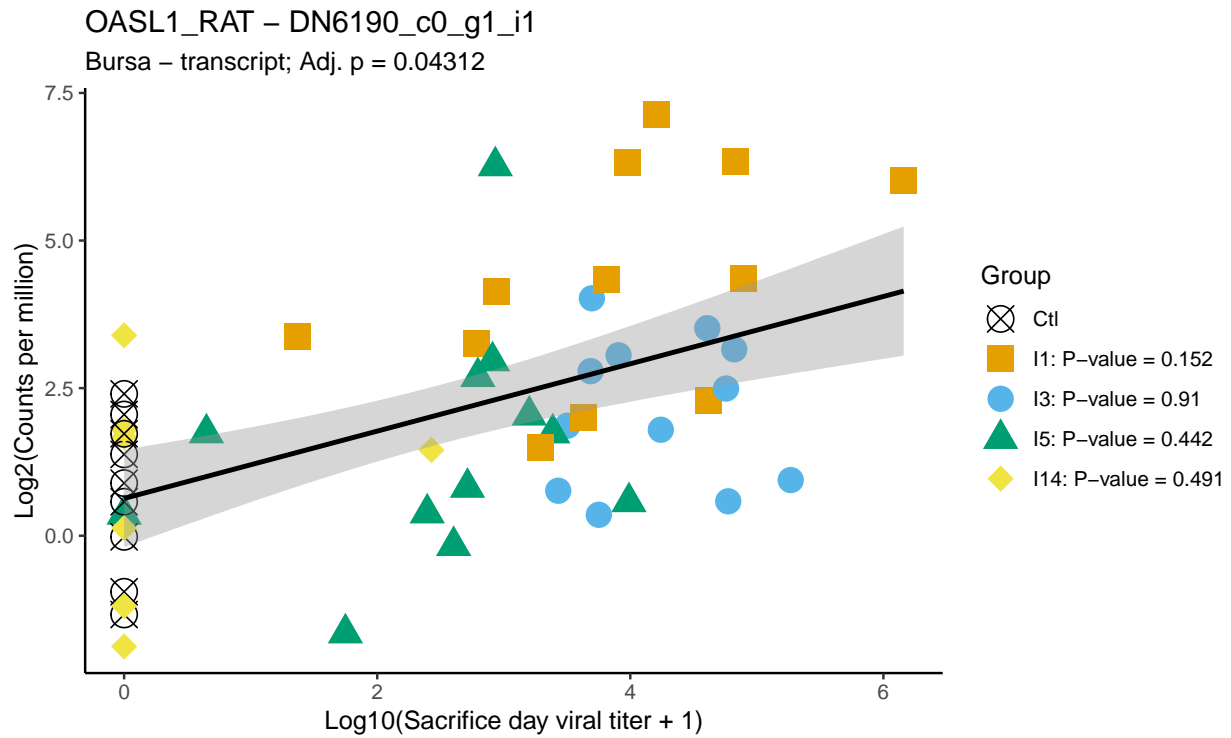


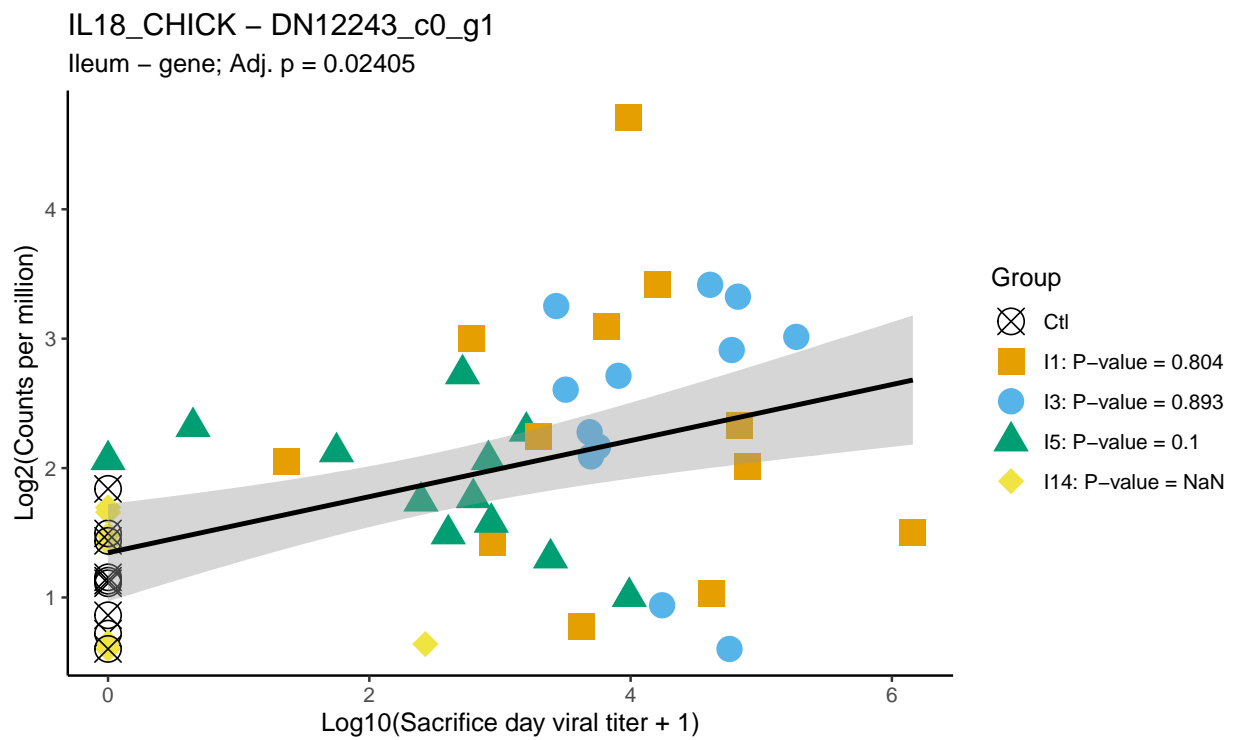
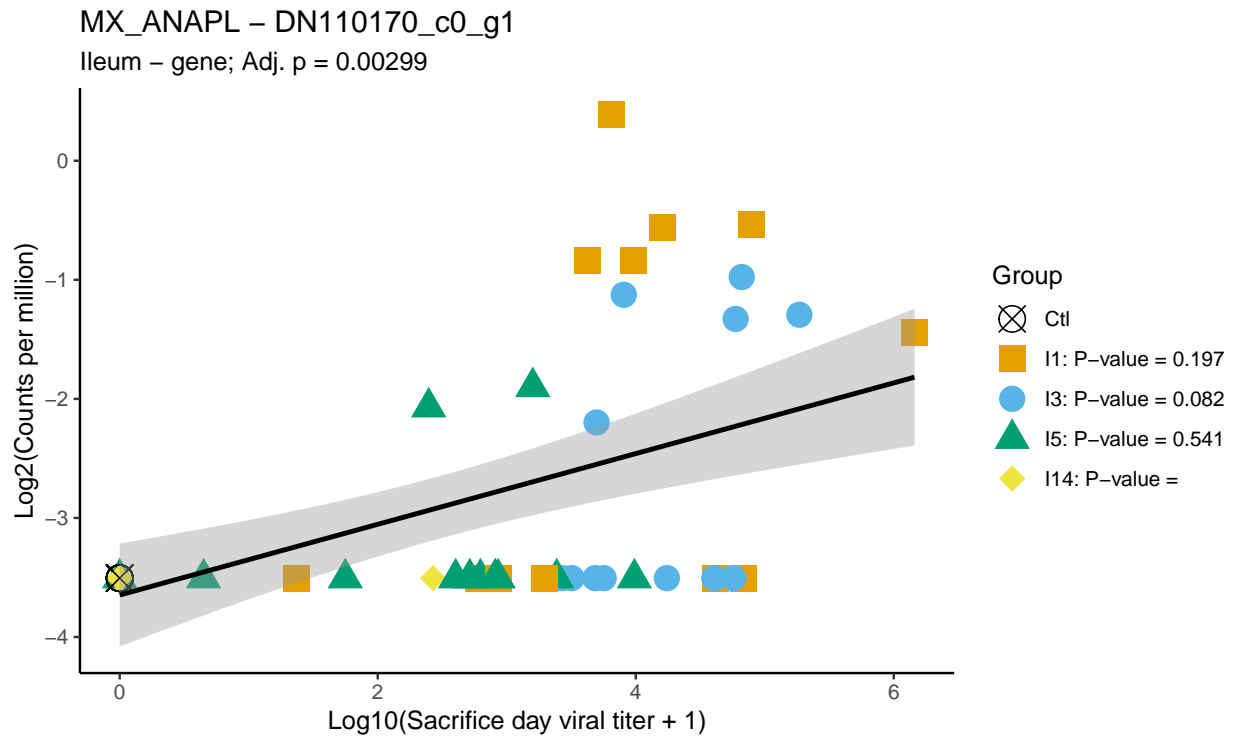
RSAD2_BOVIN – DN1920_c0_g1_i6

Bursa – transcript; Adj. p = 0.03006



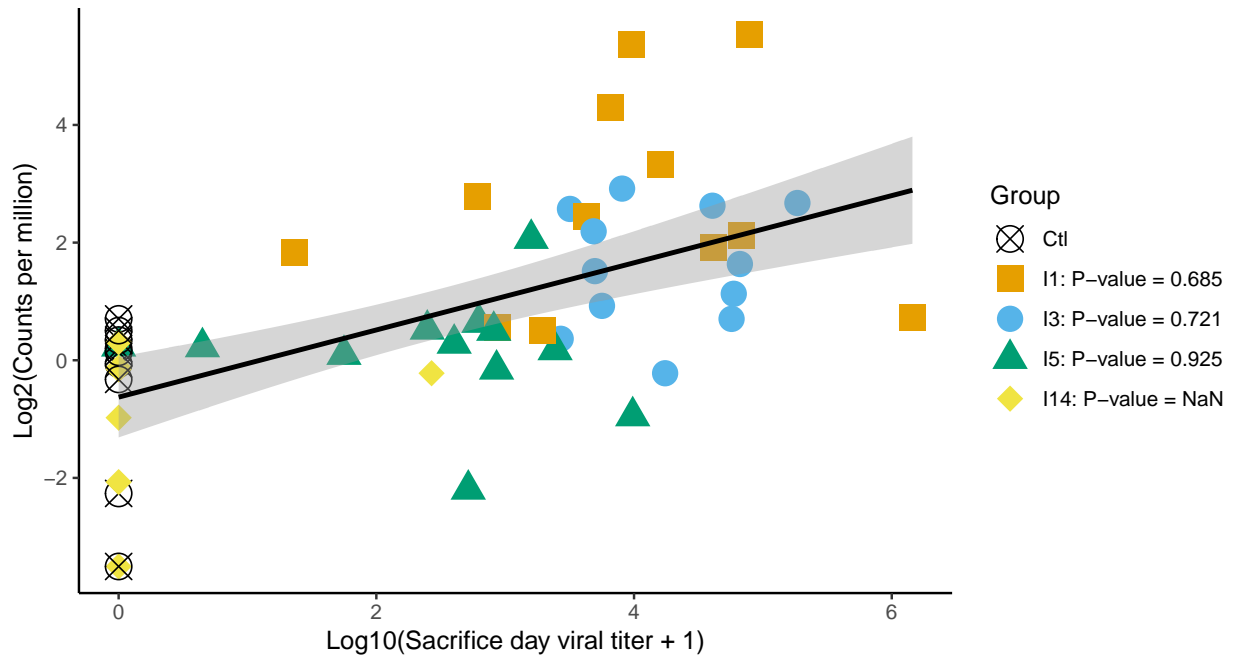






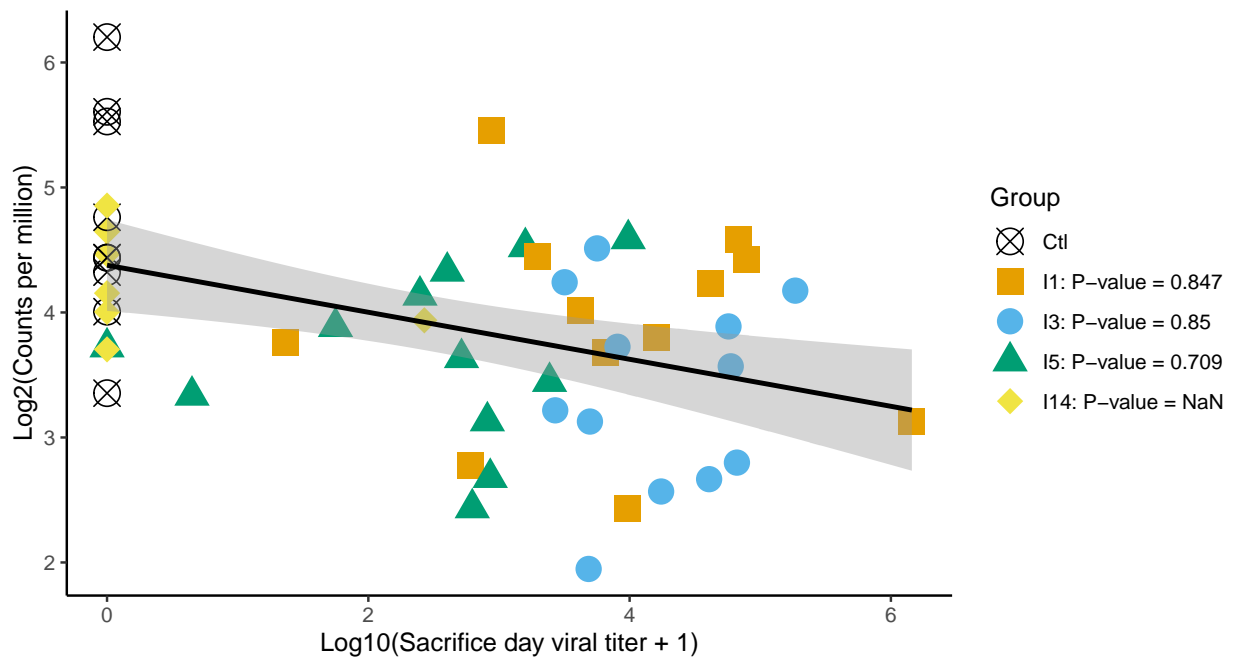
CC4L_HUMAN – DN12298_c0_g1

Ileum – gene; Adj. p = 0.00036



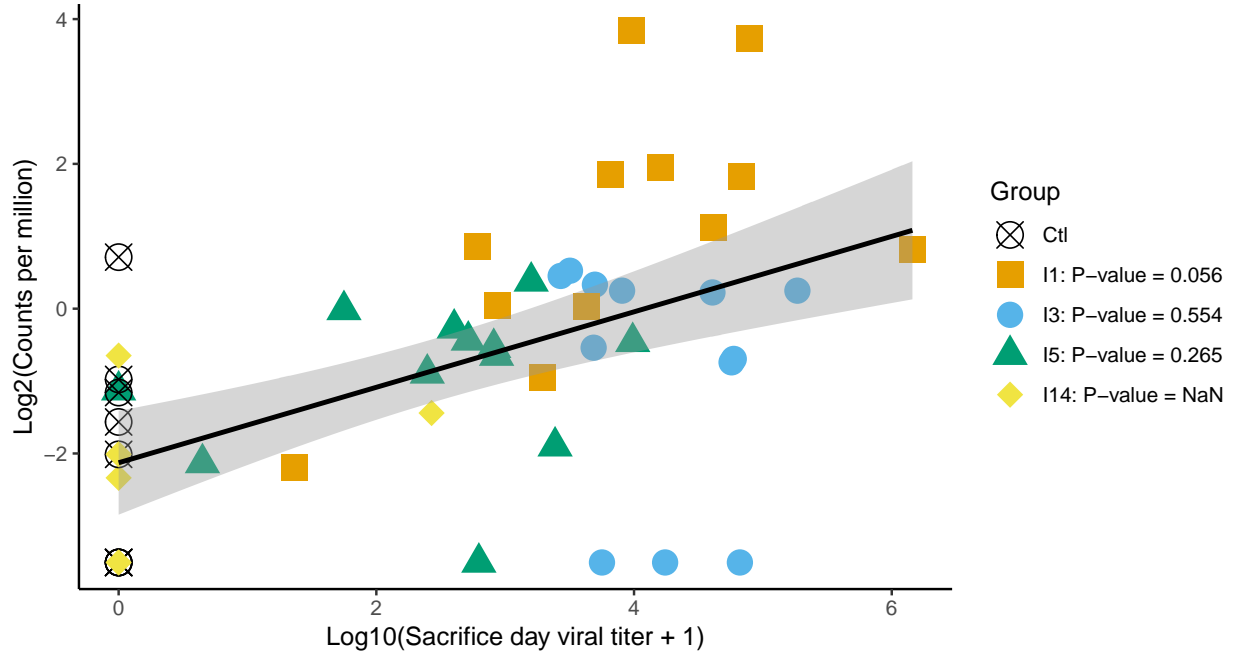
SIA4A_CHICK – DN13002_c0_g1

Ileum – gene; Adj. p = 0.03136



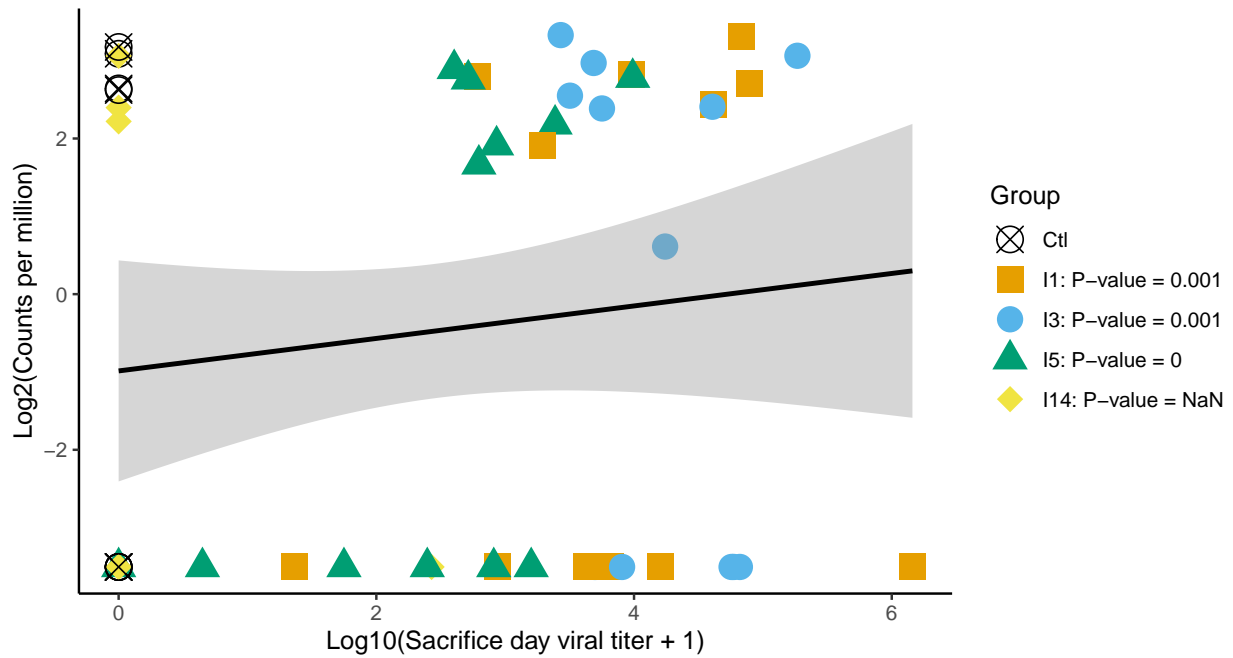
CCL13_HUMAN – DN13412_c0_g1

Ileum – gene; Adj. p = 0.00311



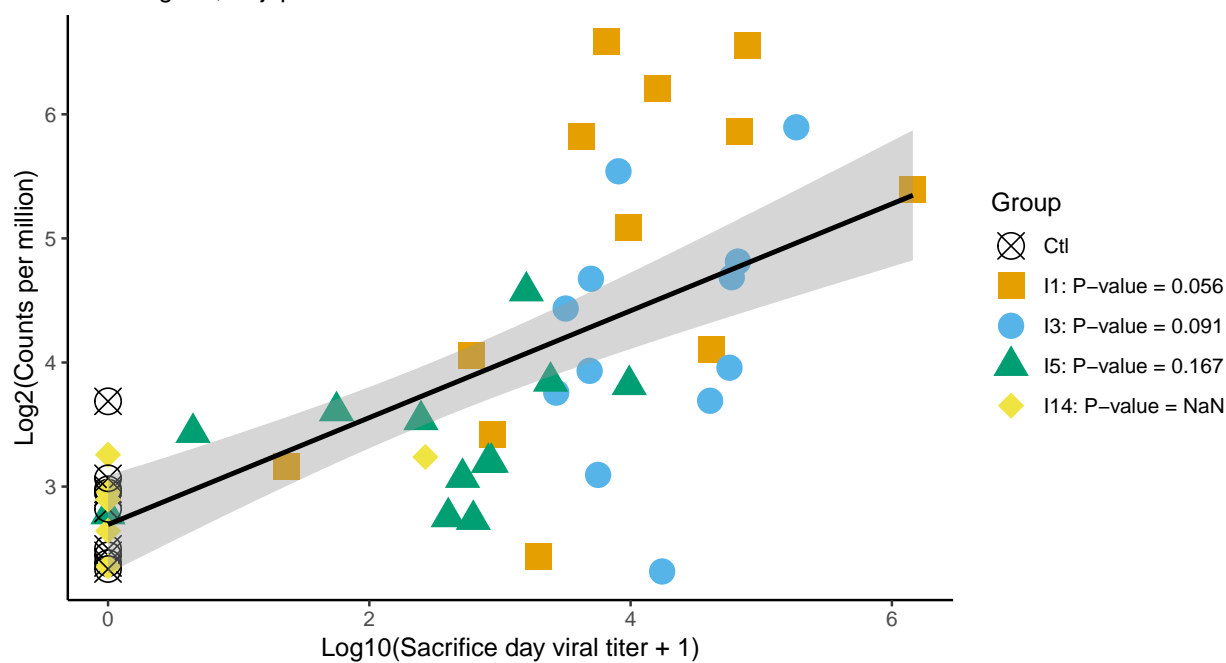
GBA2_MOUSE – DN13777_c0_g1

Ileum – gene; Adj. p = 0



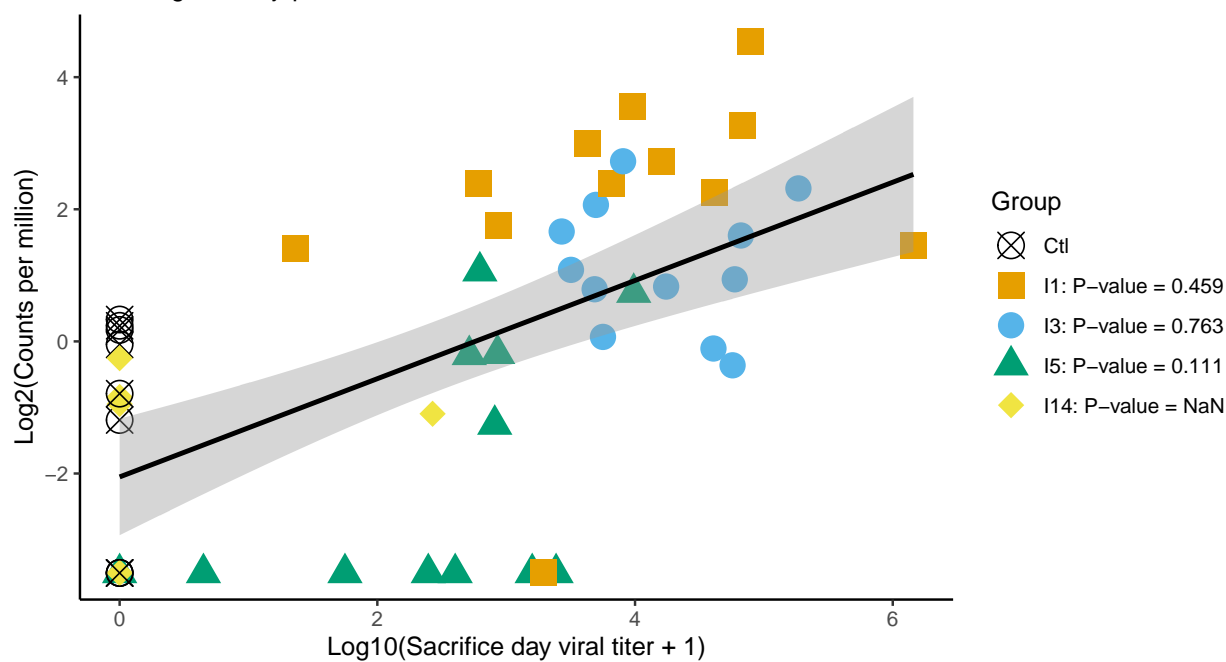
DDX58_MOUSE – DN1500_c0_g1

Ileum – gene; Adj. p = 0



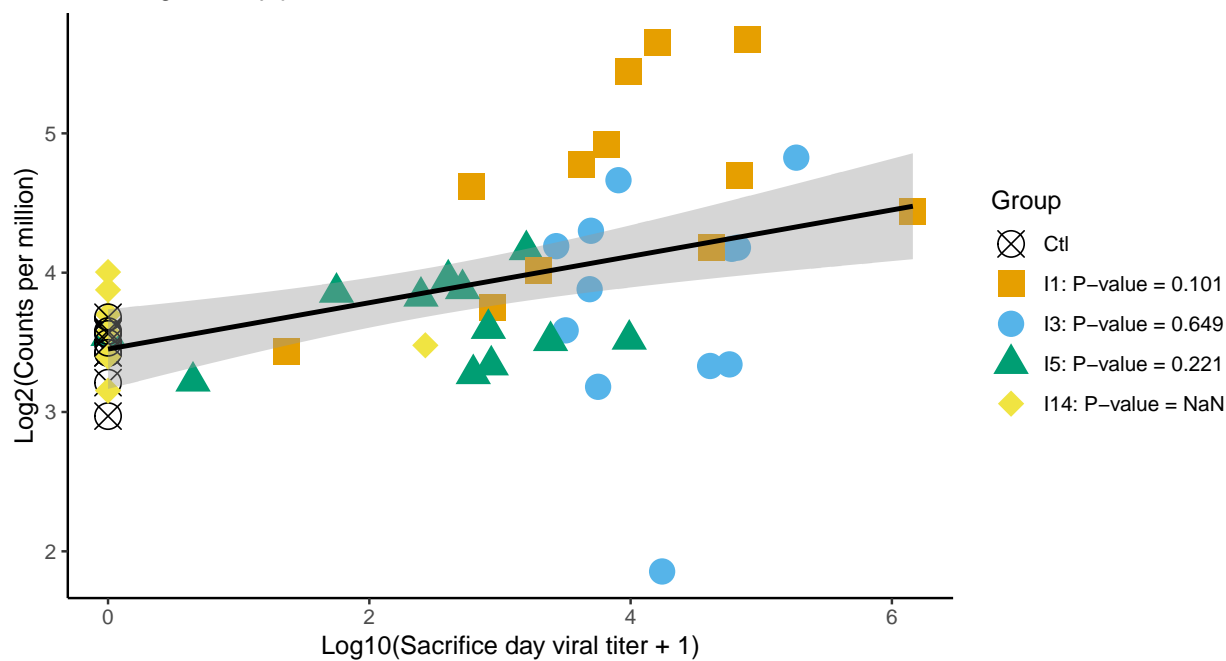
DHX58_MOUSE – DN15121_c0_g1

Ileum – gene; Adj. p = 0.00036



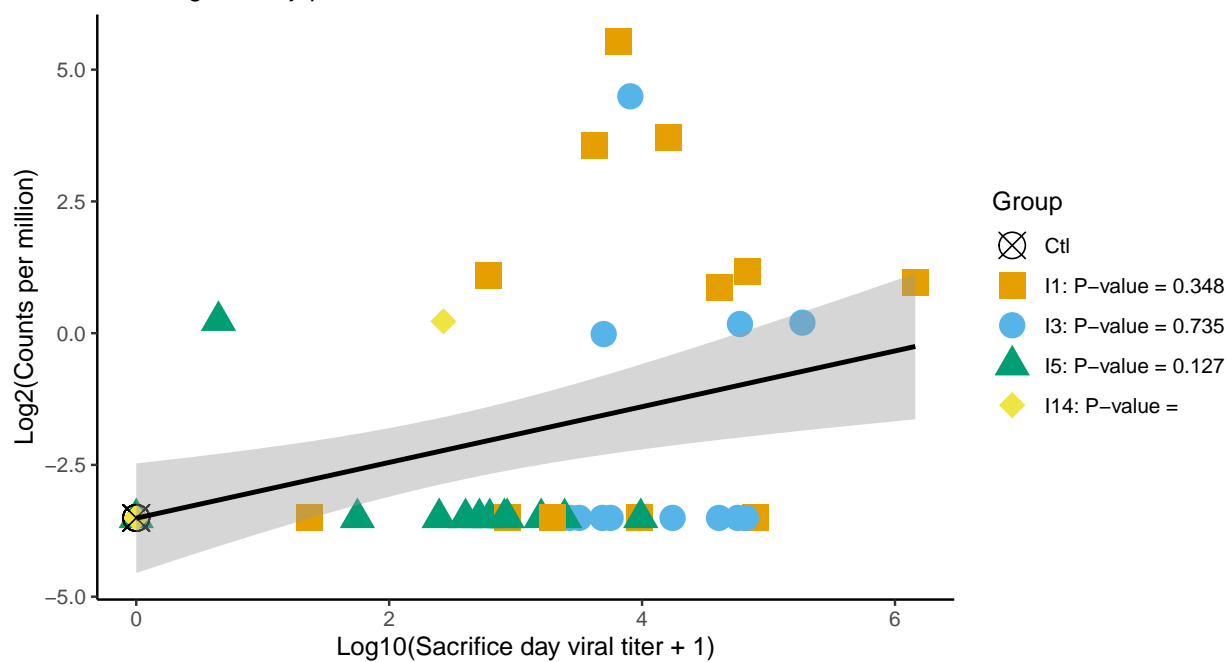
FOXC2_RAT – DN15388_c0_g1

Ileum – gene; Adj. p = 0.0093



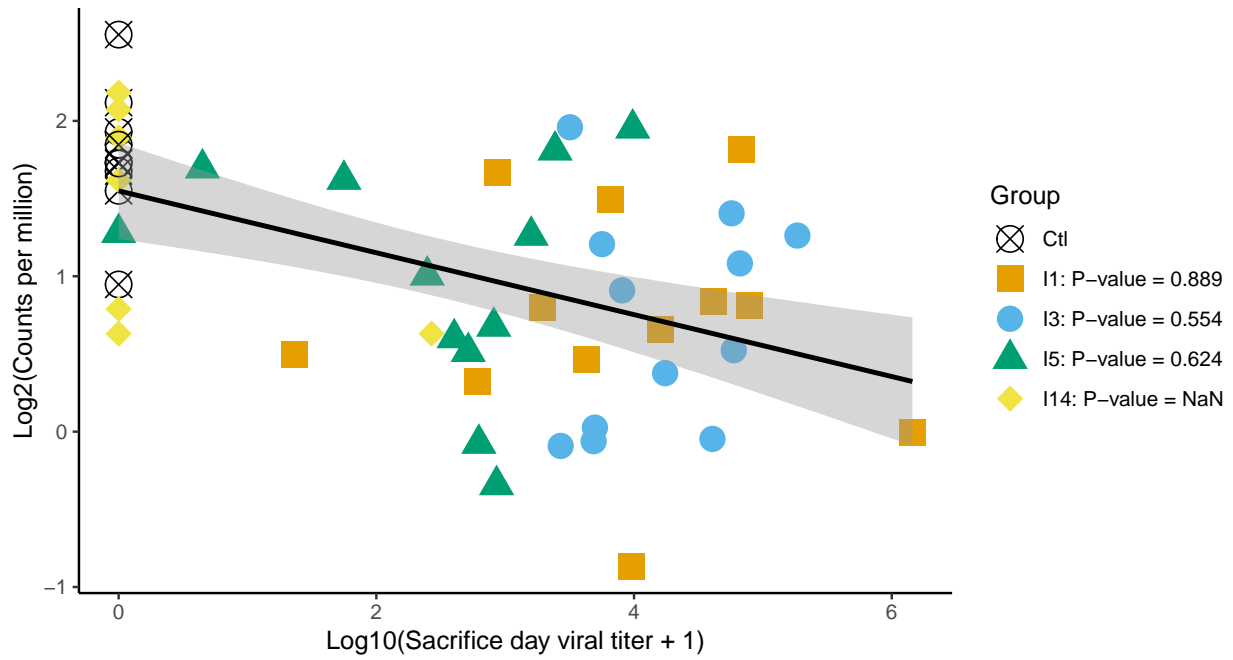
OASL2_RAT – DN15488_c0_g1

Ileum – gene; Adj. p = 0.02262



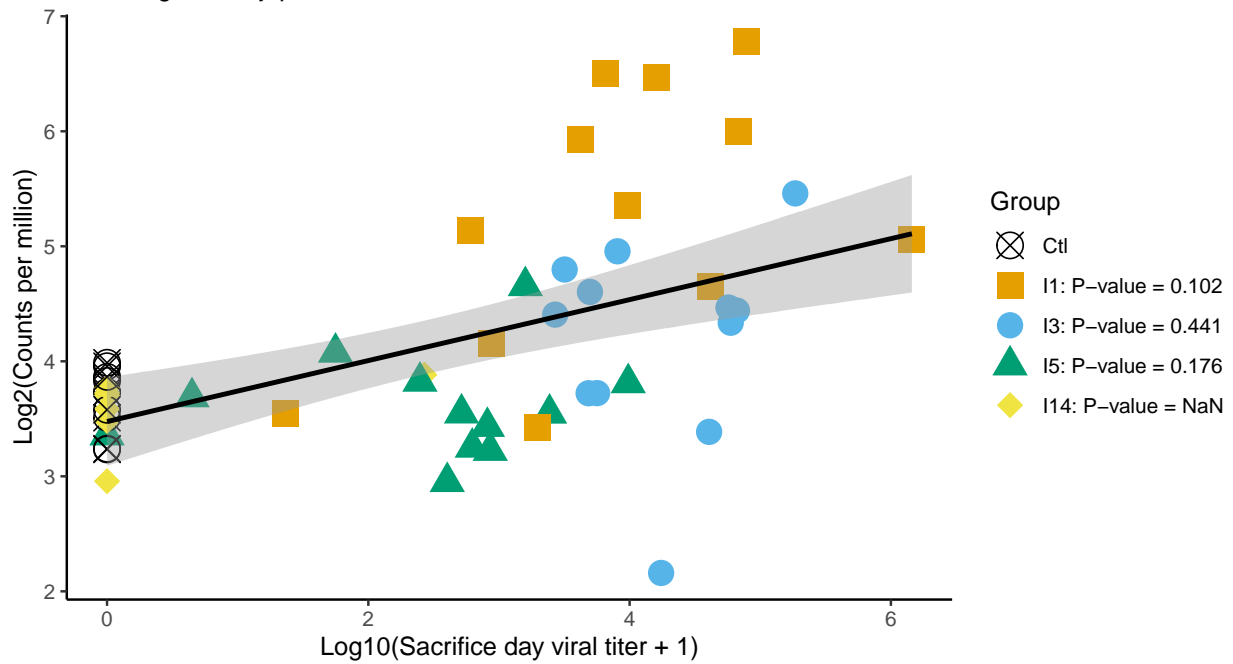
SIA7C_HUMAN – DN15589_c0_g1

Ileum – gene; Adj. p = 0.00685



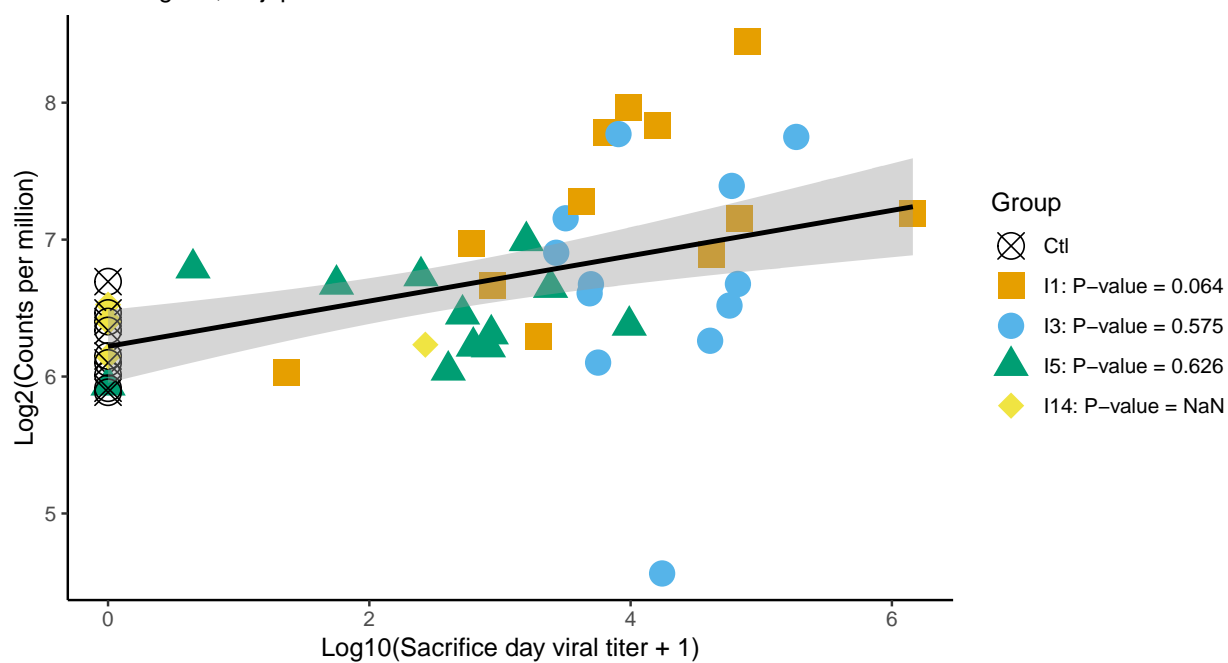
PARP9_HUMAN – DN161_c0_g1

Ileum – gene; Adj. p = 0.0019



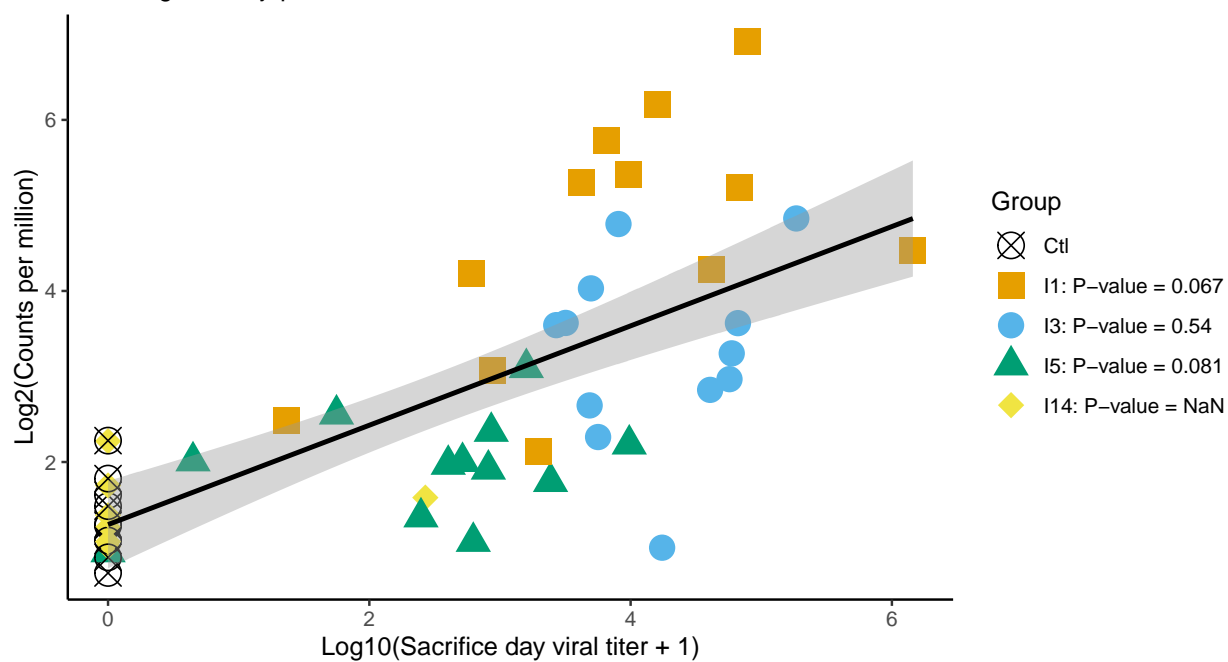
IRF1_CHICK – DN1634_c0_g1

Ileum – gene; Adj. p = 0.00317



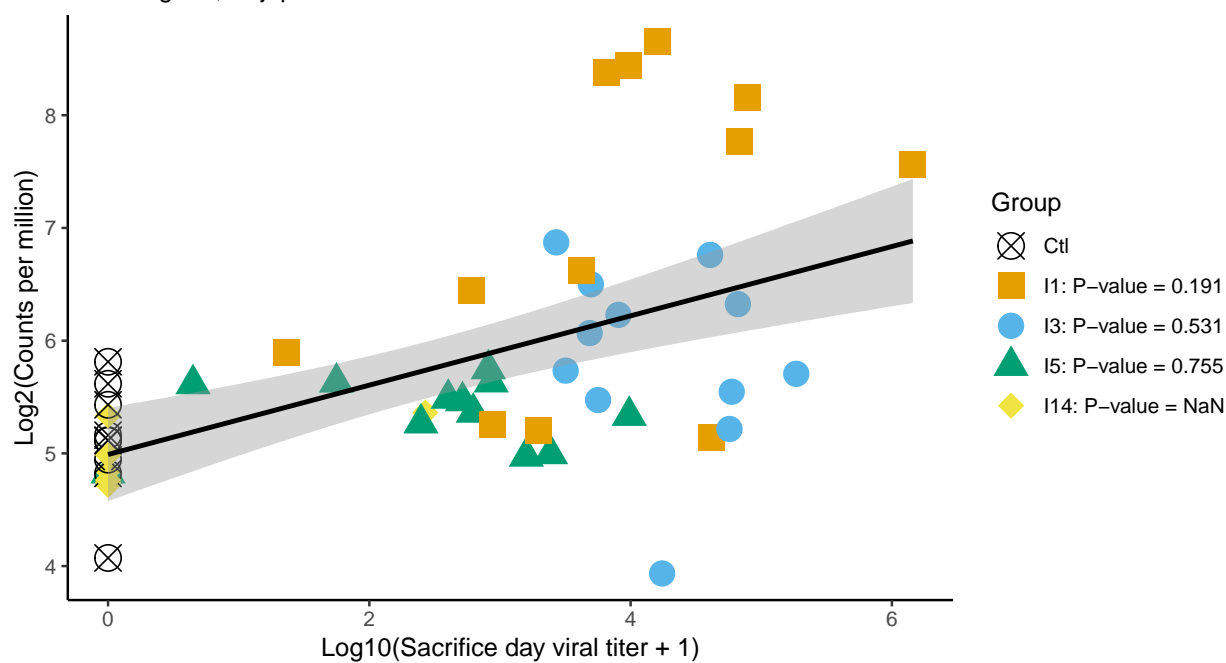
DHX58_HUMAN – DN164_c3_g1

Ileum – gene; Adj. p = 0



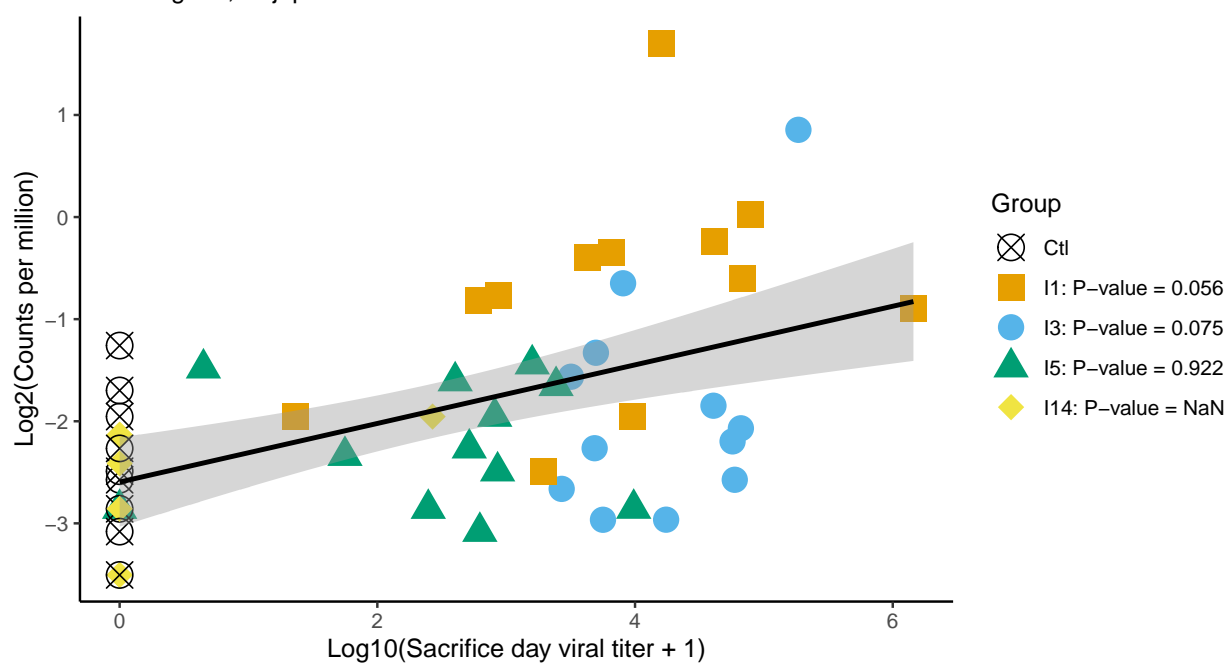
IFM5_HUMAN – DN16598_c0_g1

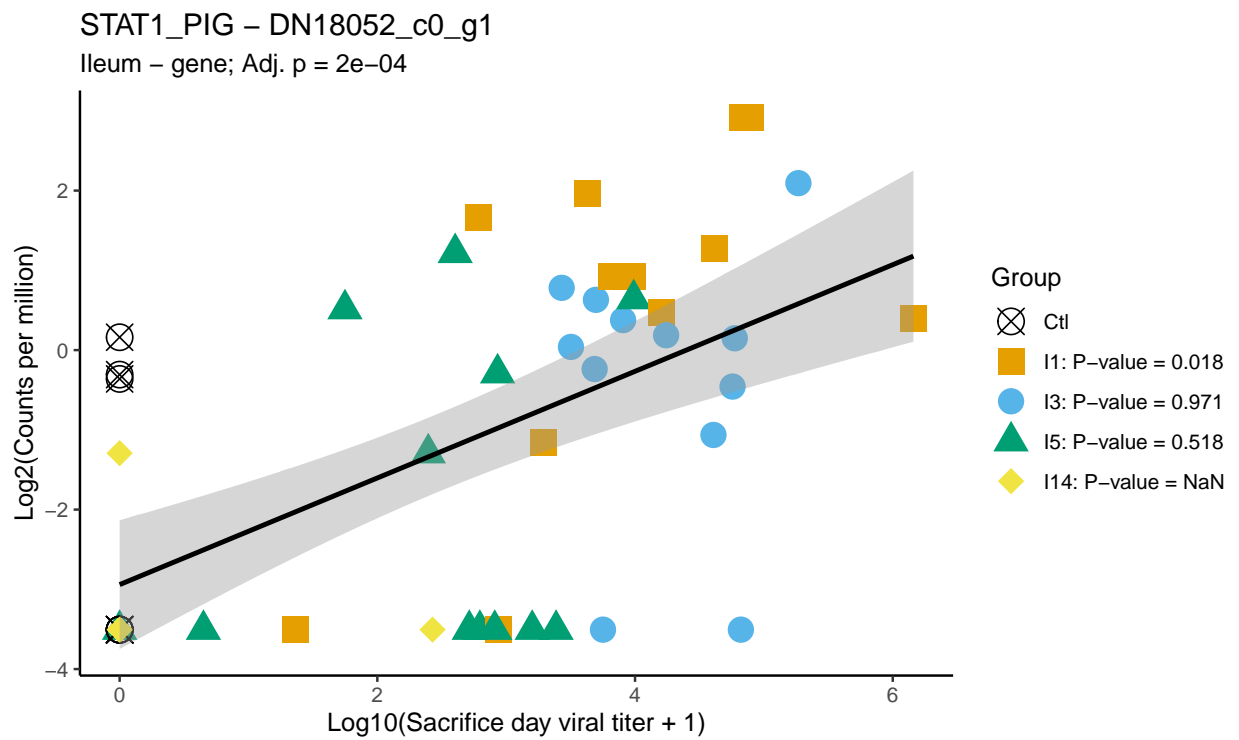
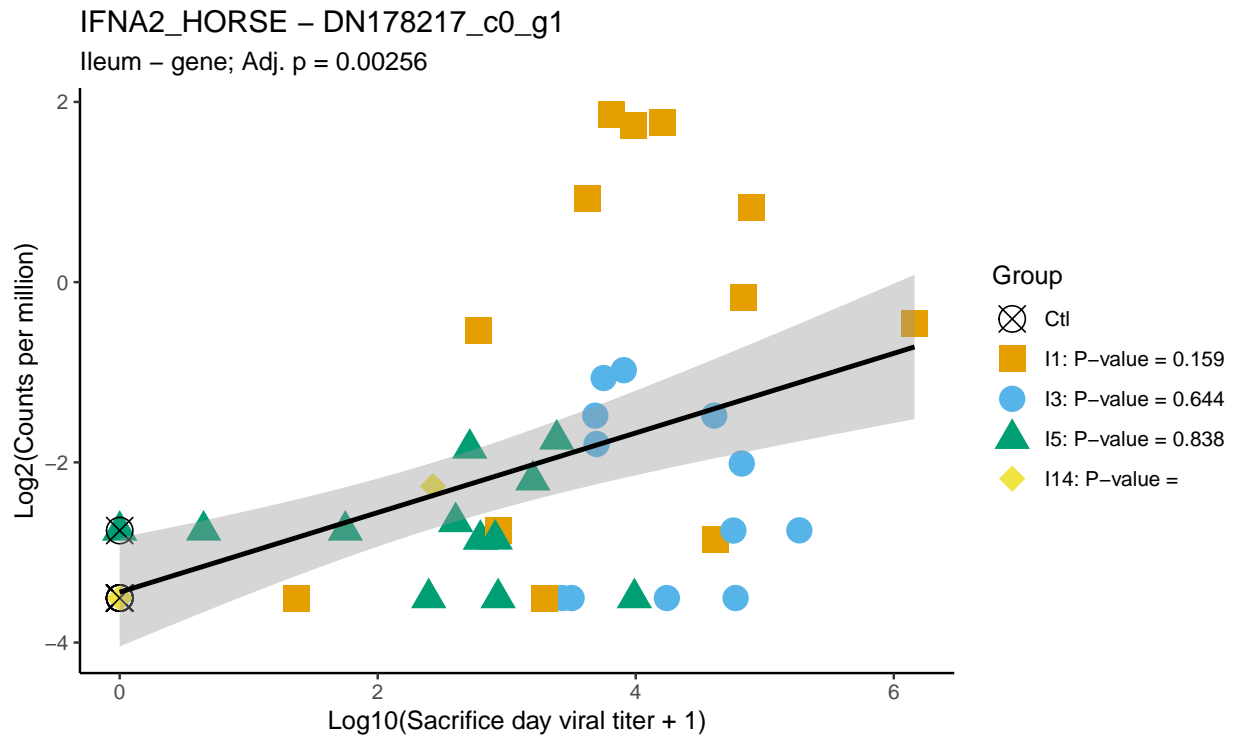
Ileum – gene; Adj. p = 0.00277

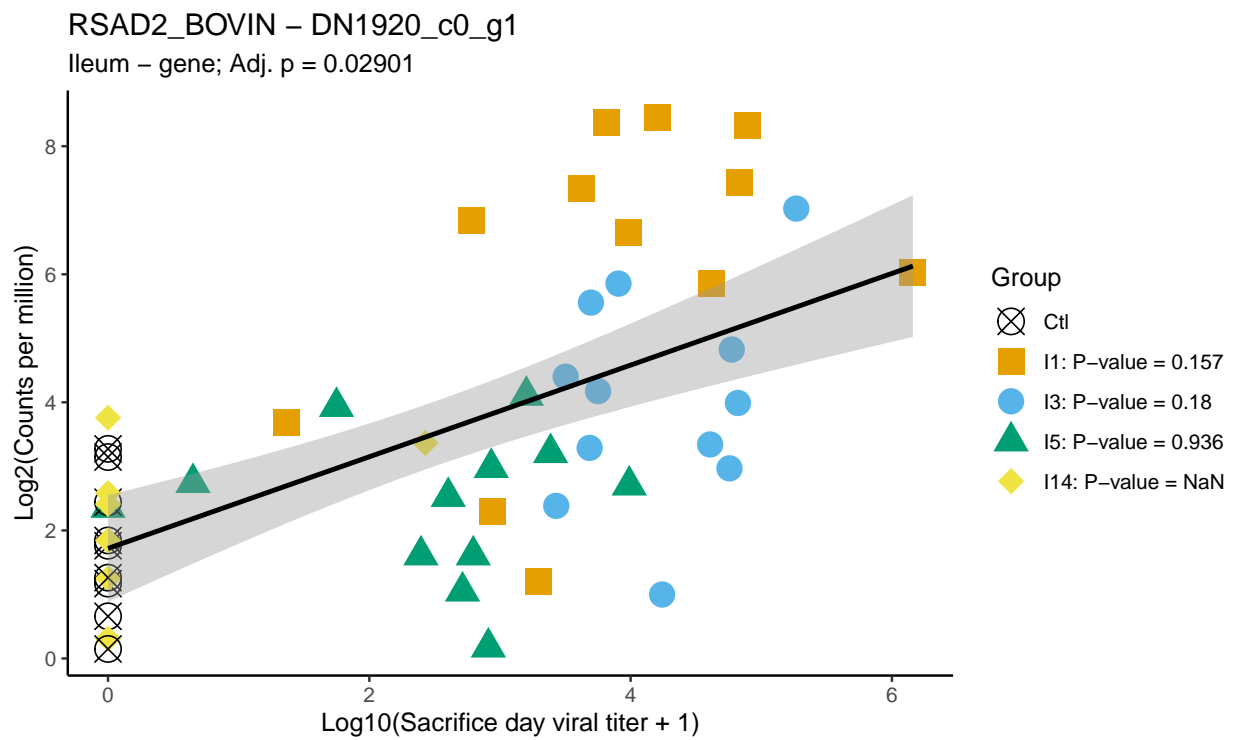
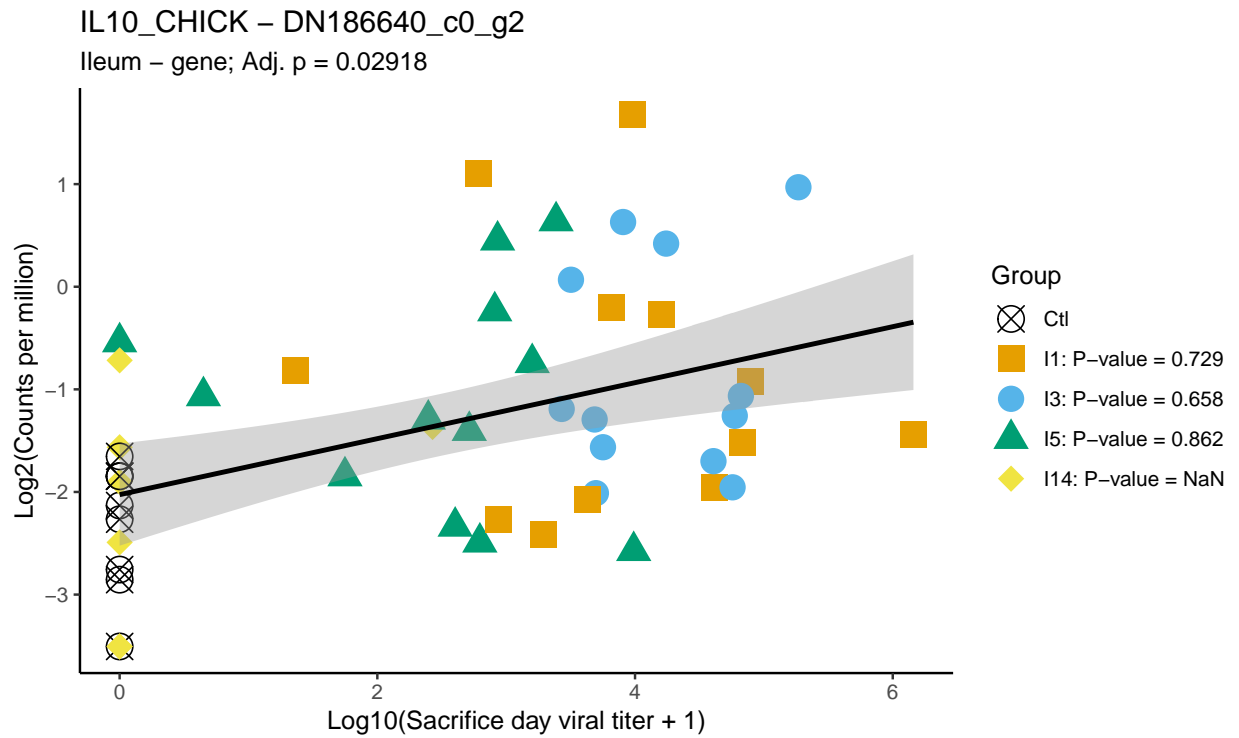


CCL4_PIG – DN17675_c0_g2

Ileum – gene; Adj. p = 0.00736

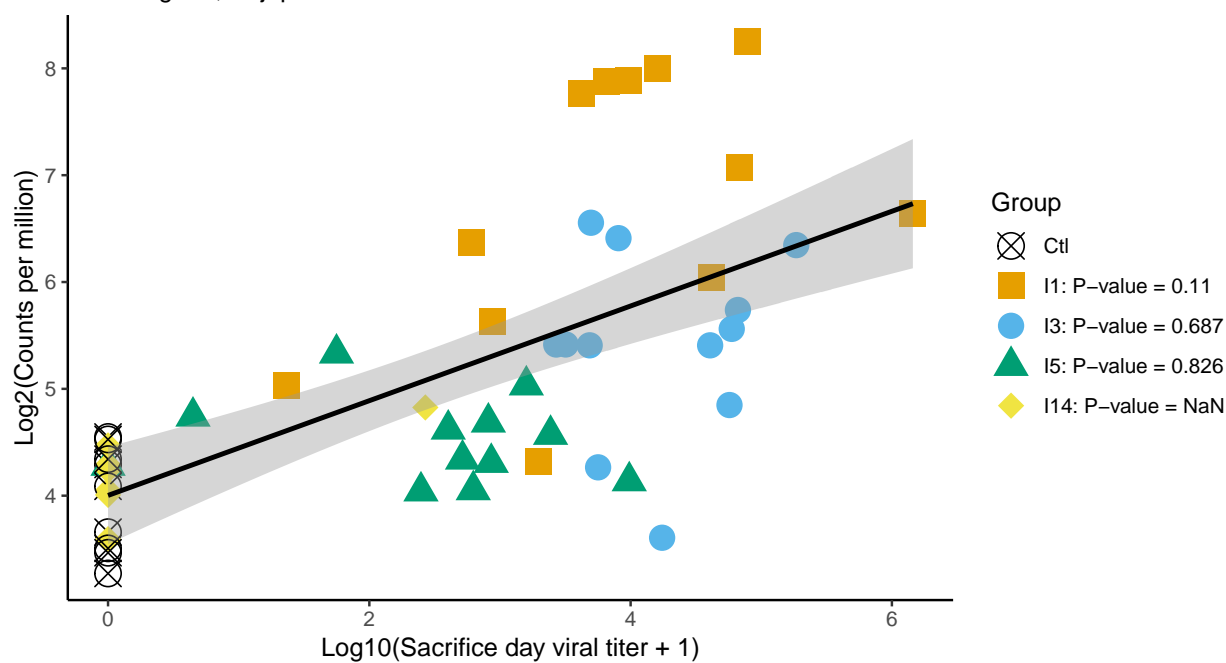






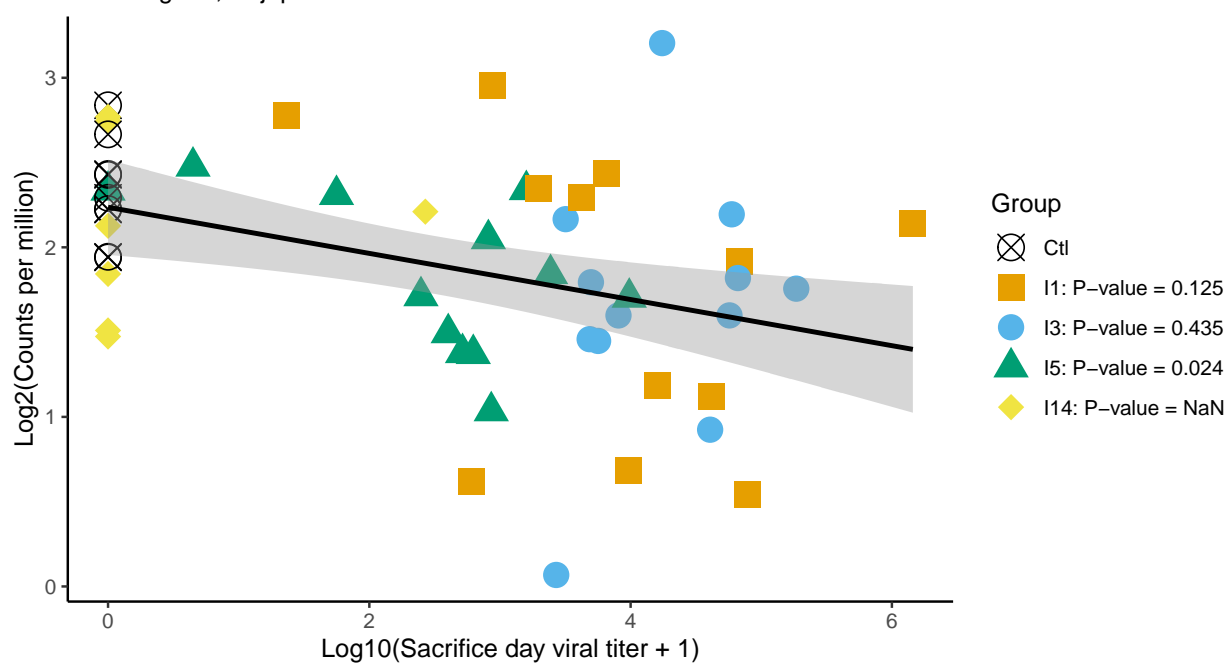
IRF3_CHICK – DN1934_c0_g1

Ileum – gene; Adj. p = 1e-05



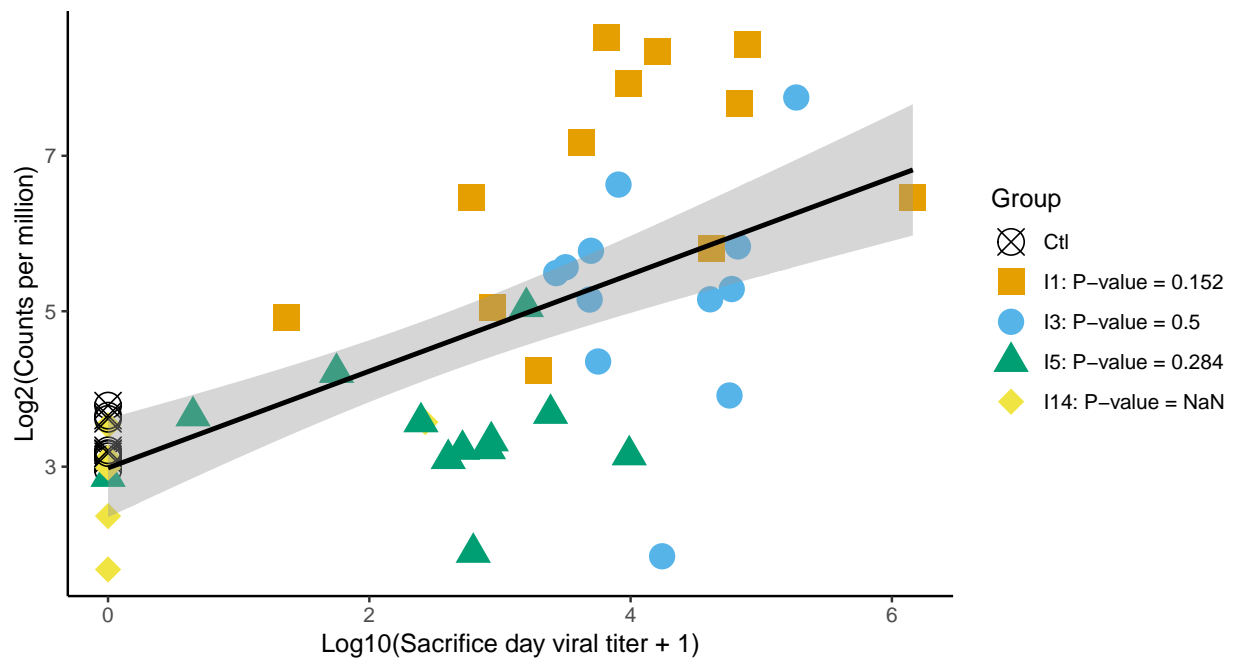
PDE4D_MOUSE – DN20116_c0_g1

Ileum – gene; Adj. p = 0.00916



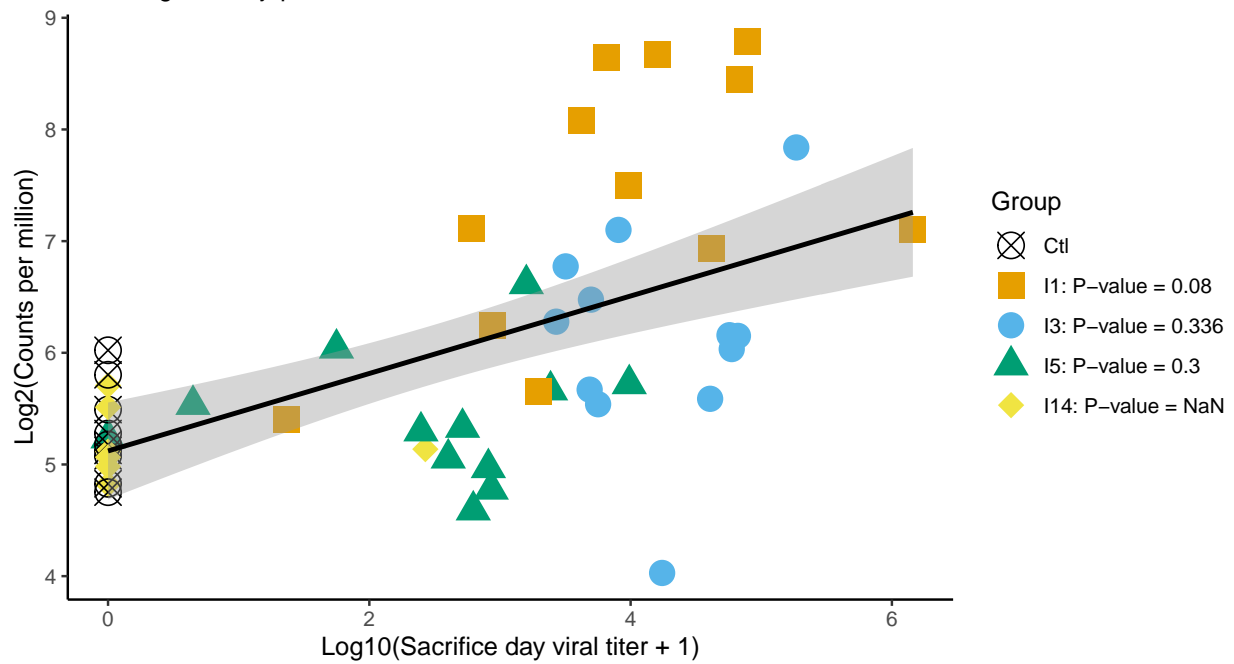
MX_ANAPL – DN2085_c0_g2

Ileum – gene; Adj. p = 0.04048



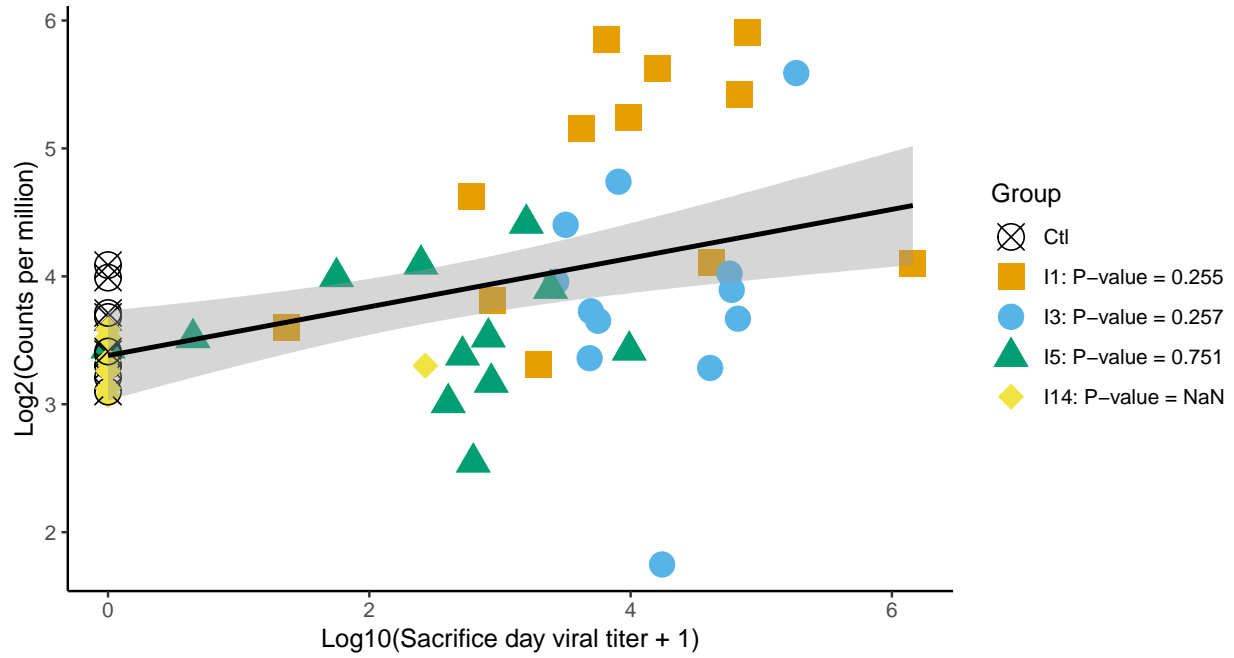
PAR12_MOUSE – DN20874_c0_g1

Ileum – gene; Adj. p = 0.00042



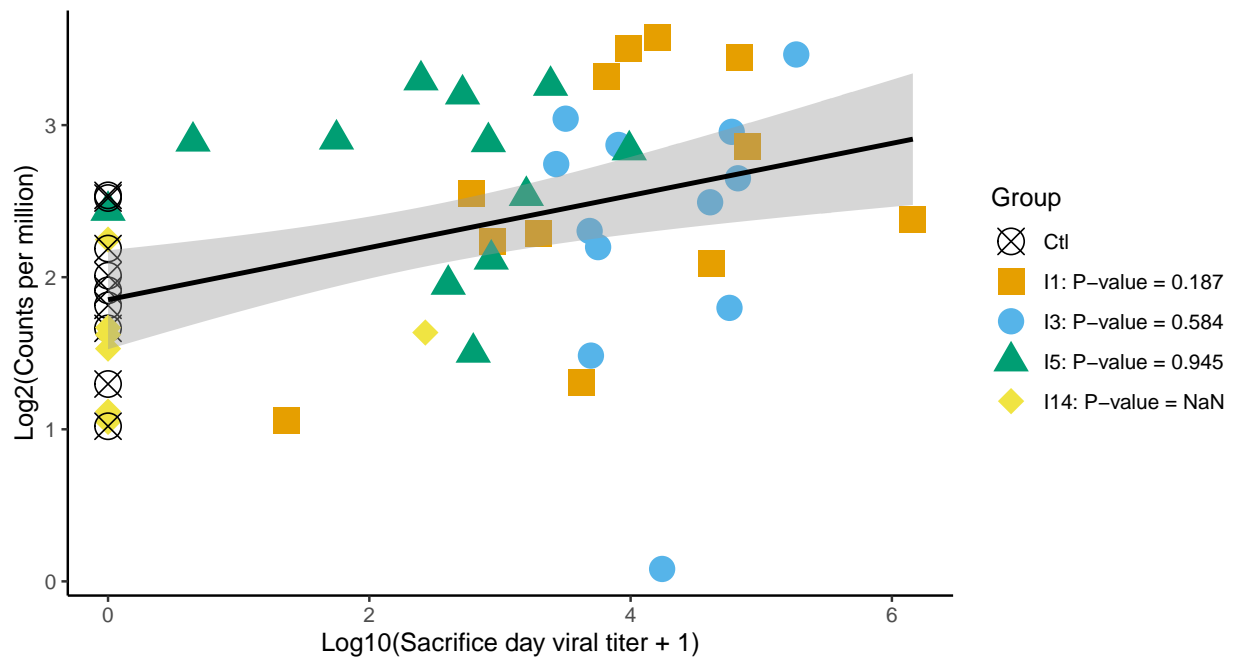
IFIH1_HUMAN – DN24849_c0_g1

Ileum – gene; Adj. p = 0.02422



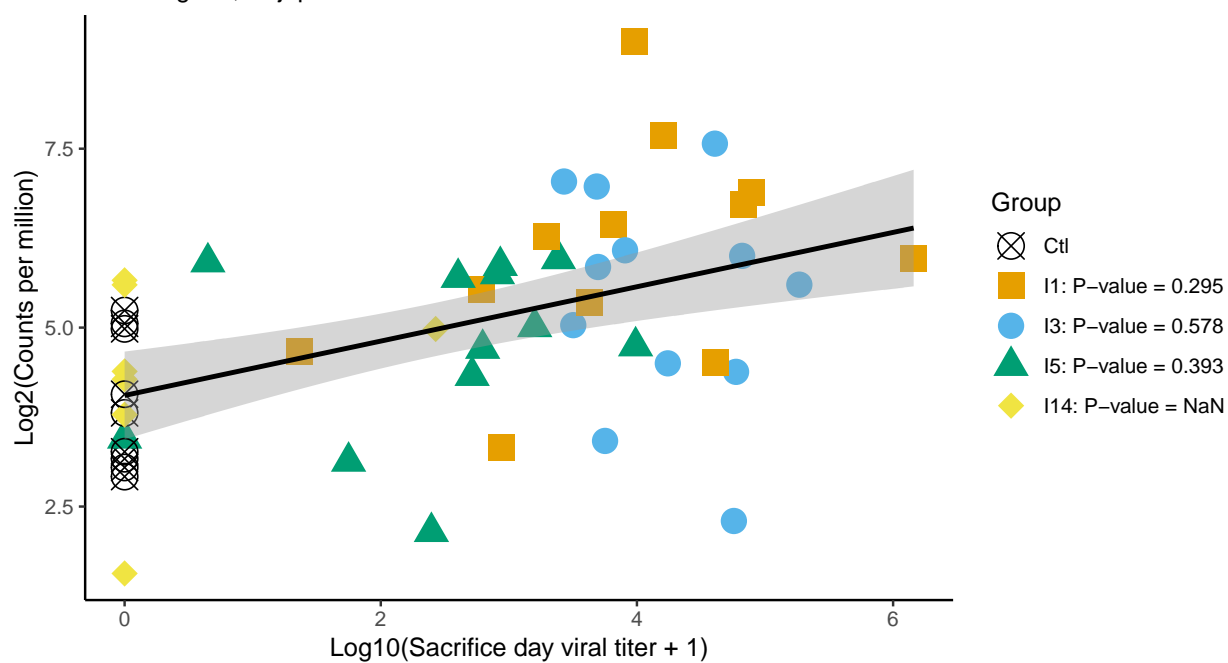
CCR5_BOVIN – DN2578_c0_g1

Ileum – gene; Adj. p = 0.04153



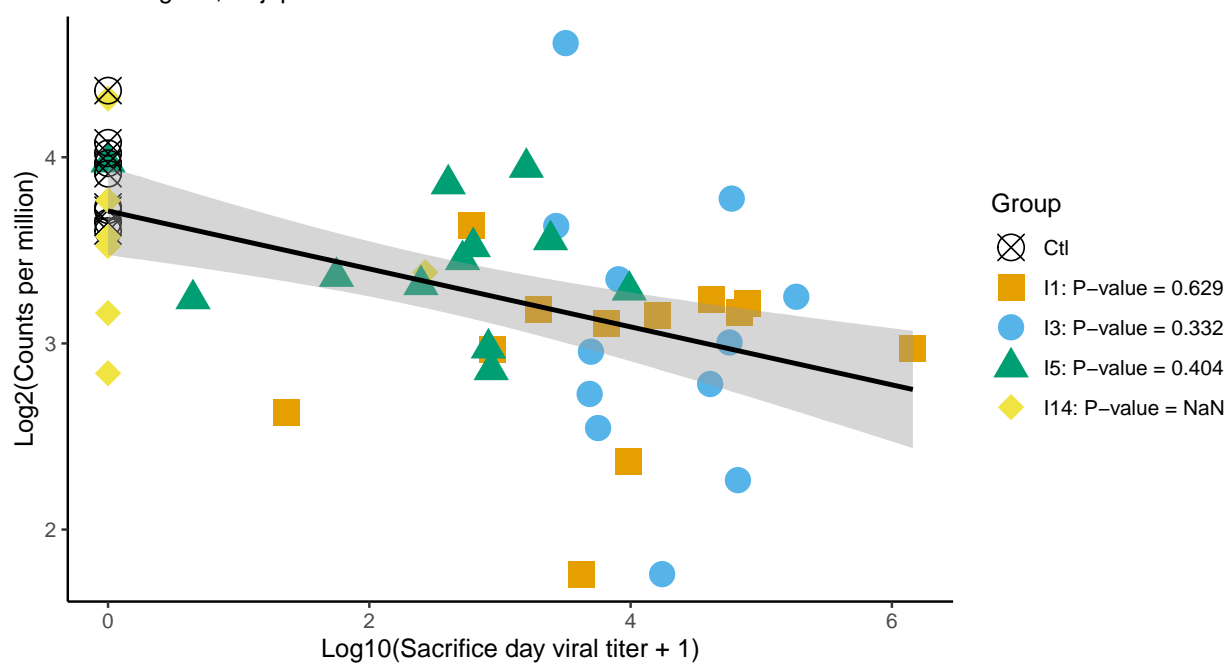
CCL4_PIG – DN2677_c0_g1

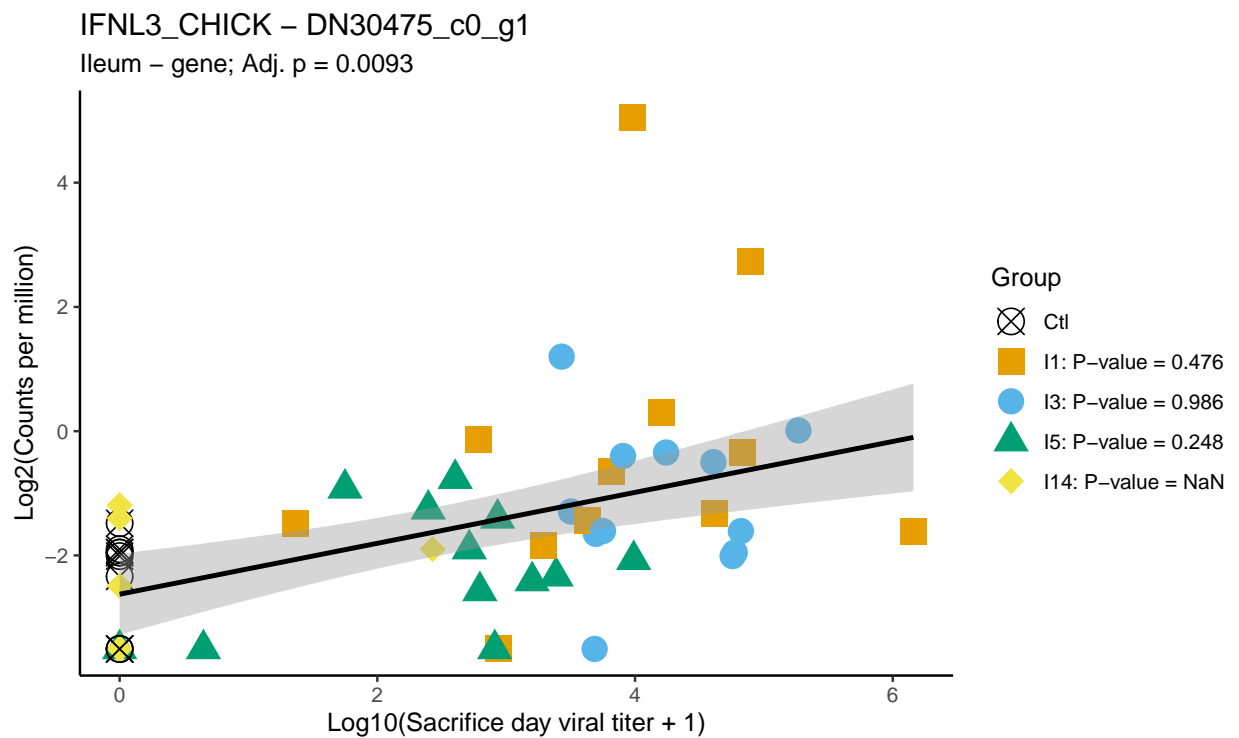
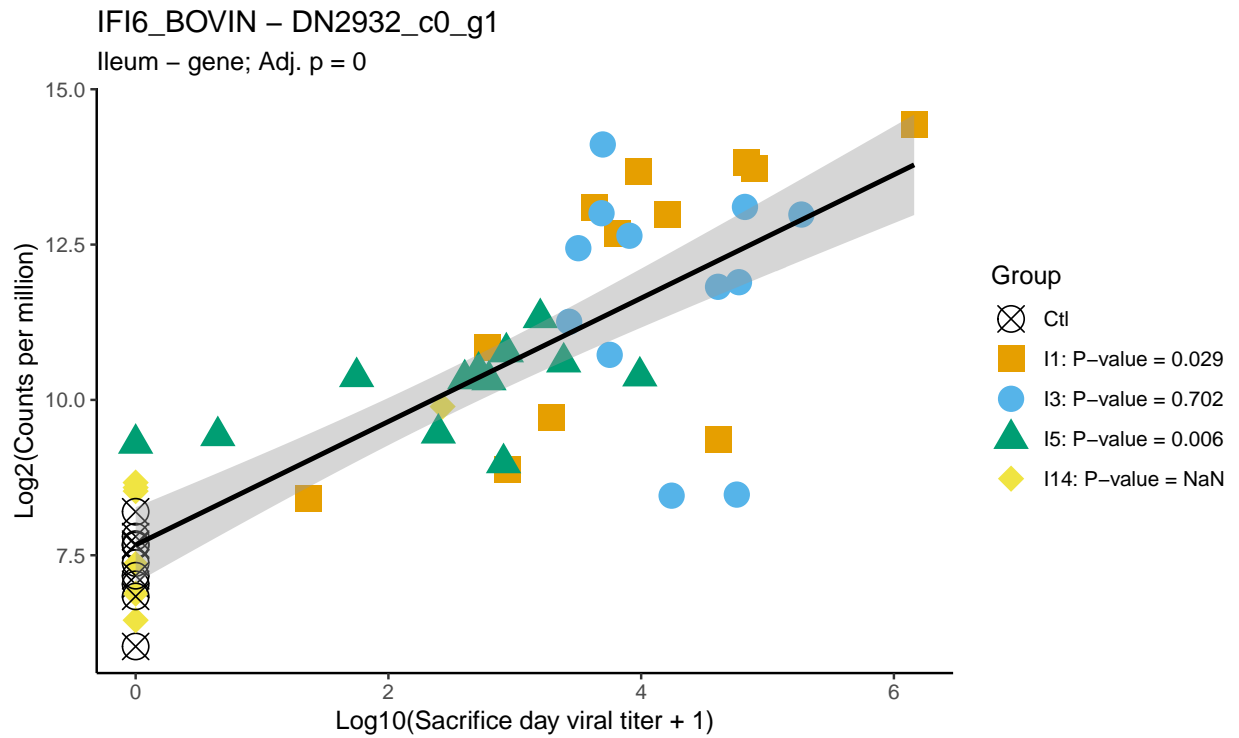
Ileum – gene; Adj. p = 0.00906



FGF4_CHICK – DN28958_c0_g1

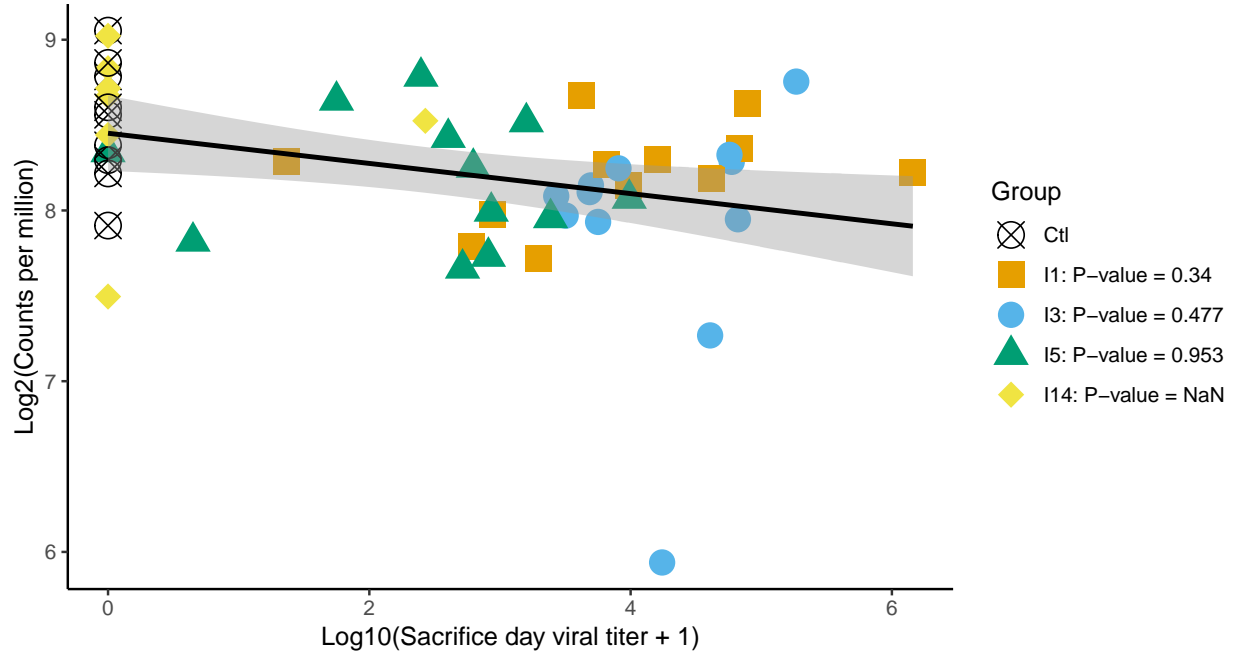
Ileum – gene; Adj. p = 0.00317





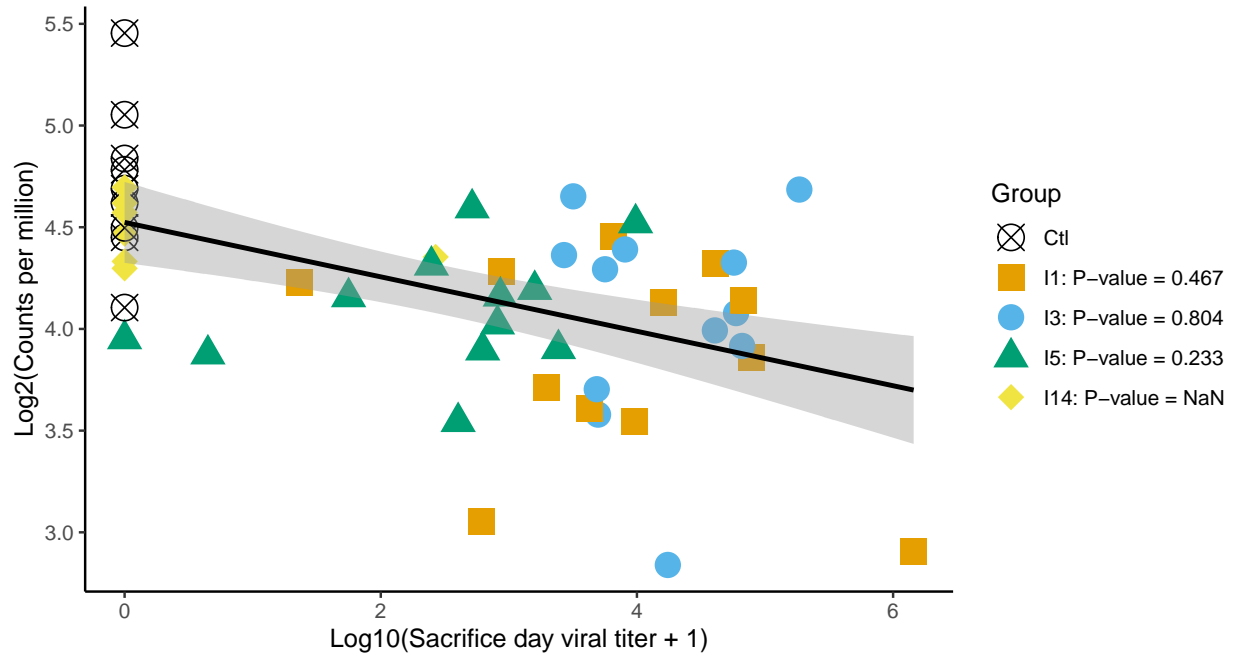
IFRD1_HUMAN – DN3126_c0_g1

Ileum – gene; Adj. p = 0.04599



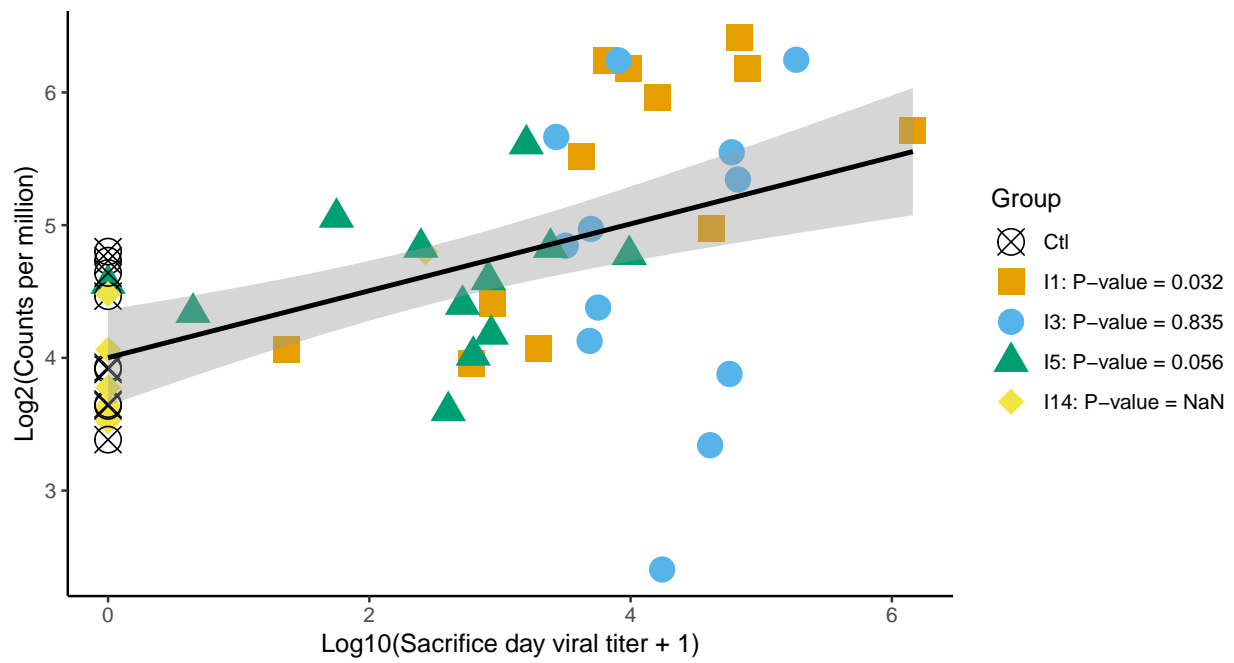
BMP6_RAT – DN313_c0_g5

Ileum – gene; Adj. p = 0.00462



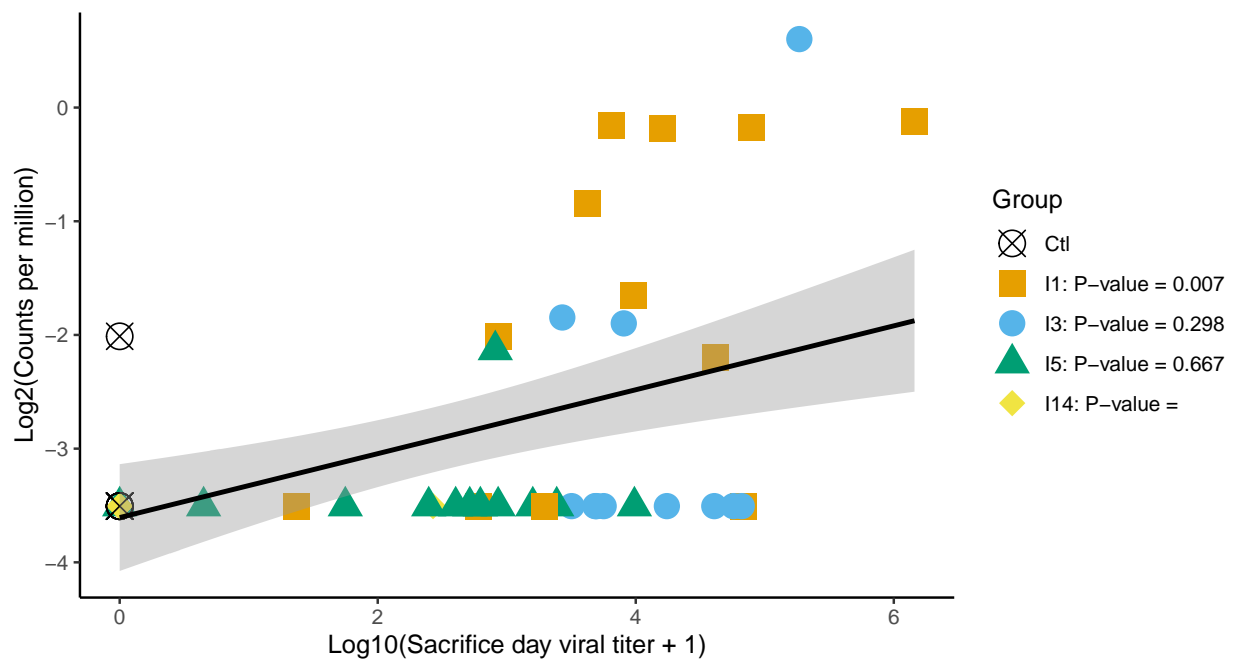
TAP1_GORGO – DN3236_c0_g1

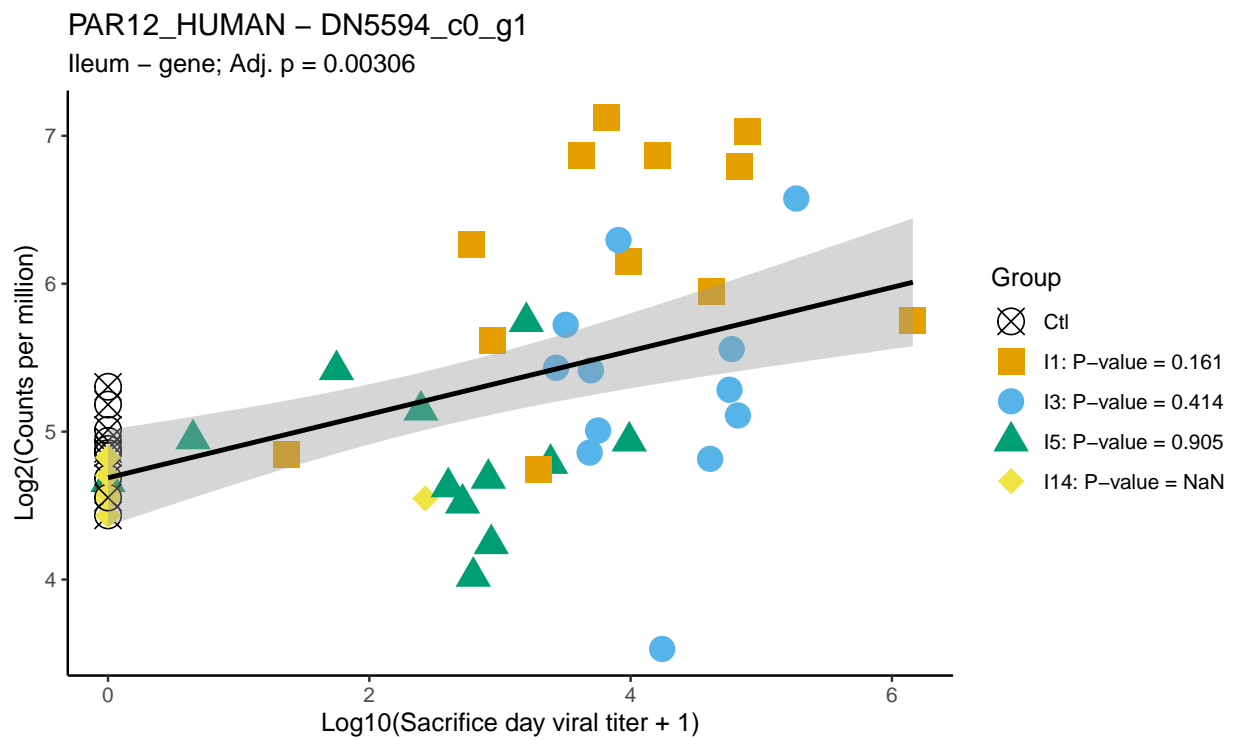
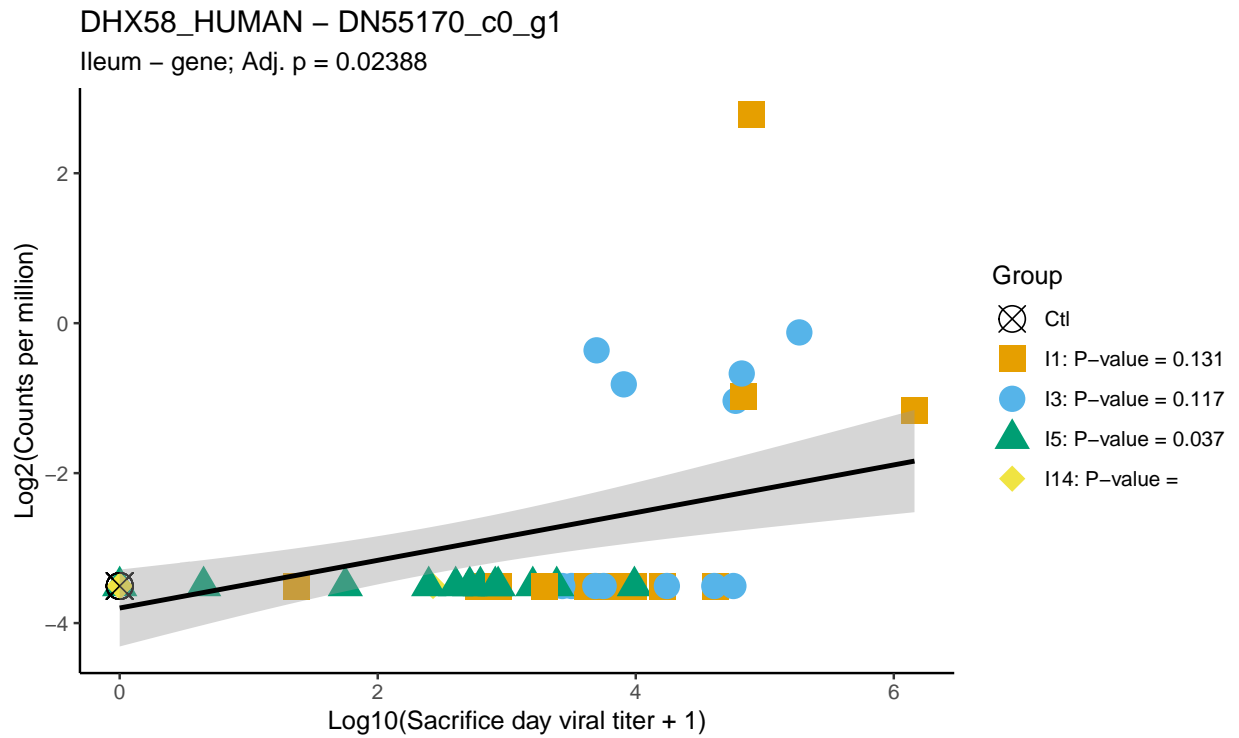
Ileum – gene; Adj. p = 0.00169



STAT1_HUMAN – DN51353_c2_g1

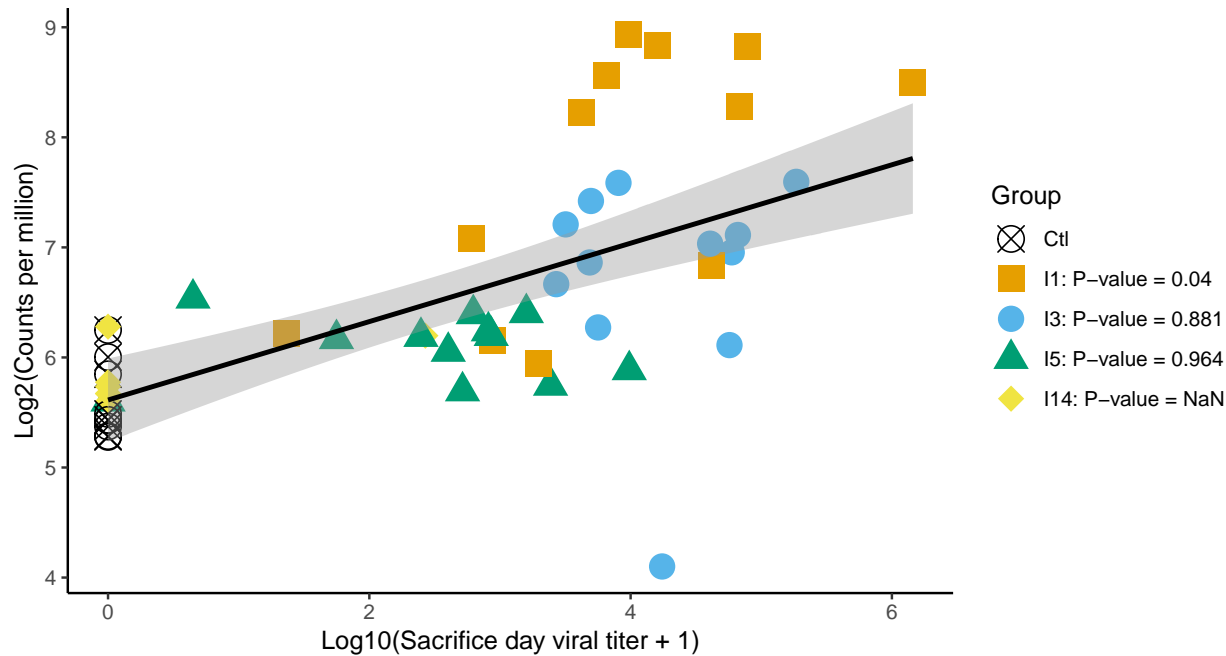
Ileum – gene; Adj. p = 0.01107





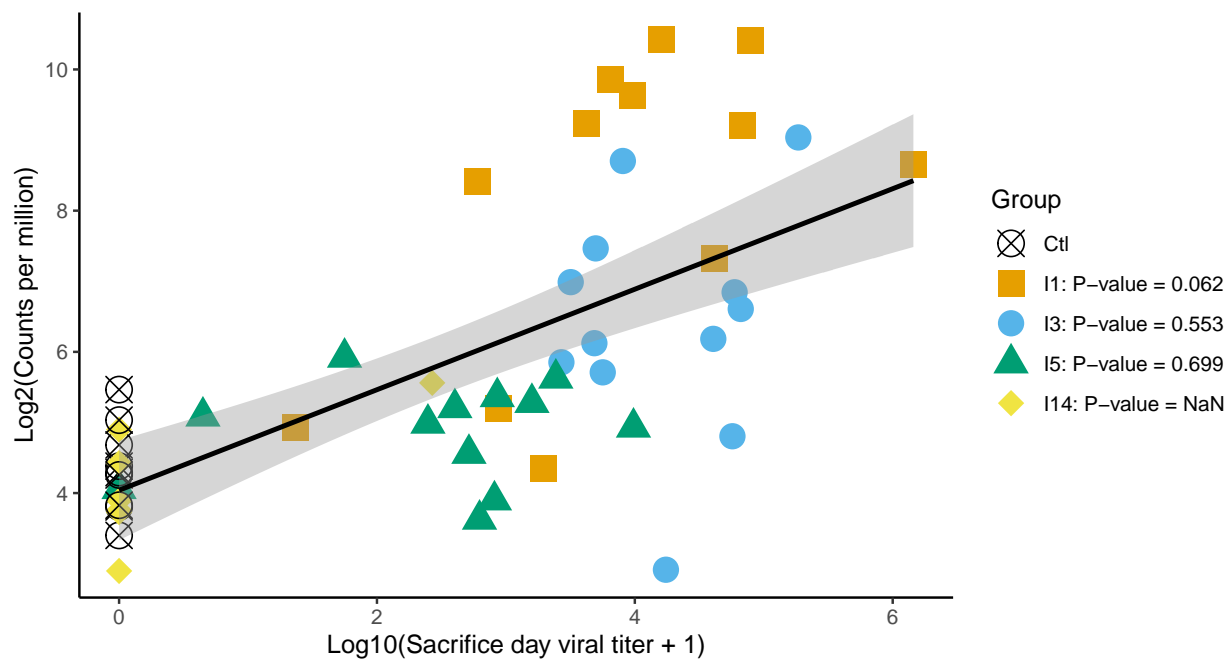
IN35_HUMAN – DN6170_c0_g1

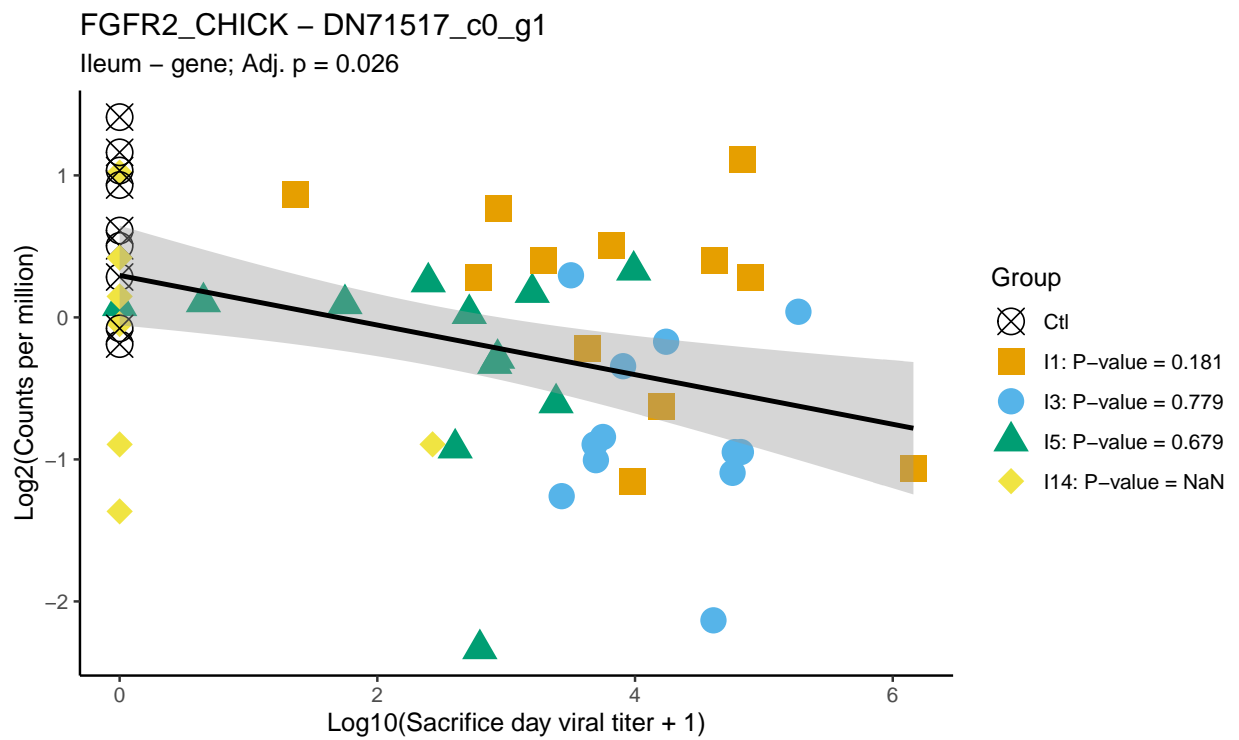
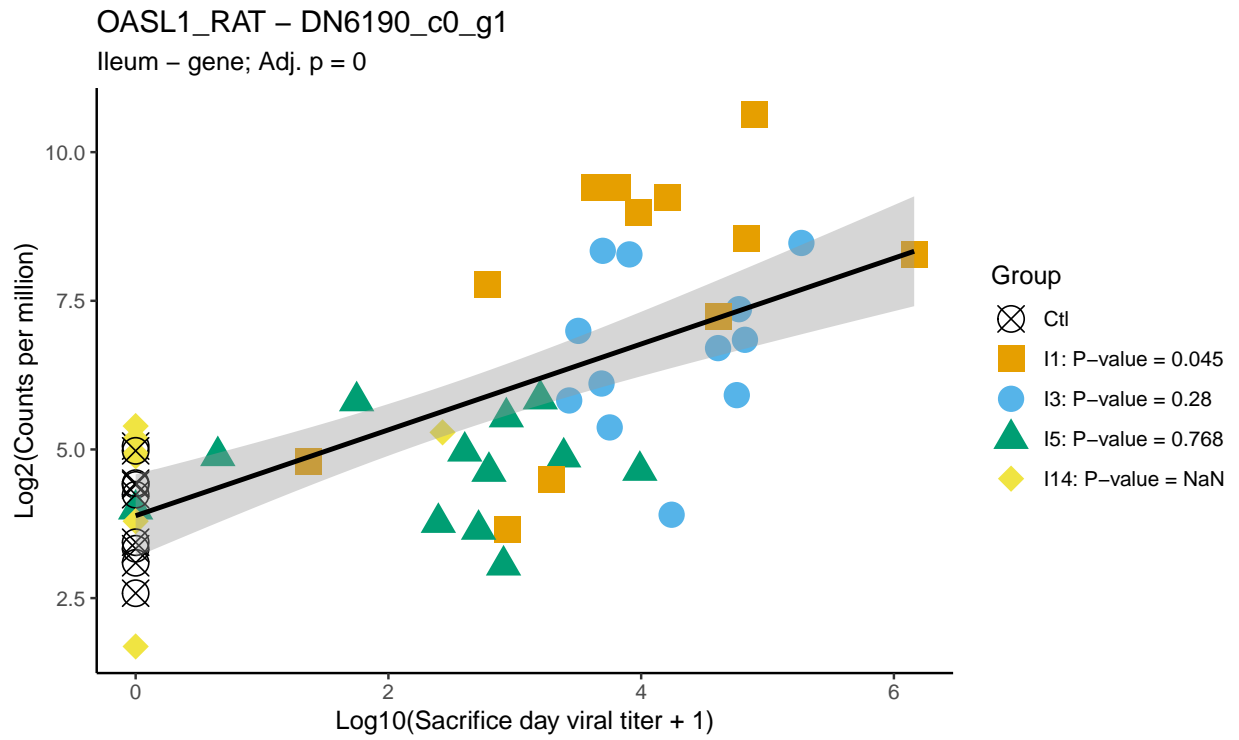
Ileum – gene; Adj. p = 1e-05



UBP34_HUMAN – DN6178_c0_g1

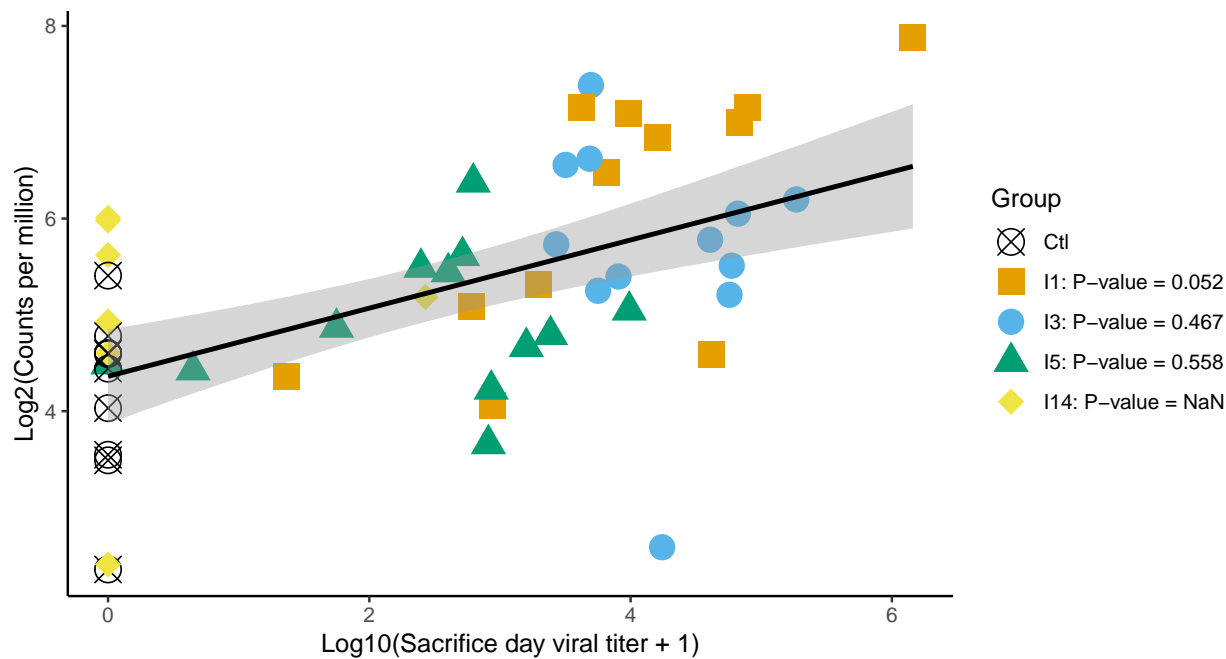
Ileum – gene; Adj. p = 0





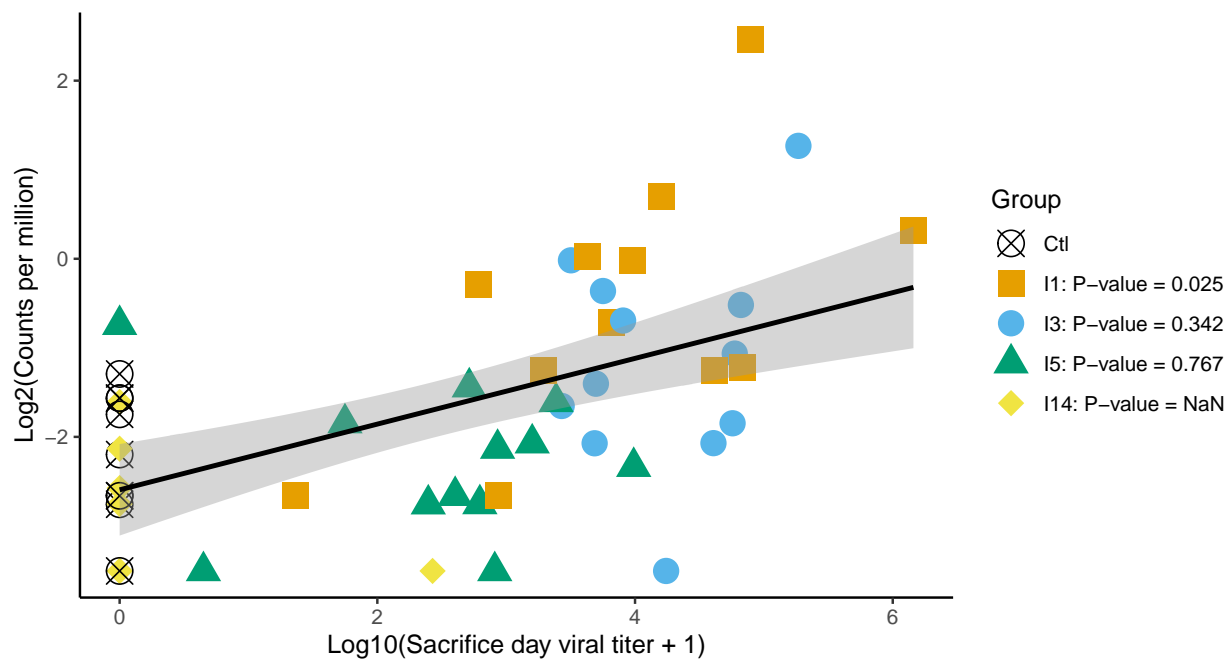
IFM5_HUMAN – DN718_c0_g1

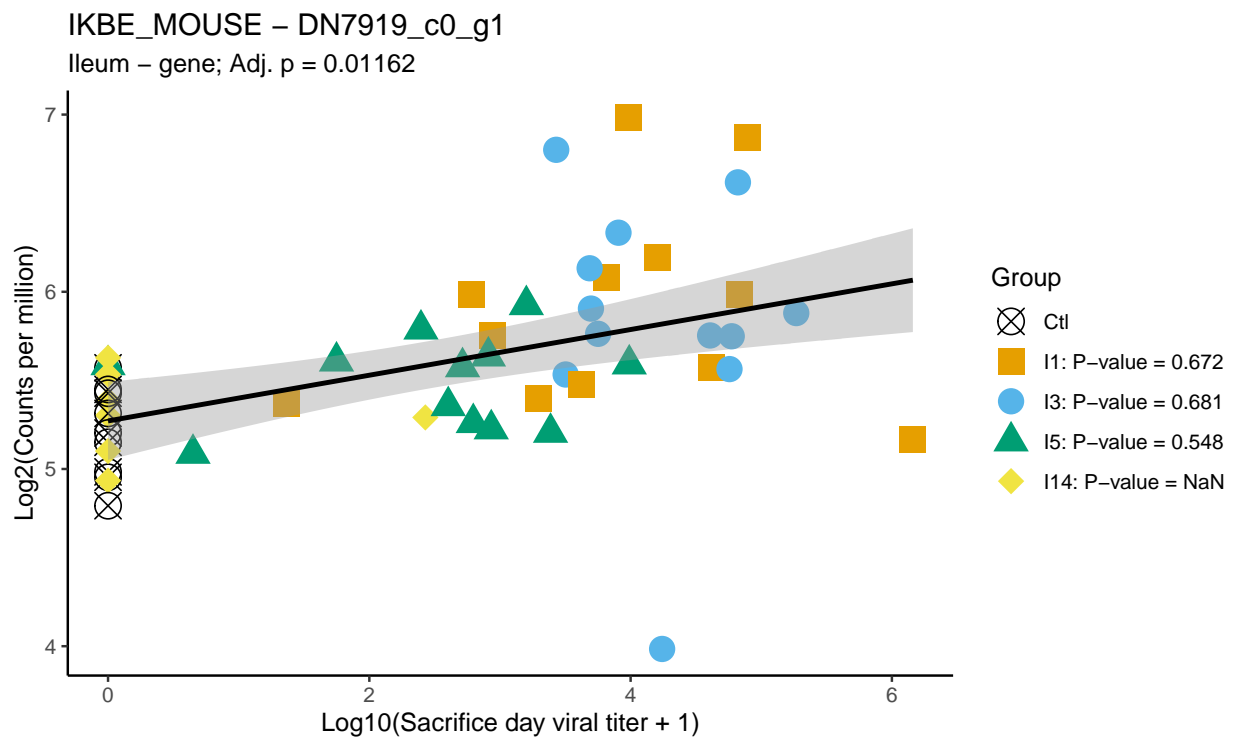
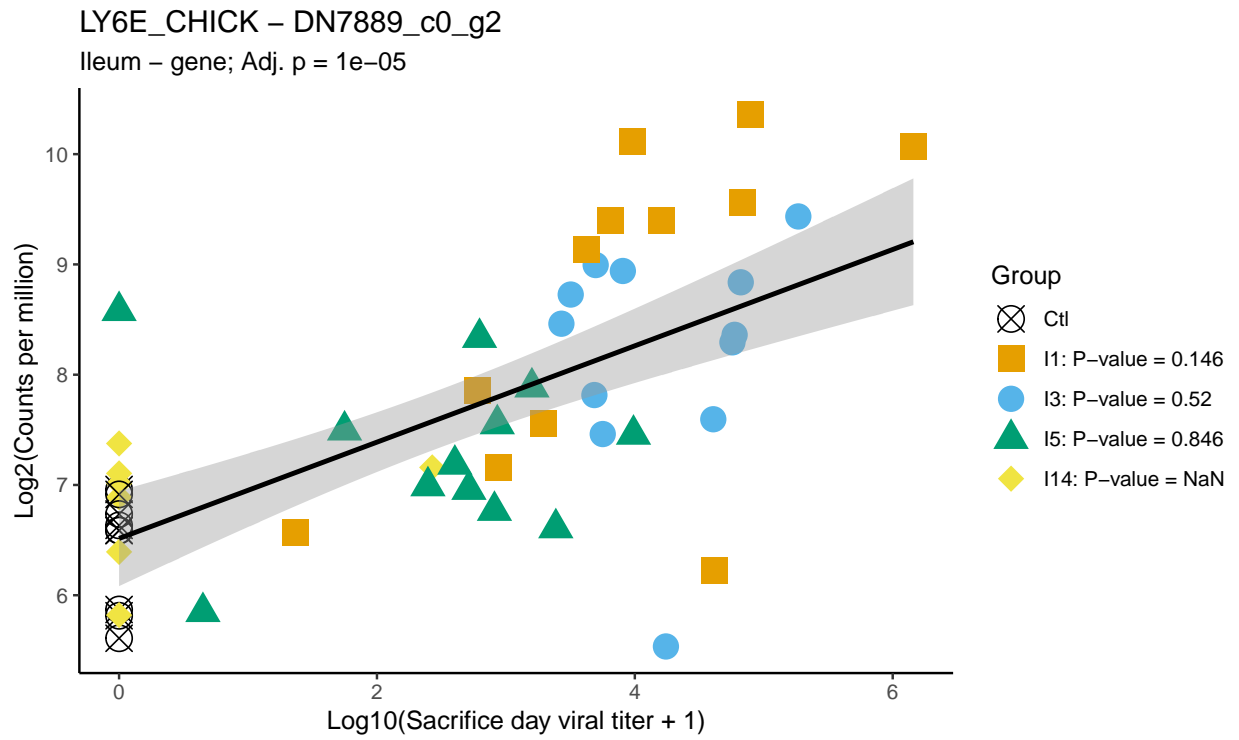
Ileum – gene; Adj. p = 0.00132

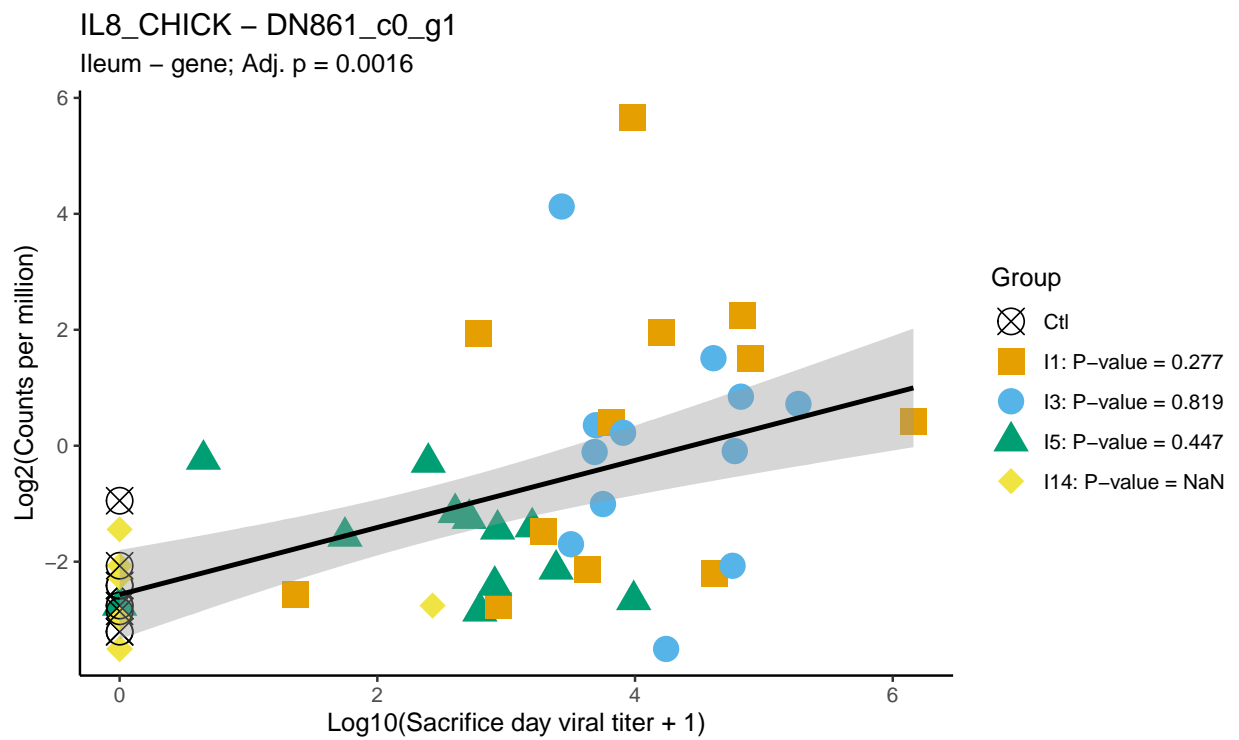
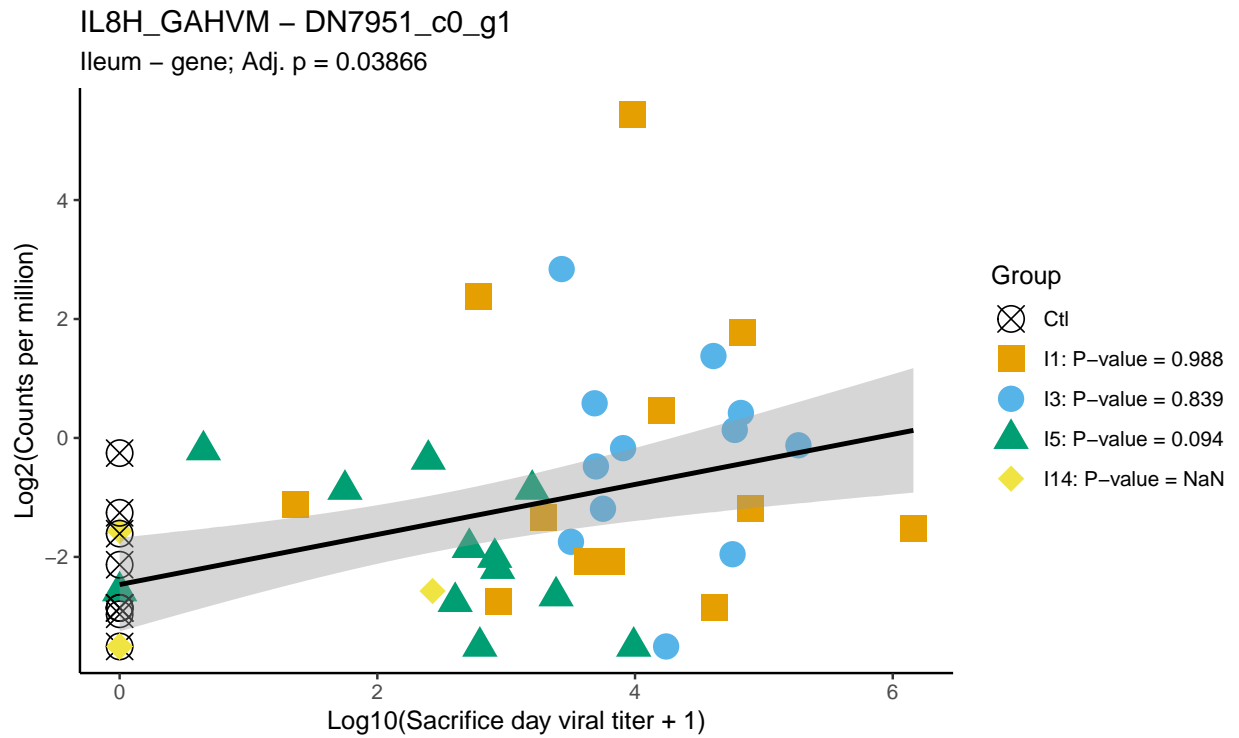


LY6E_CHICK – DN7889_c0_g1

Ileum – gene; Adj. p = 0.00304

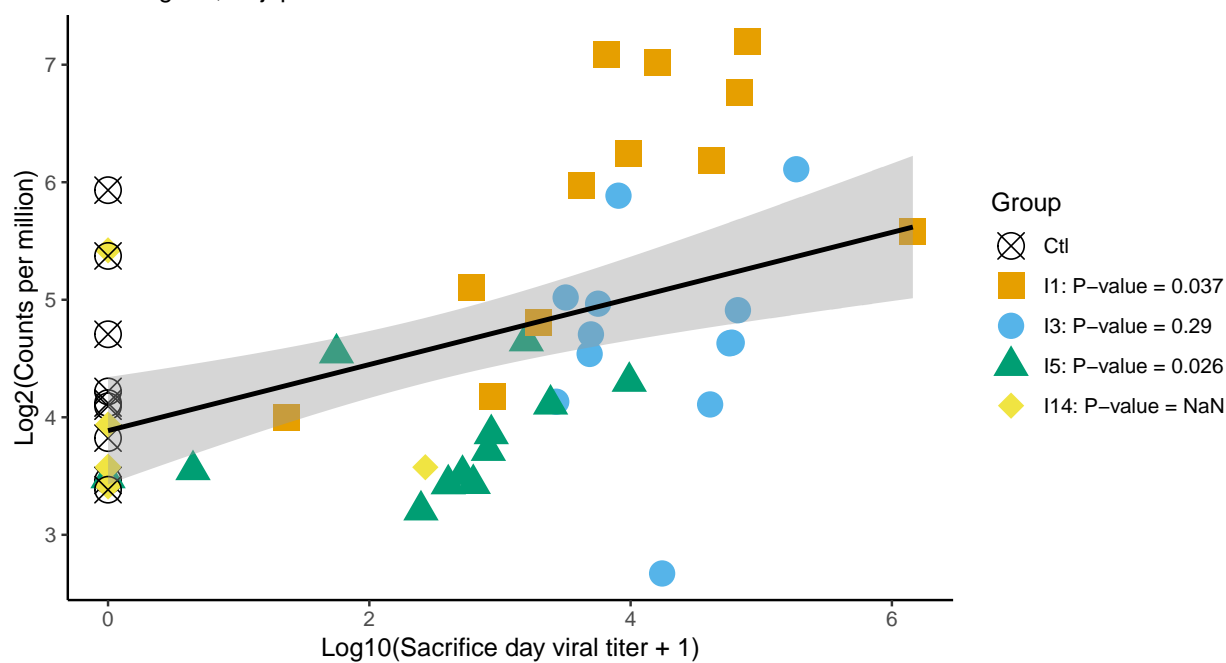






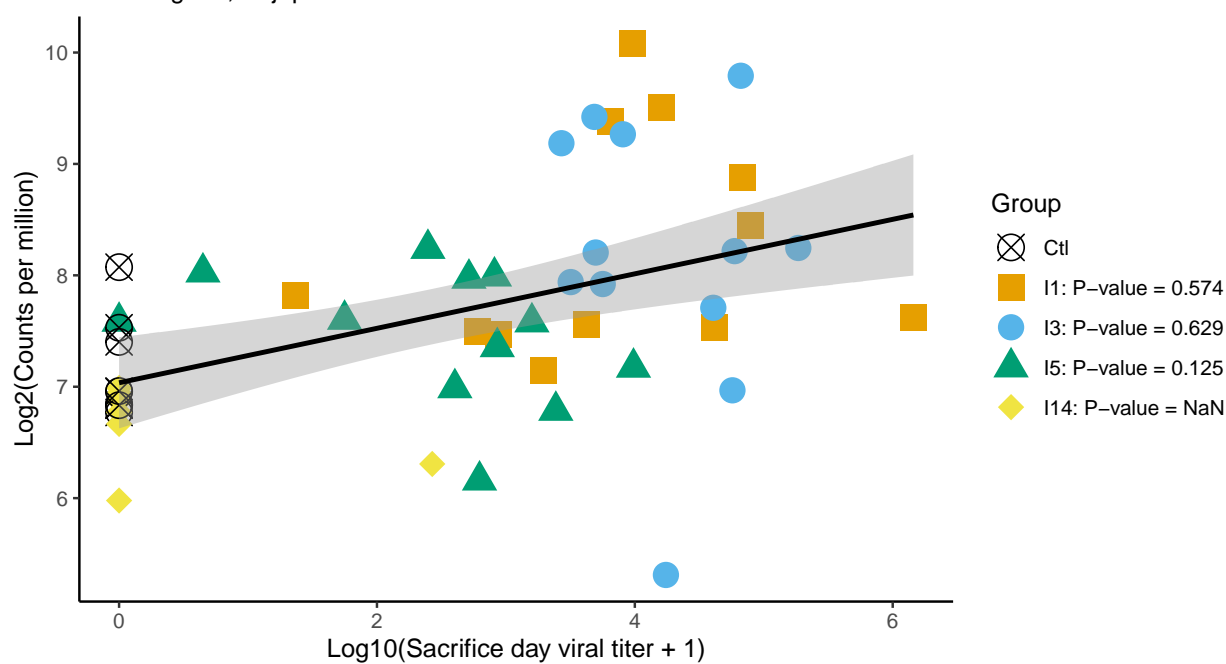
E2AK2_HUMAN – DN876_c0_g1

Ileum – gene; Adj. p = 0.0093



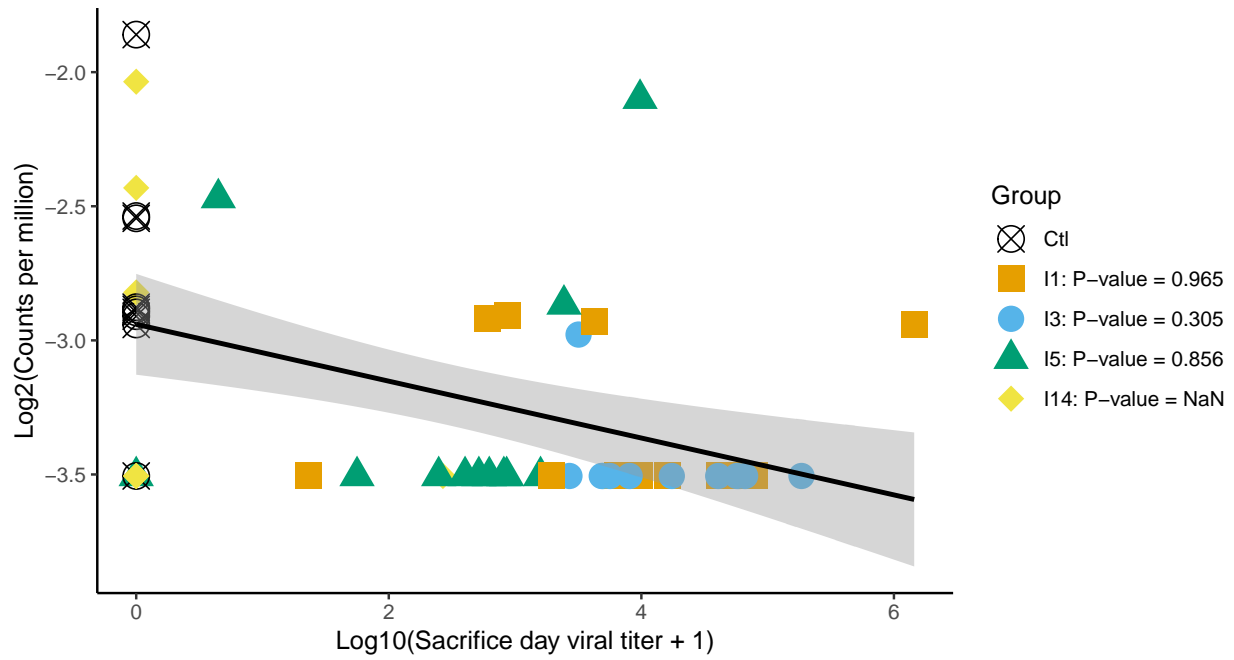
CCL26_CANLF – DN9204_c0_g1

Ileum – gene; Adj. p = 0.01179



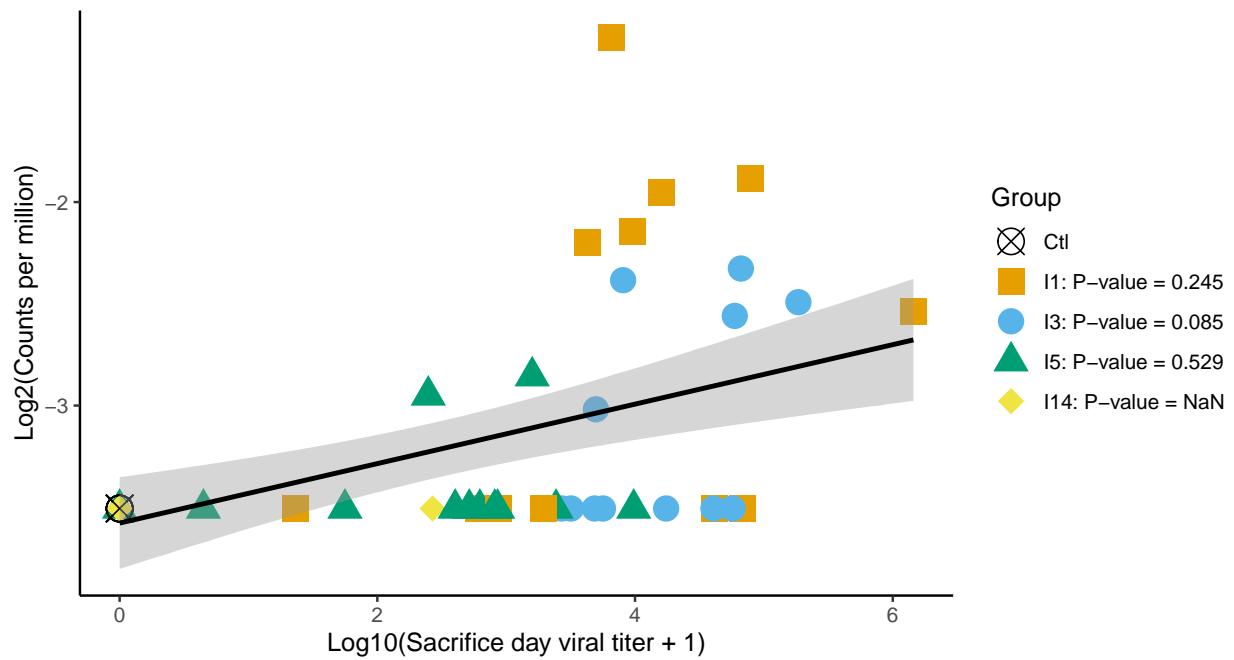
FGFR3_MOUSE – DN100201_c0_g1_i1

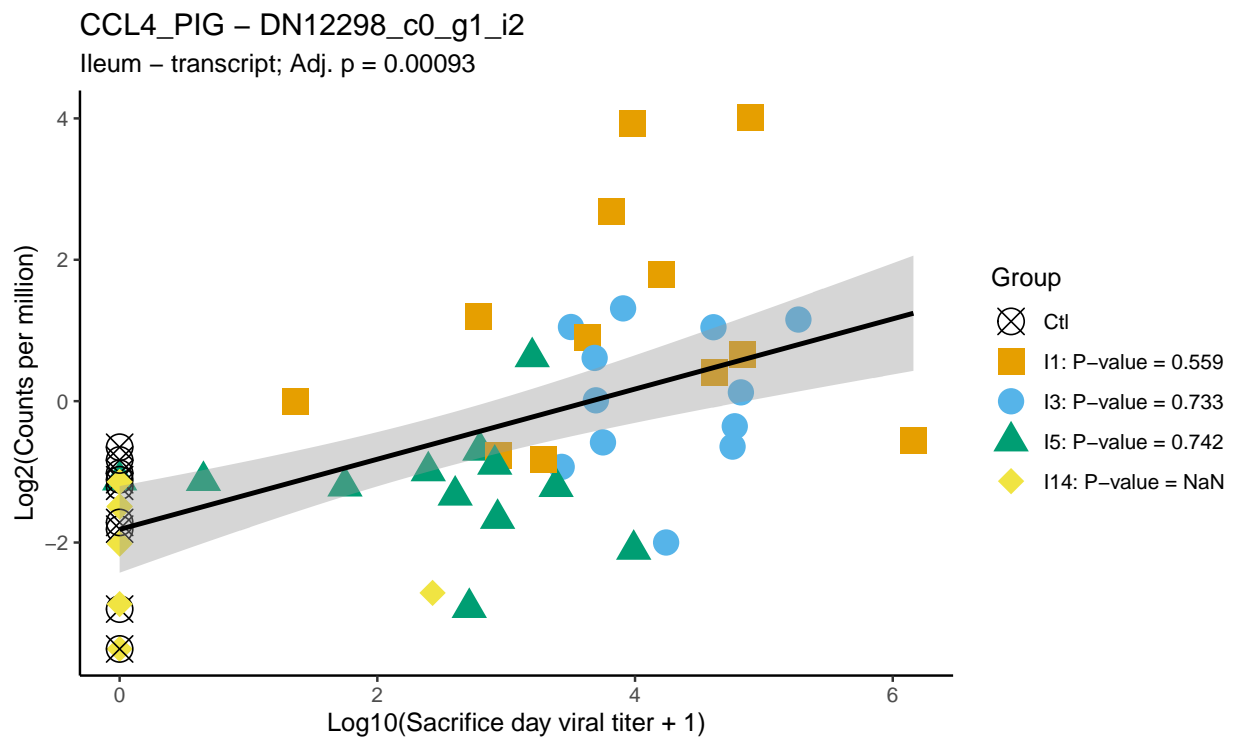
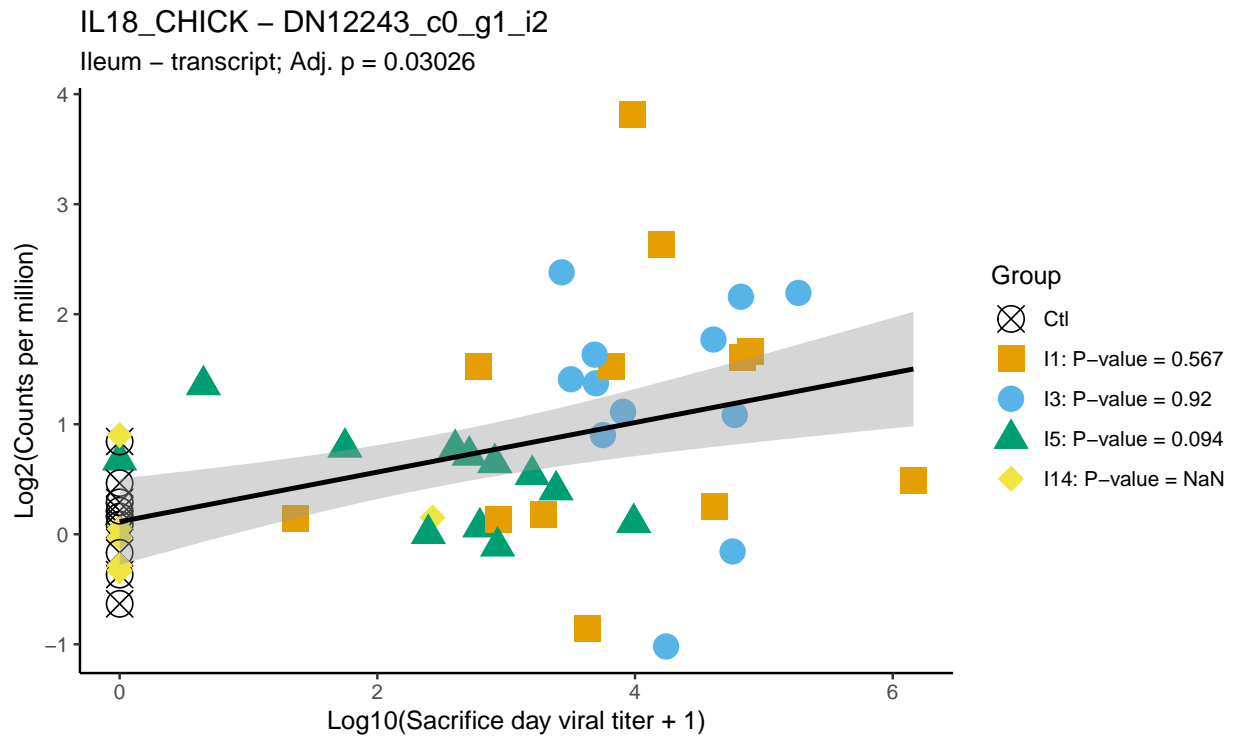
Ileum – transcript; Adj. p = 0.03289



MX_ANAPL – DN110170_c0_g1_i1

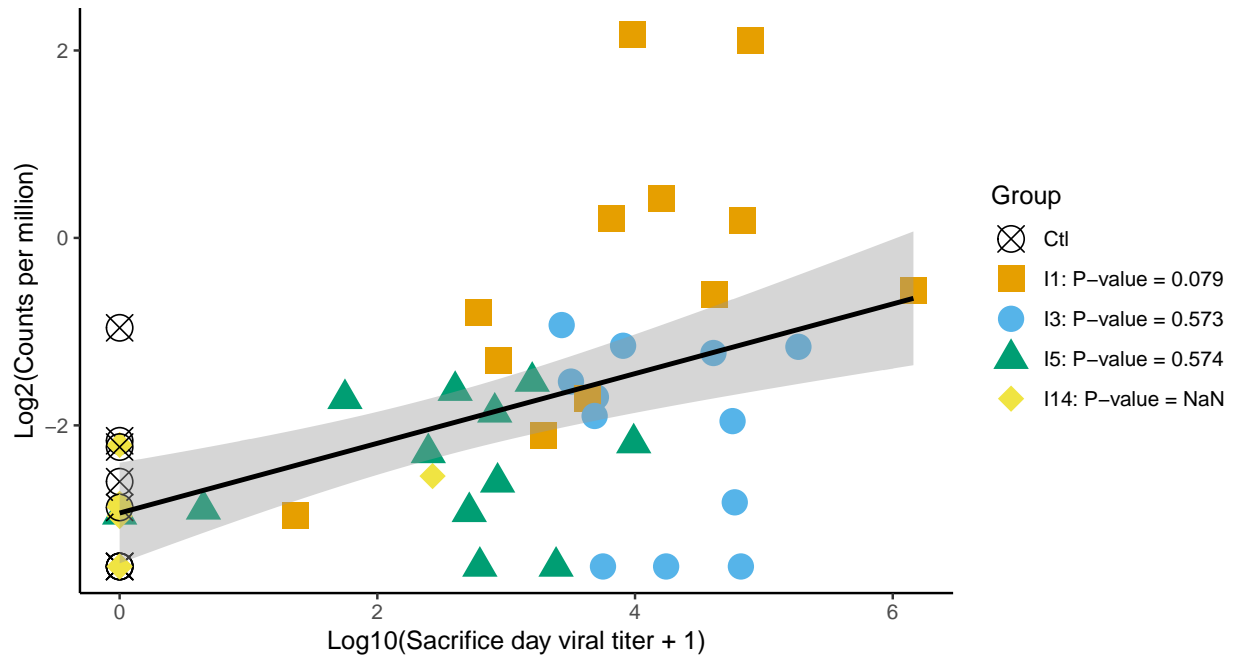
Ileum – transcript; Adj. p = 0.0107





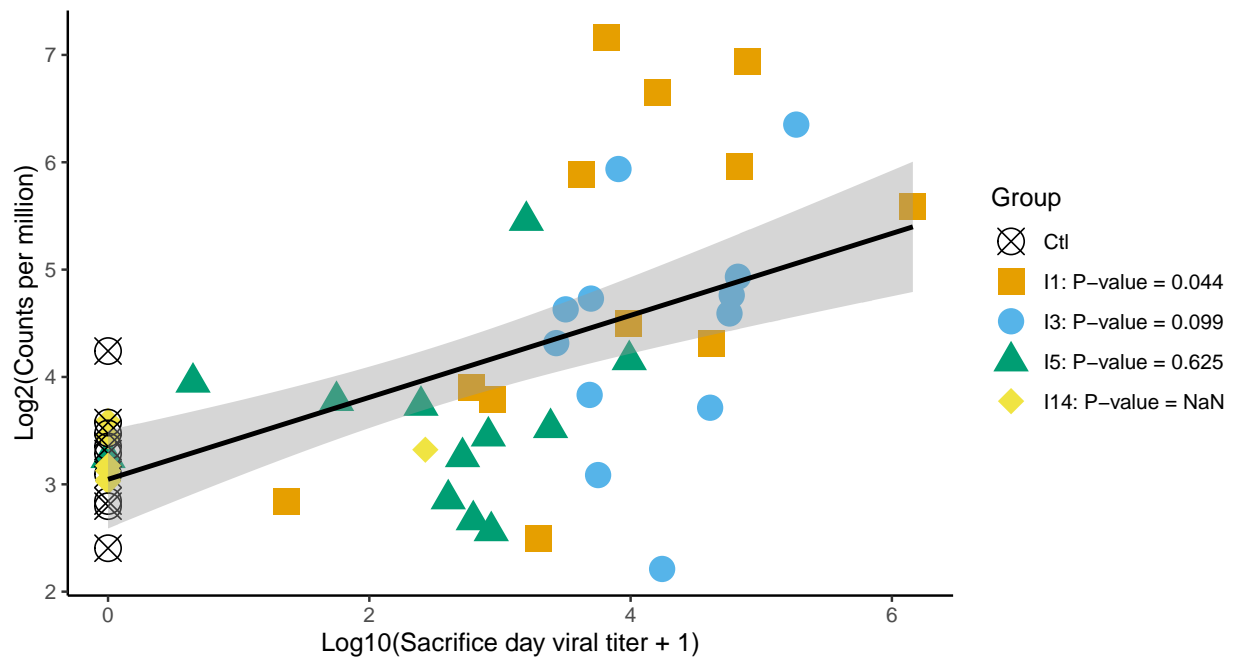
CCL13_HUMAN – DN13412_c0_g1_i3

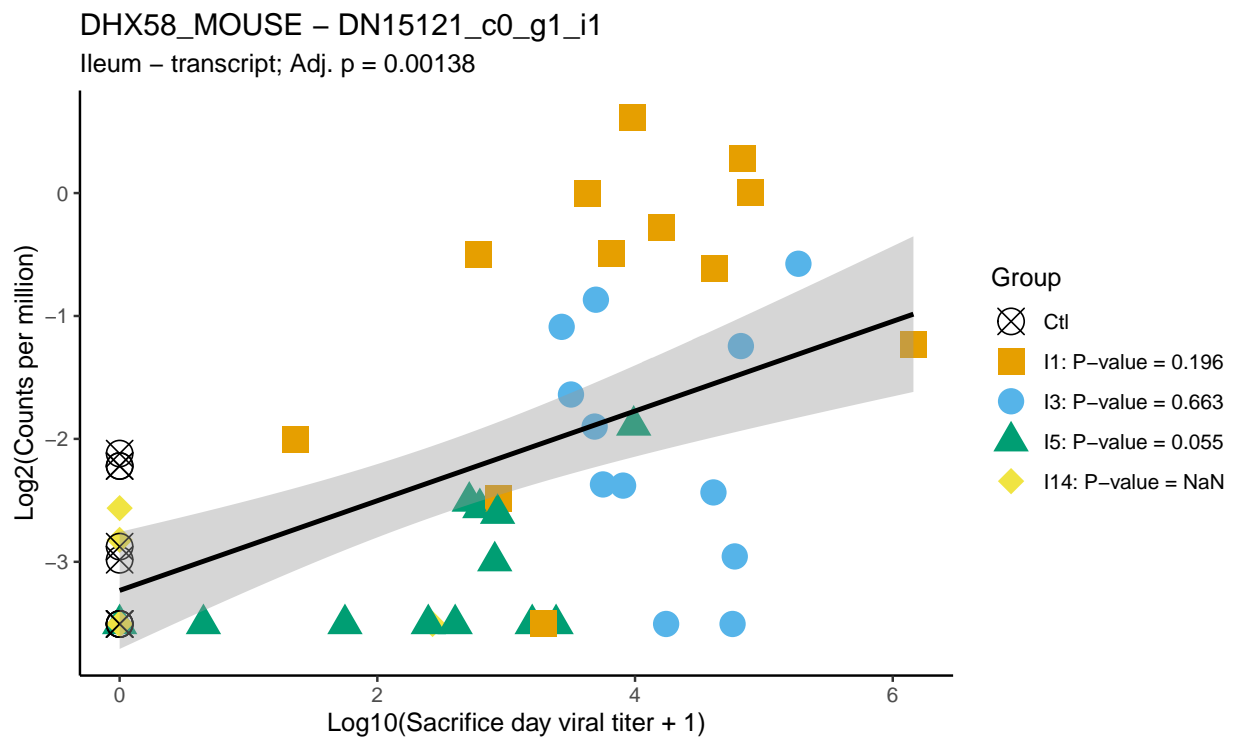
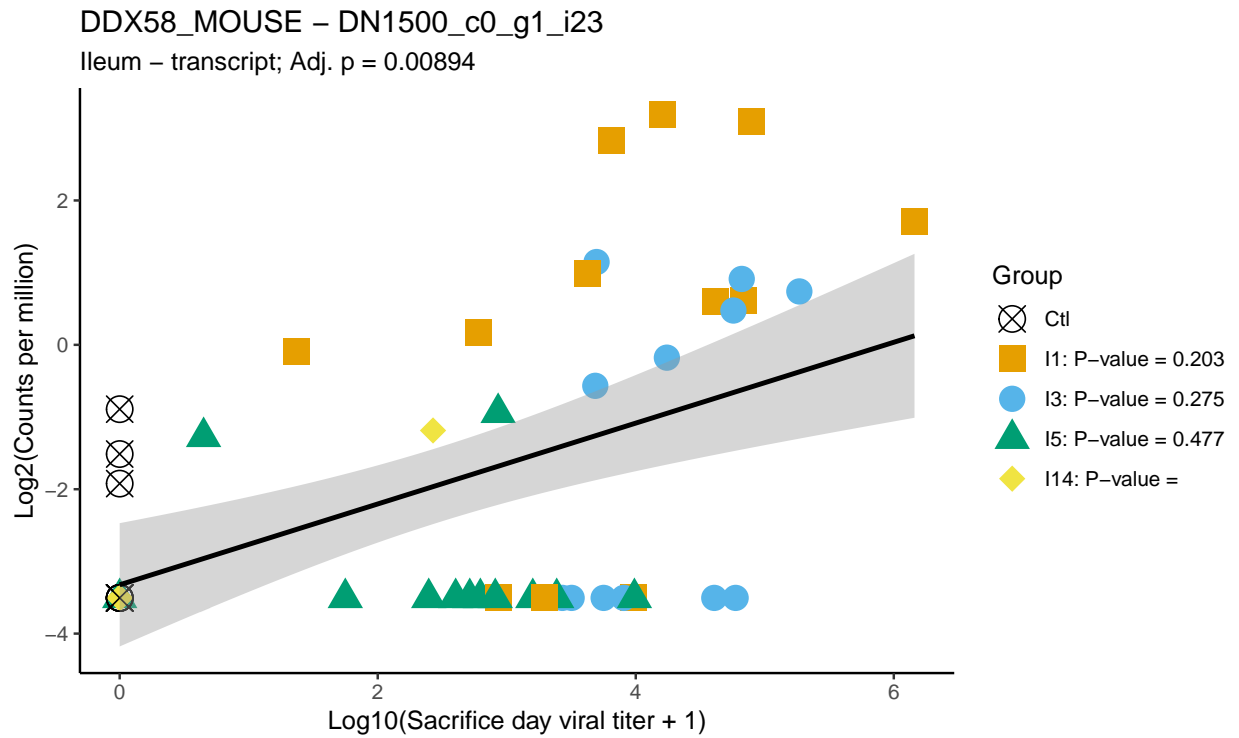
Ileum – transcript; Adj. p = 0.00894



DDX58_HUMAN – DN1500_c0_g1_i13

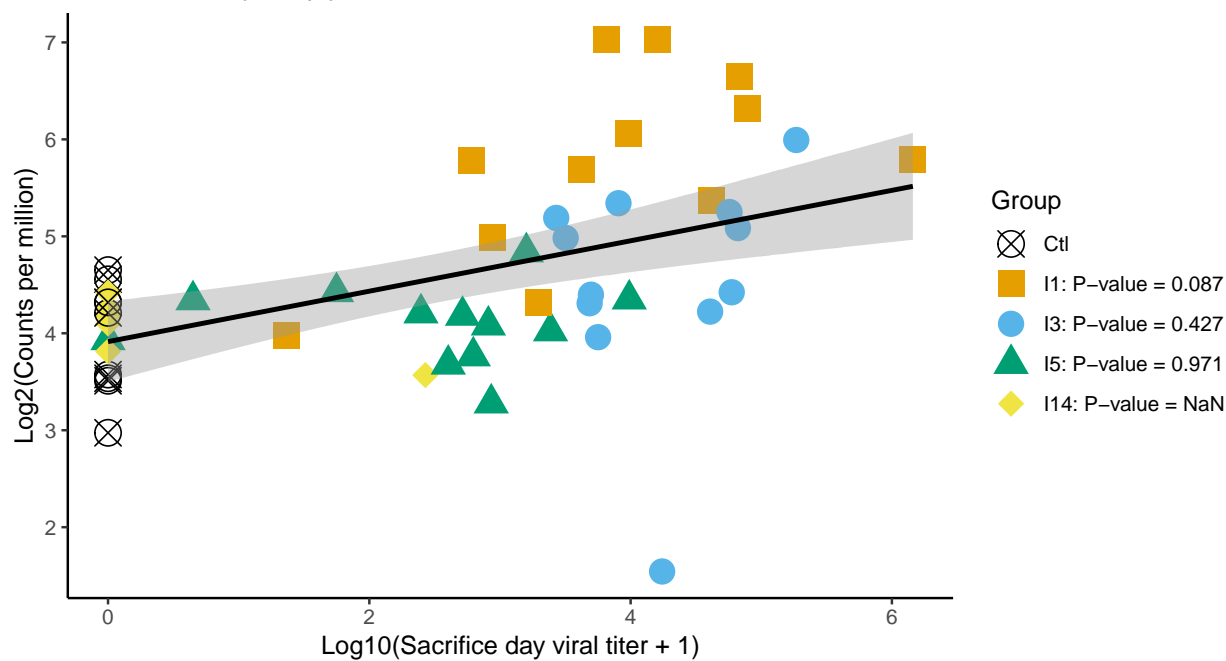
Ileum – transcript; Adj. p = 7e-05





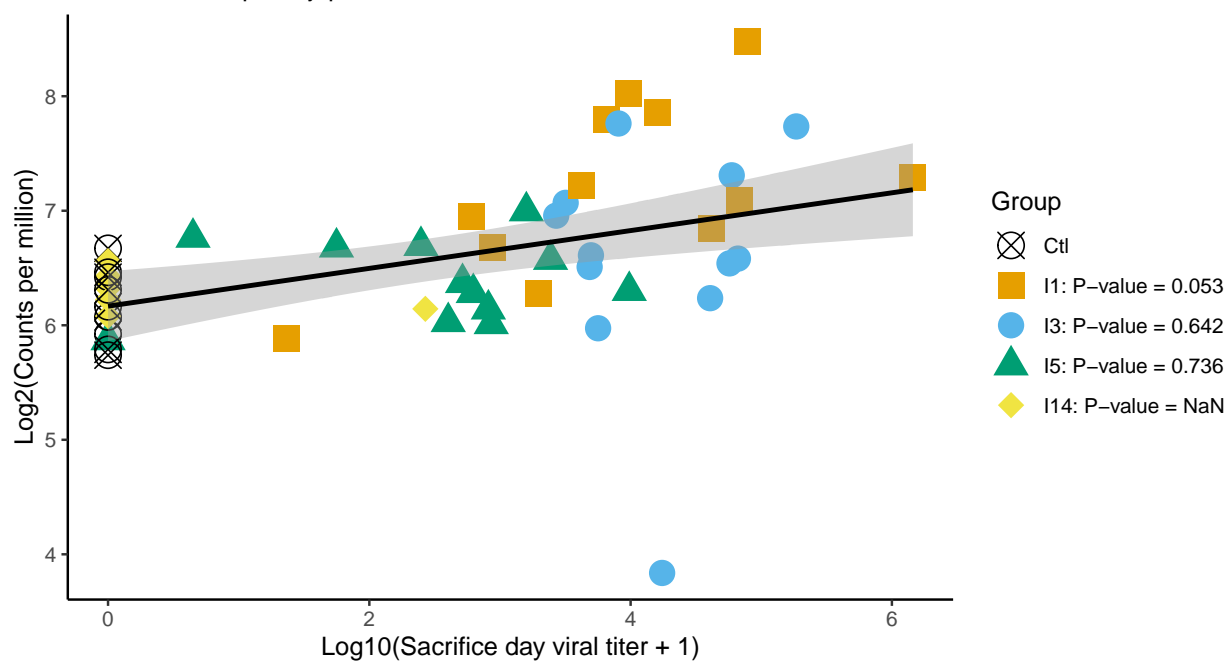
PARP9_HUMAN – DN161_c0_g1_i6

Ileum – transcript; Adj. p = 0.00859



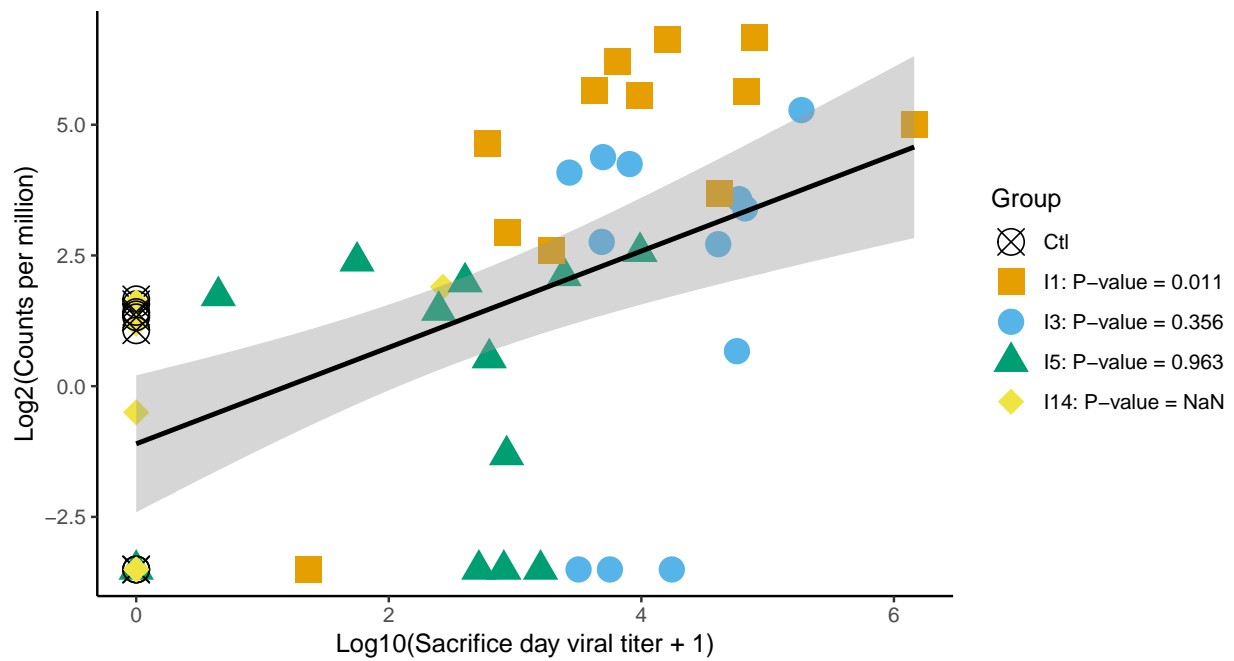
IRF1_CHICK – DN1634_c0_g1_i9

Ileum – transcript; Adj. p = 0.02061



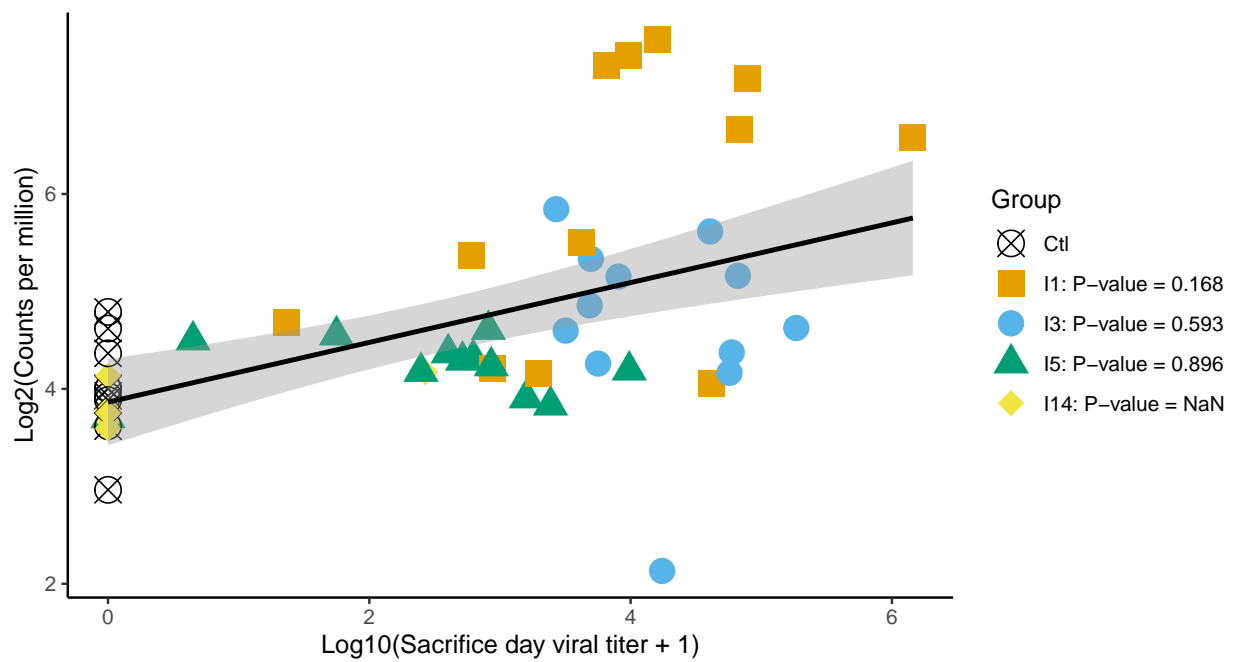
DHX58_HUMAN – DN164_c3_g1_i7

Ileum – transcript; Adj. p = 0.0032



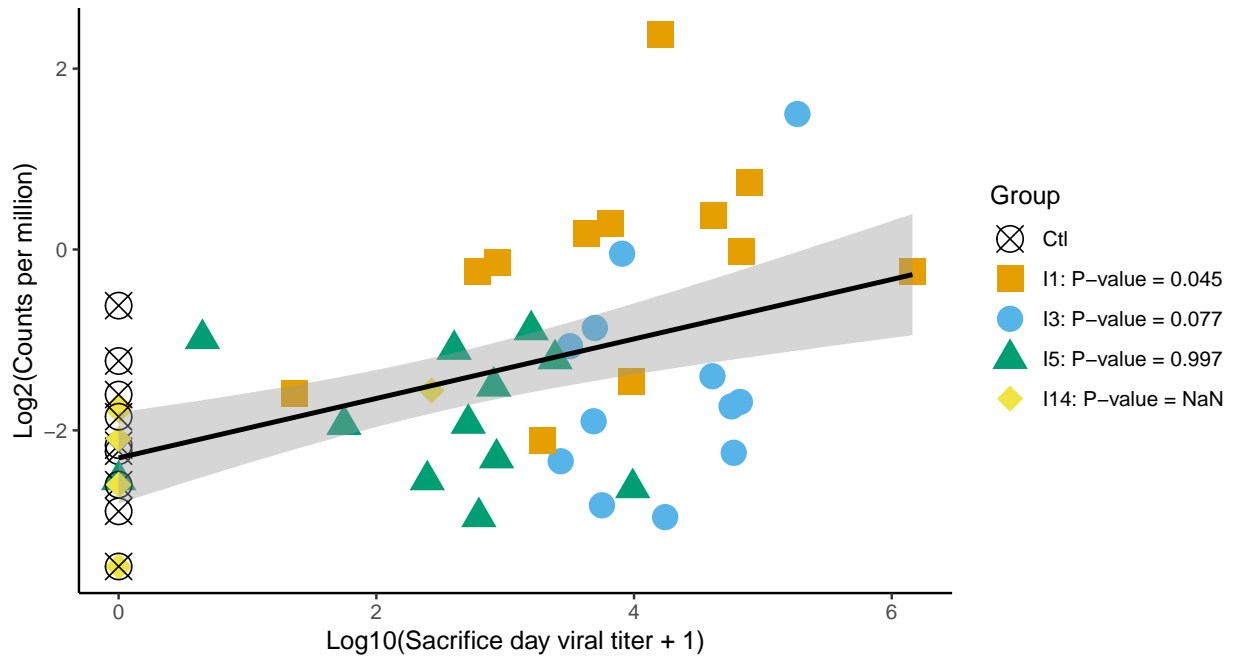
IFM5_HUMAN – DN16598_c0_g1_i1

Ileum – transcript; Adj. p = 0.00859



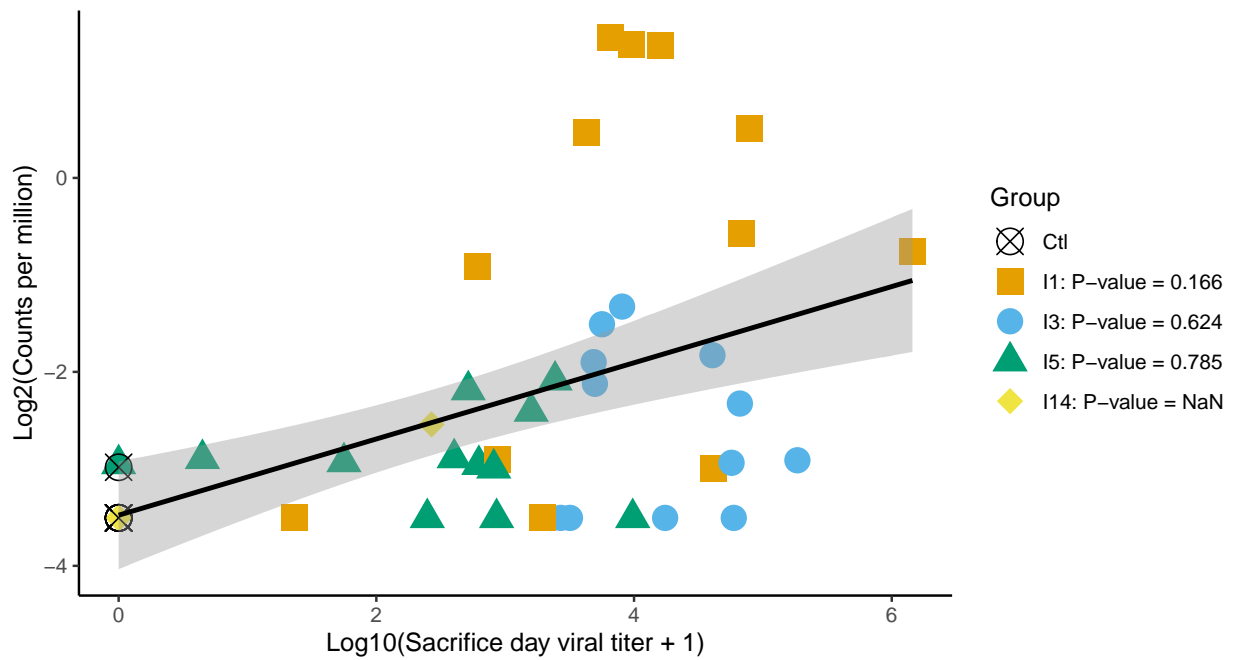
CCL4_PIG – DN17675_c0_g2_i1

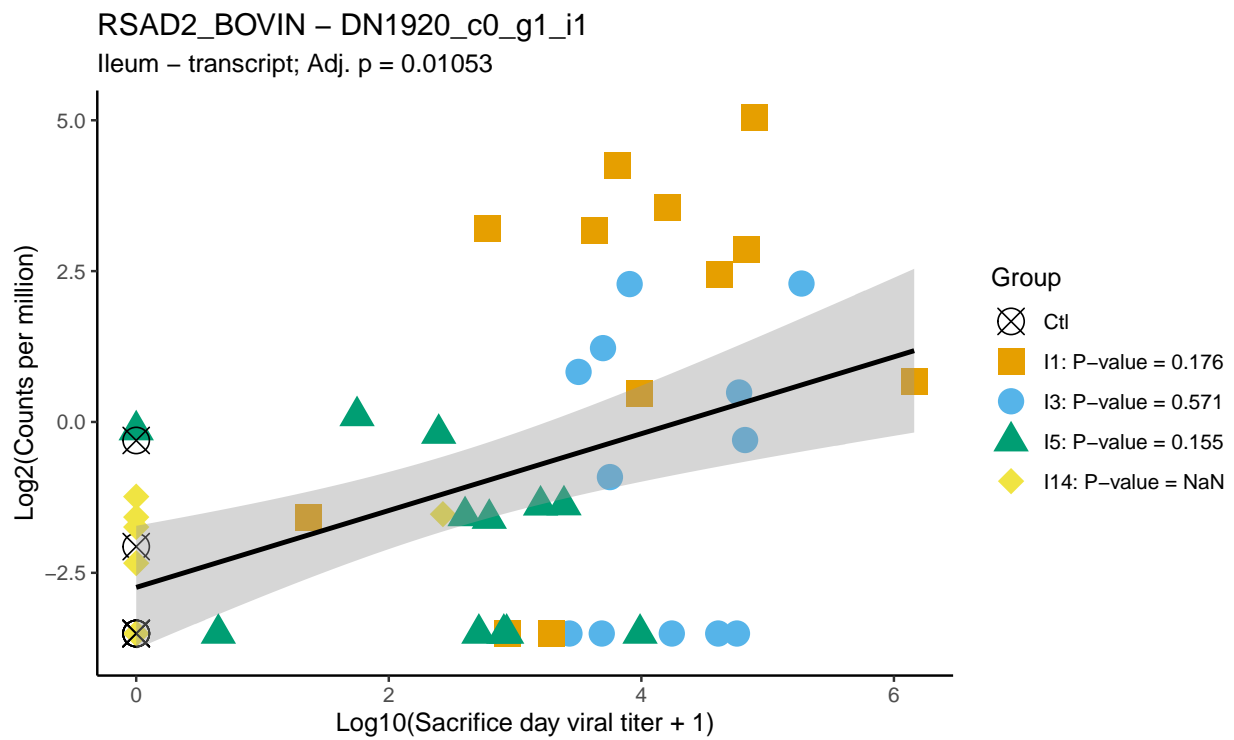
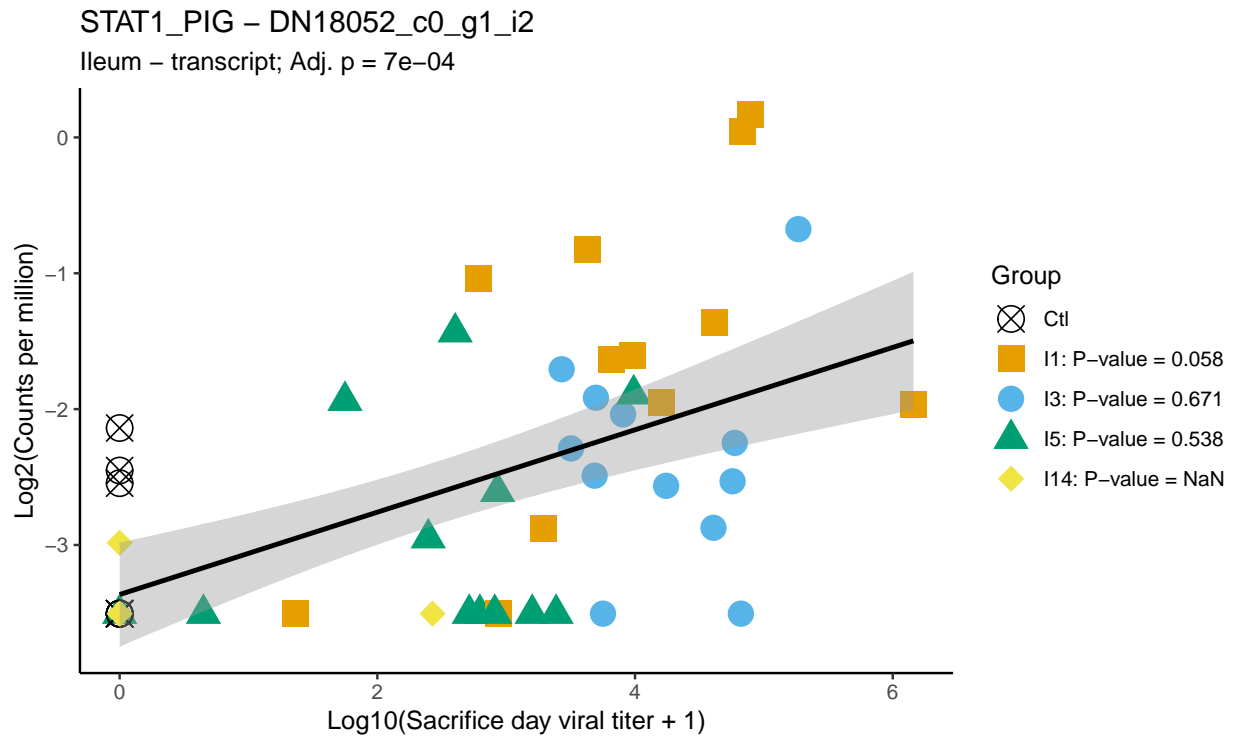
Ileum – transcript; Adj. p = 0.0132



IFNA2_HORSE – DN178217_c0_g1_i1

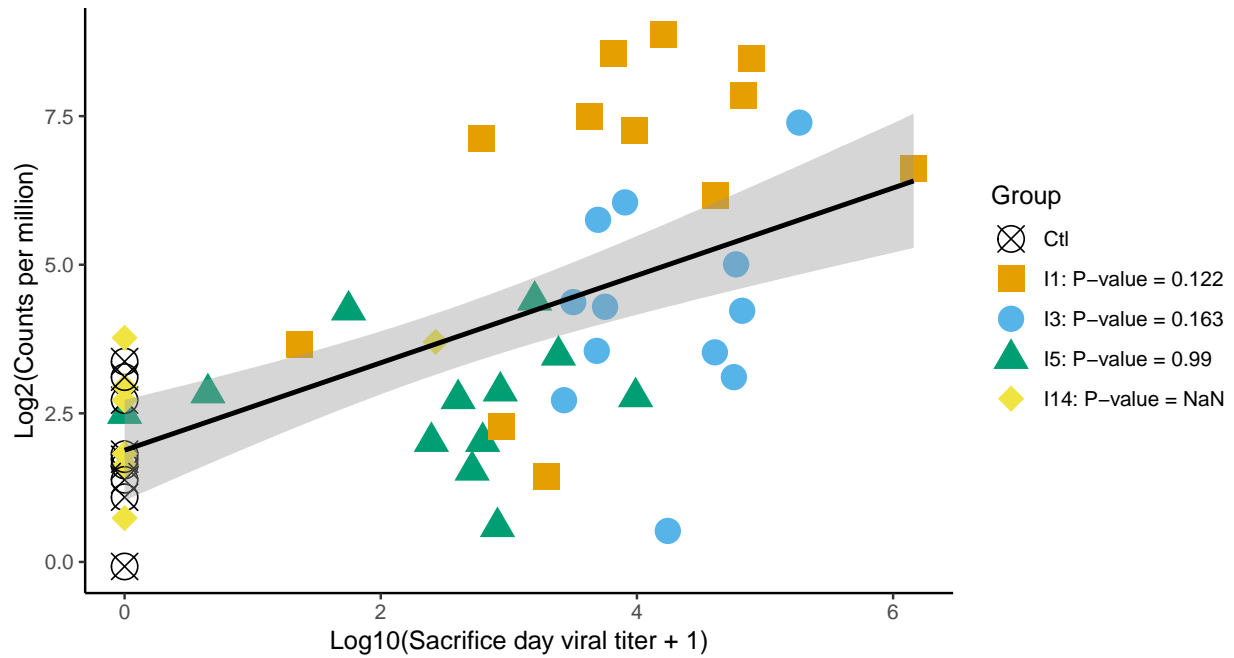
Ileum – transcript; Adj. p = 0.006





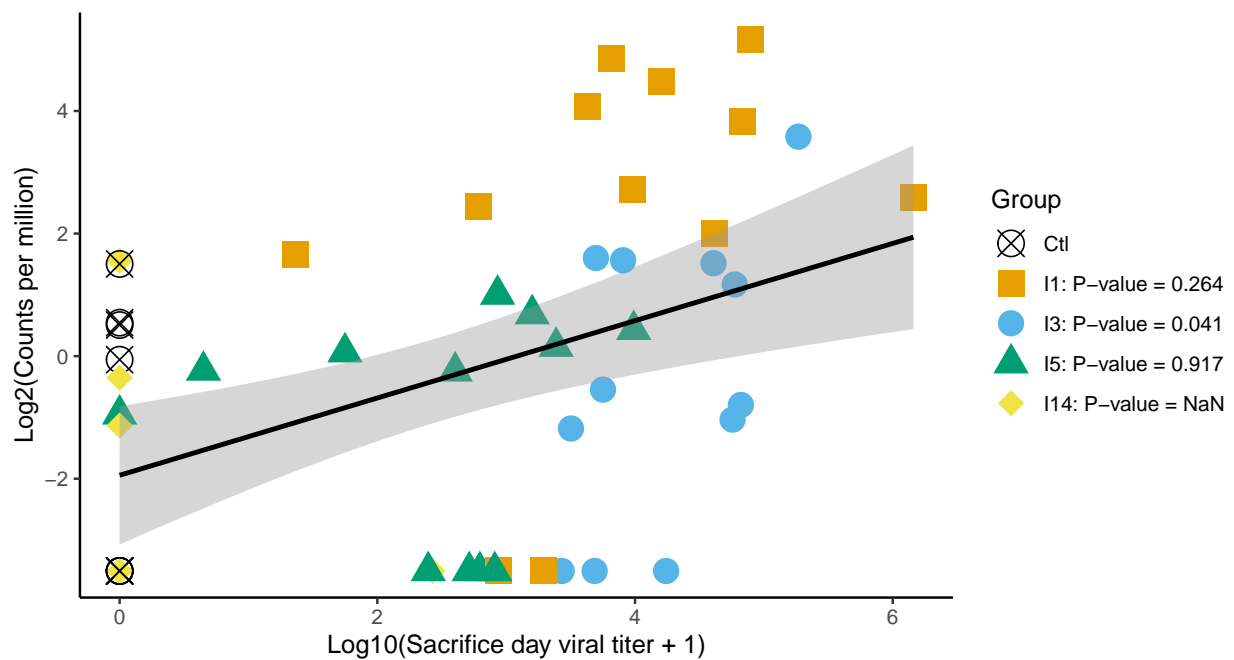
RSAD2_PIG – DN1920_c0_g1_i11

Ileum – transcript; Adj. p = 3e-05



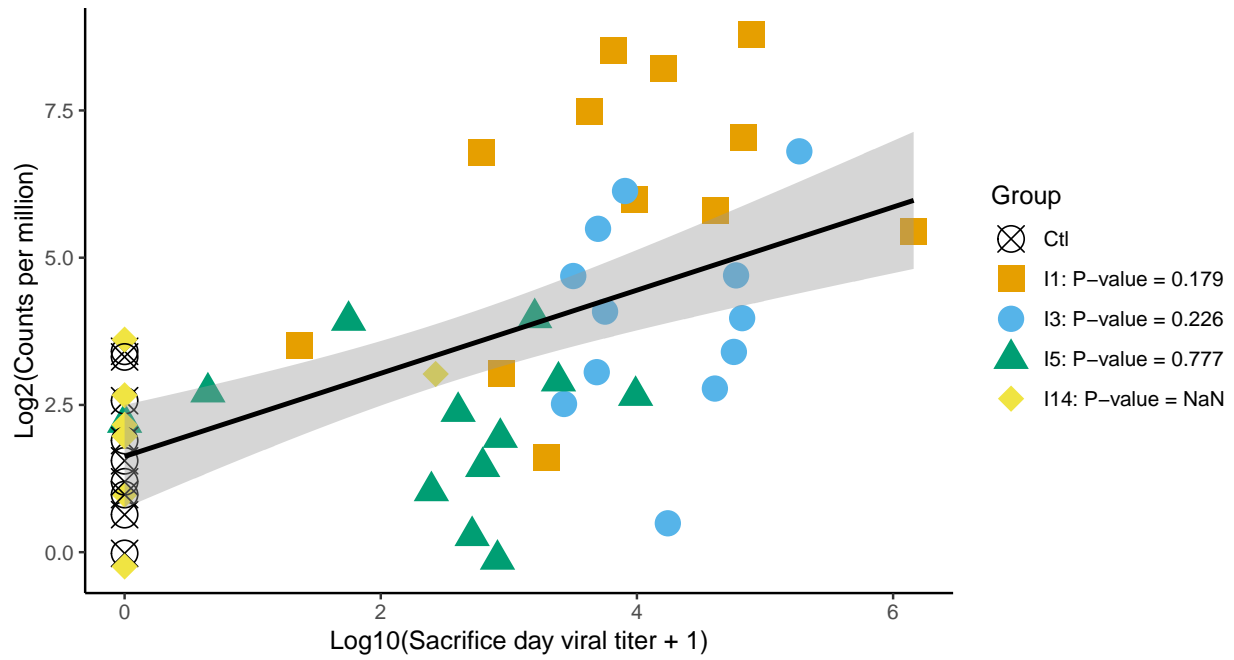
RSAD2_BOVIN – DN1920_c0_g1_i6

Ileum – transcript; Adj. p = 0.03006



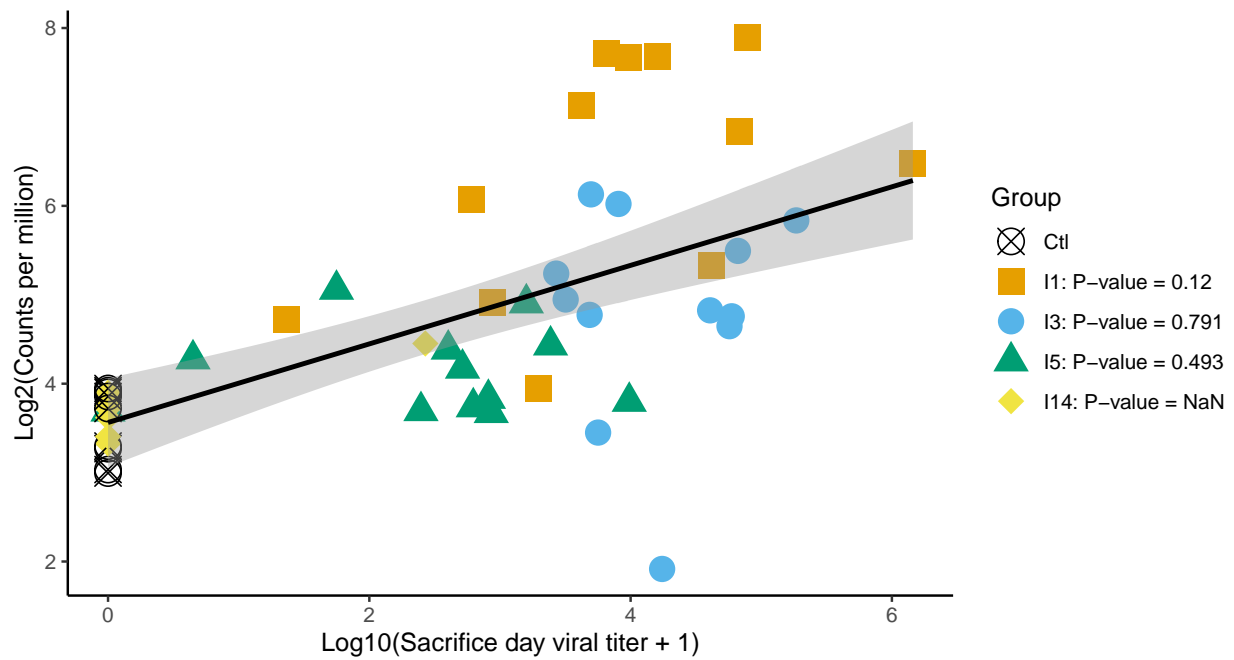
RSAD2_BOVIN – DN1920_c0_g1_i9

Ileum – transcript; Adj. p = 8e-05



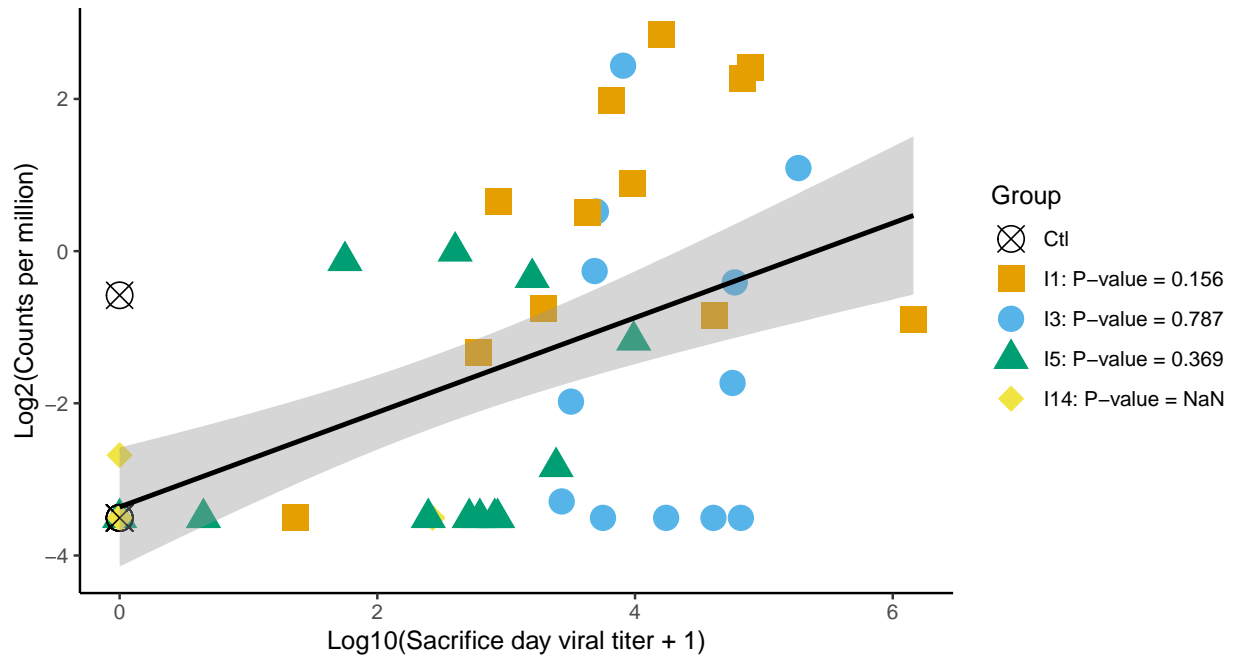
IRF3_CHICK – DN1934_c0_g1_i11

Ileum – transcript; Adj. p = 5e-05



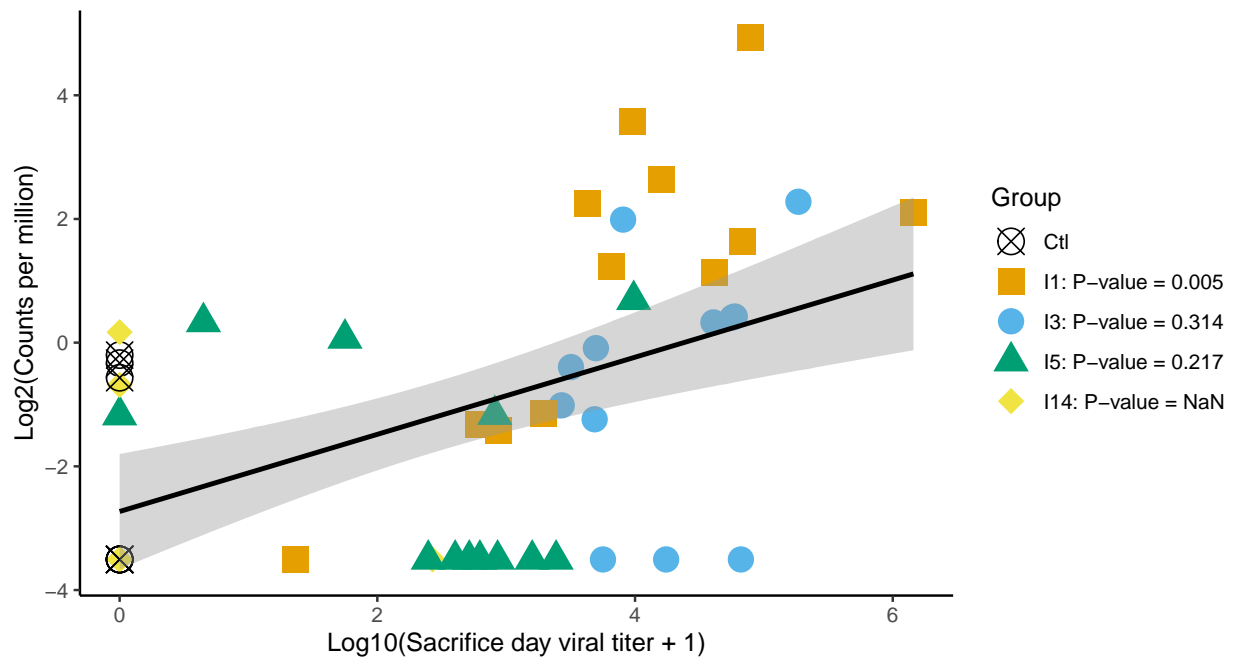
IRF3_CHICK – DN1934_c0_g1_i16

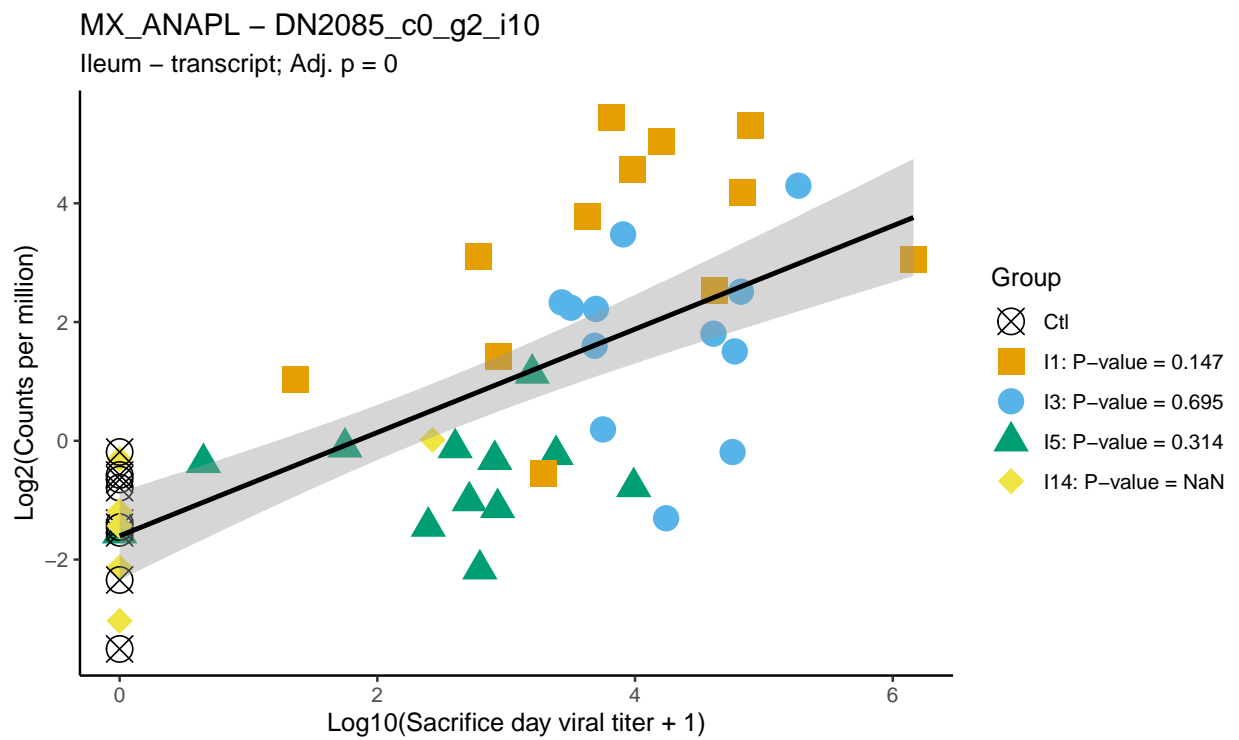
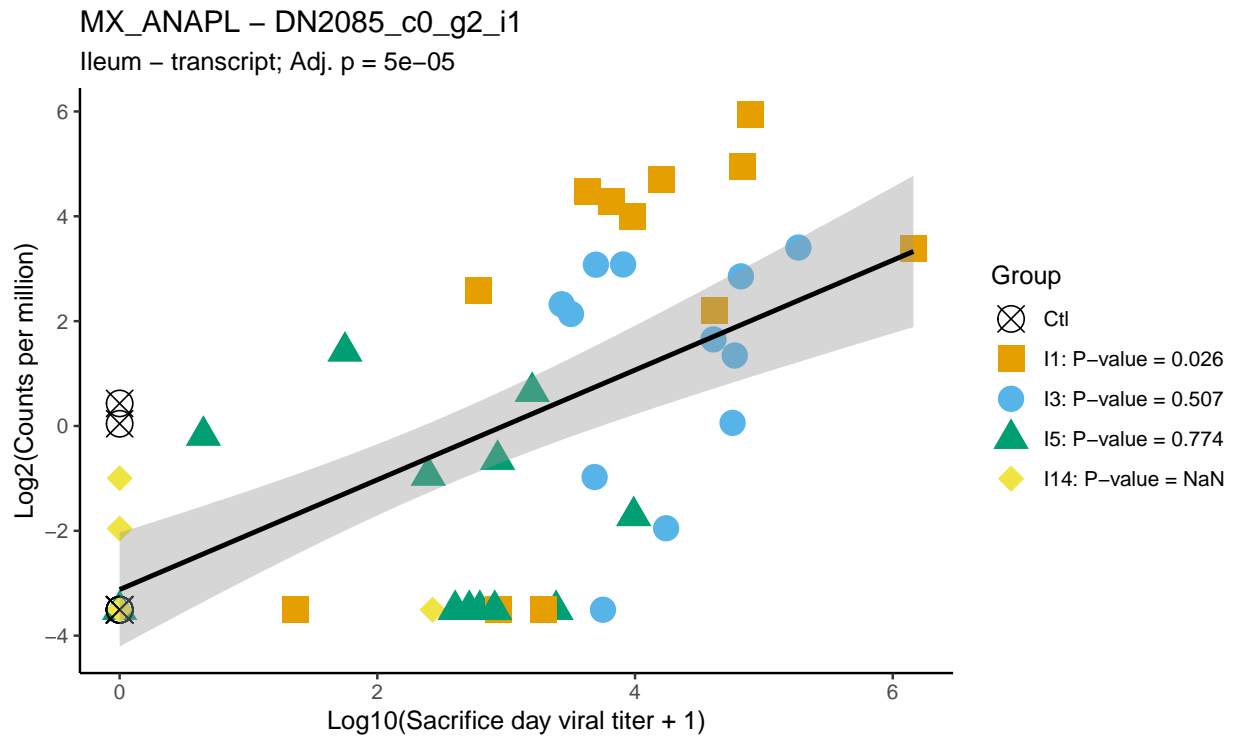
Ileum – transcript; Adj. p = 0.00084

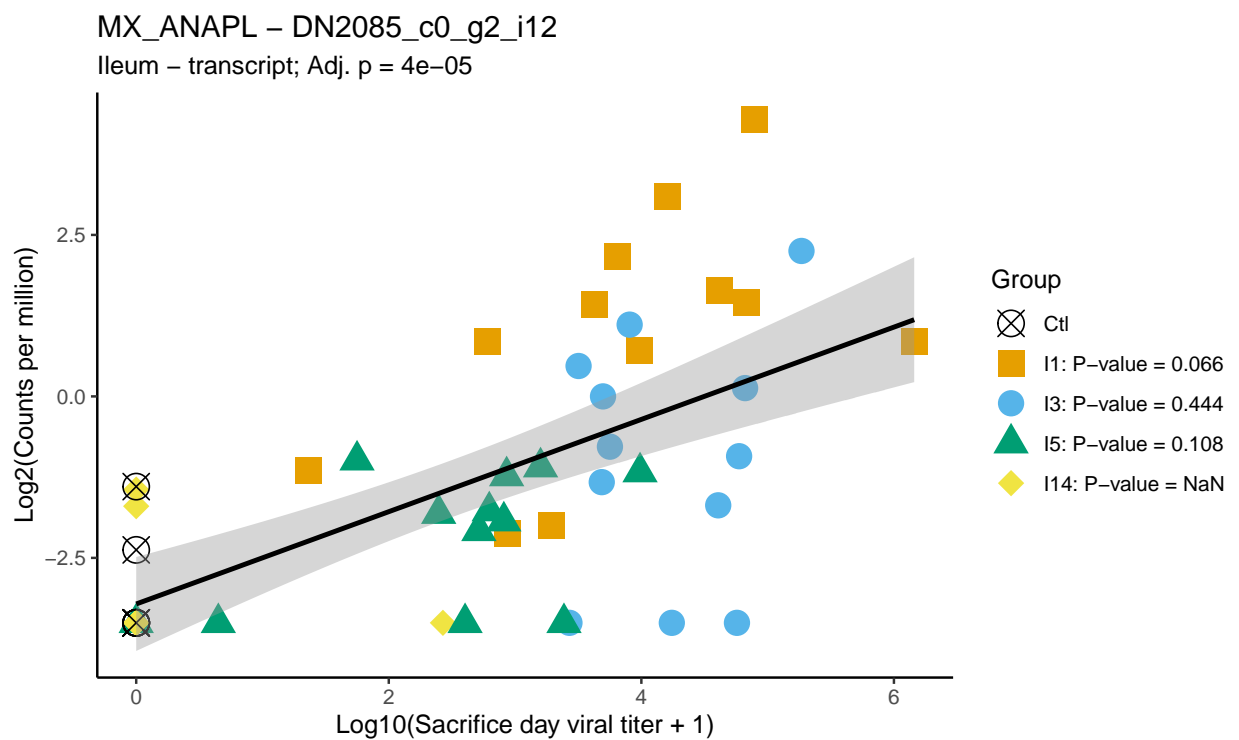
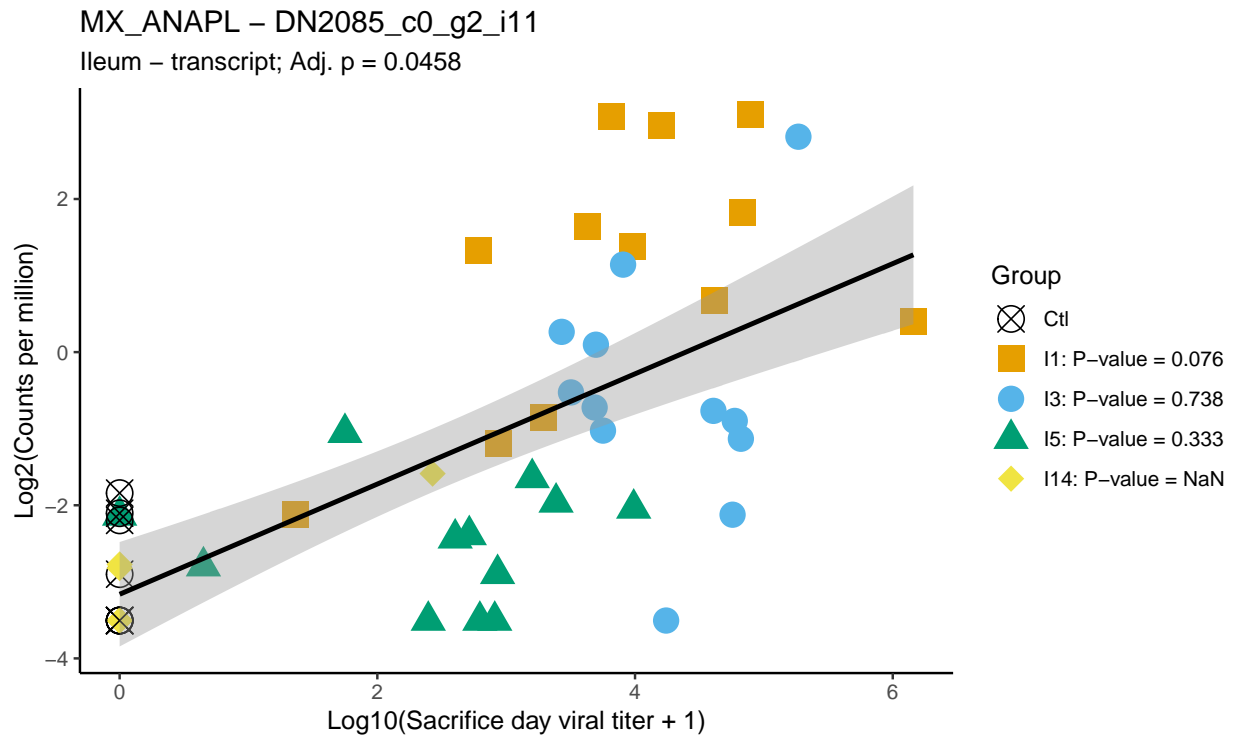


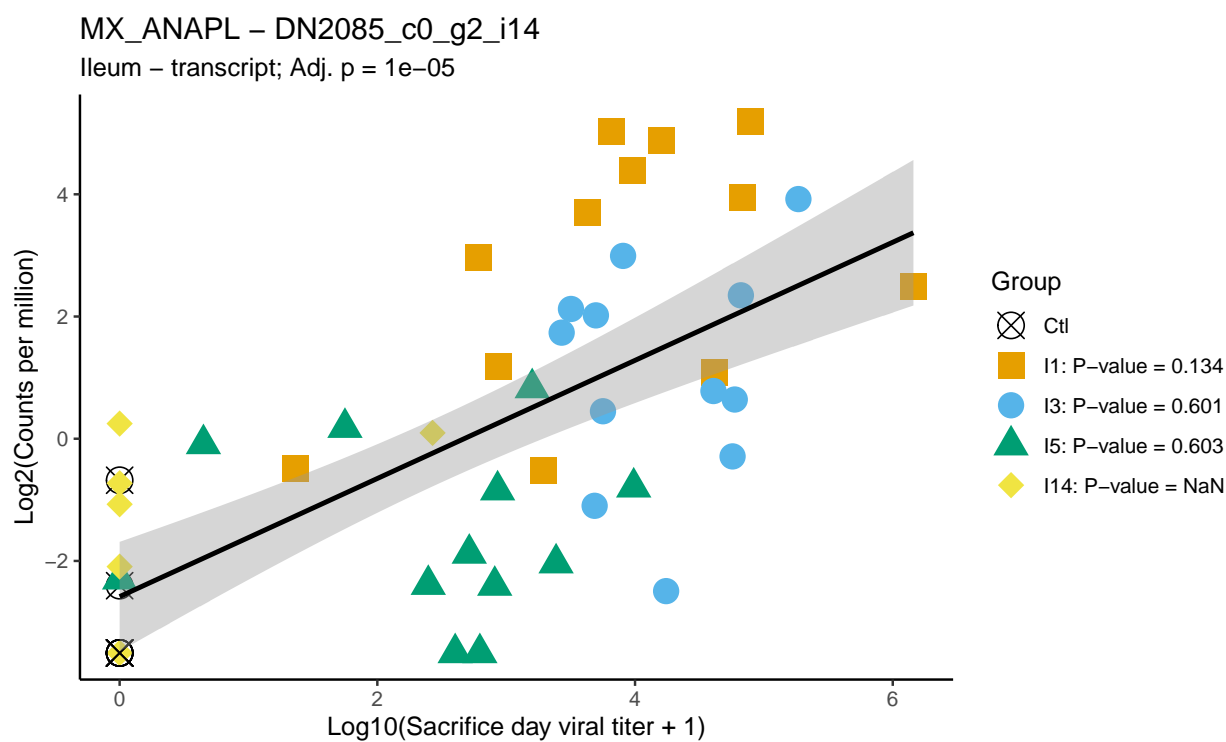
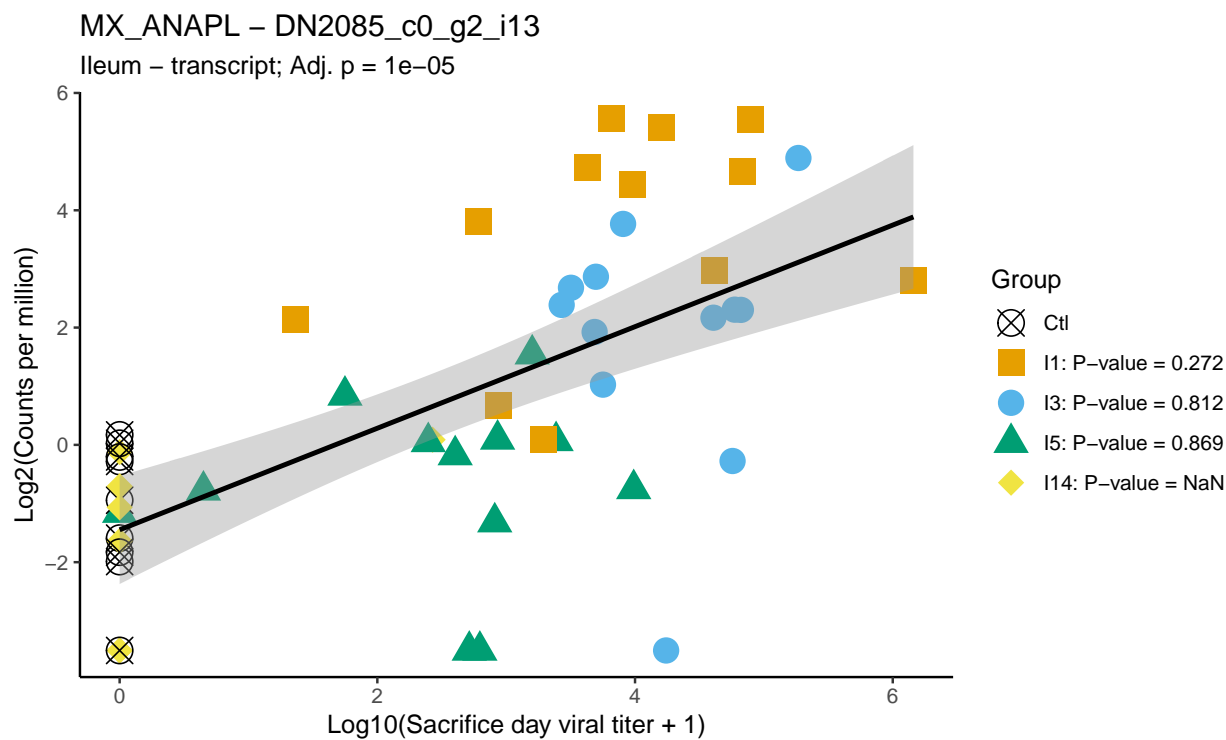
IRF3_CHICK – DN1934_c0_g1_i9

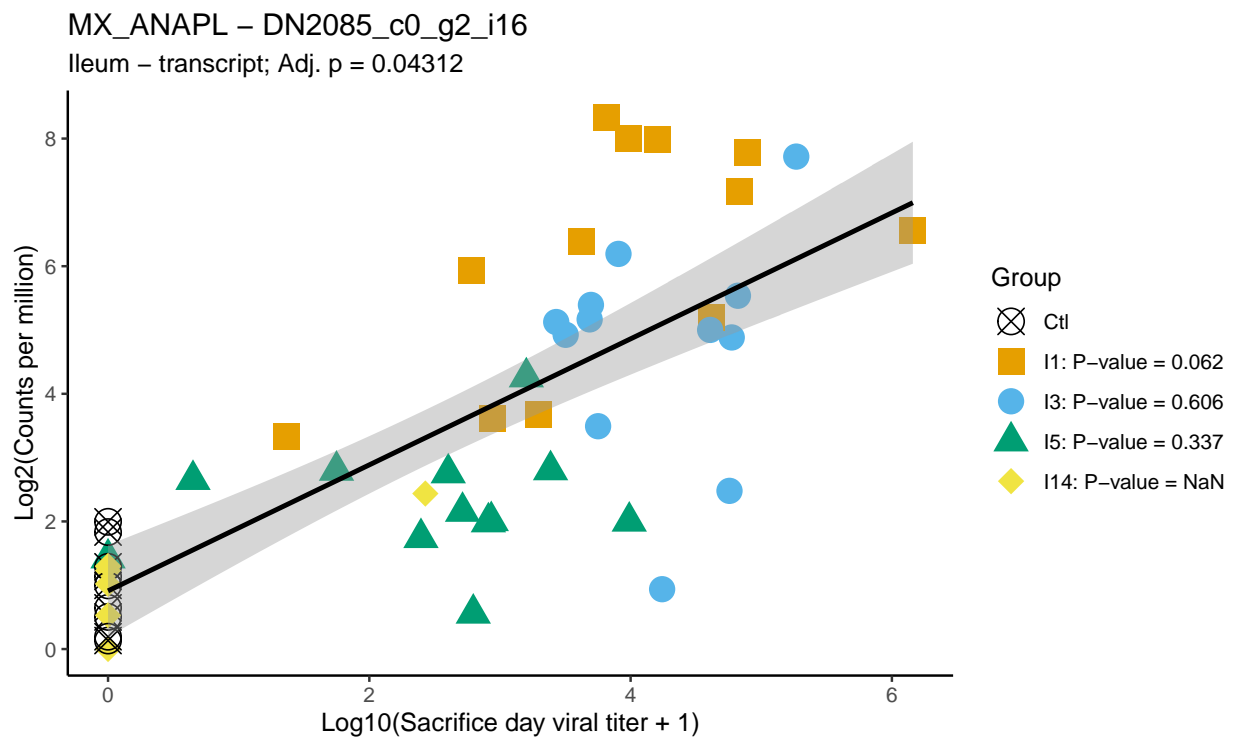
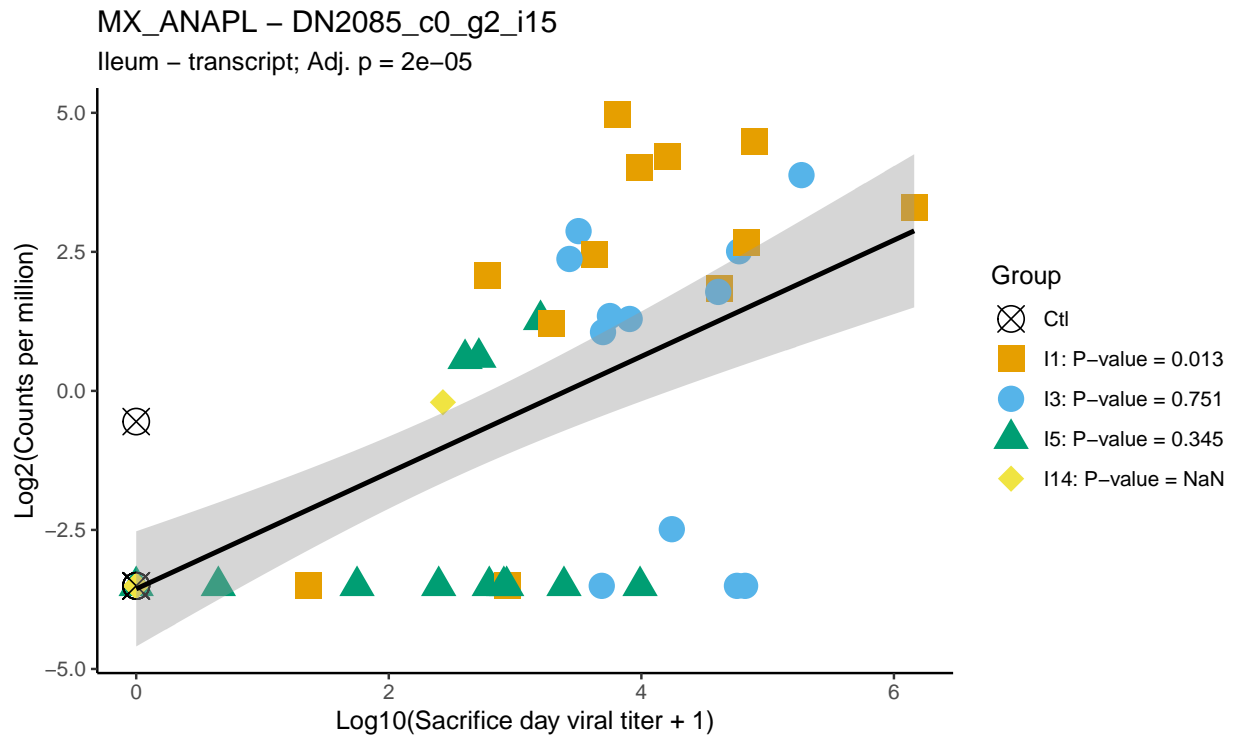
Ileum – transcript; Adj. p = 0.00894

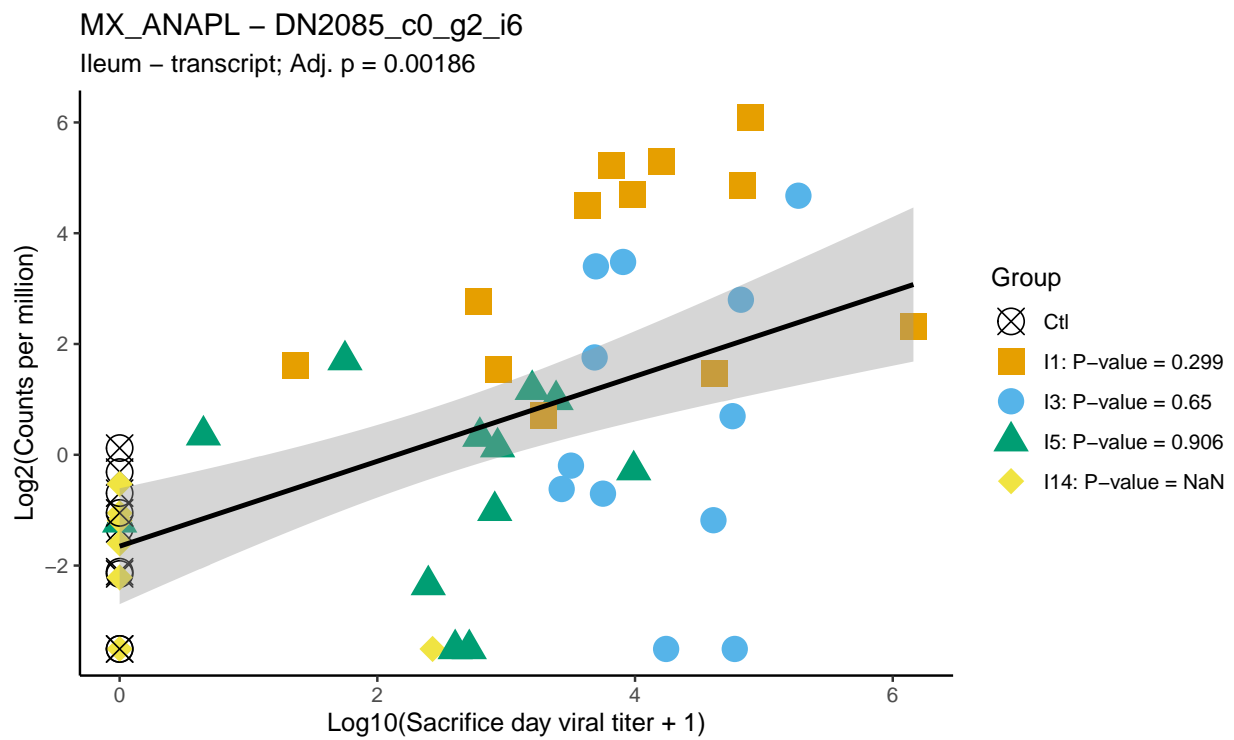
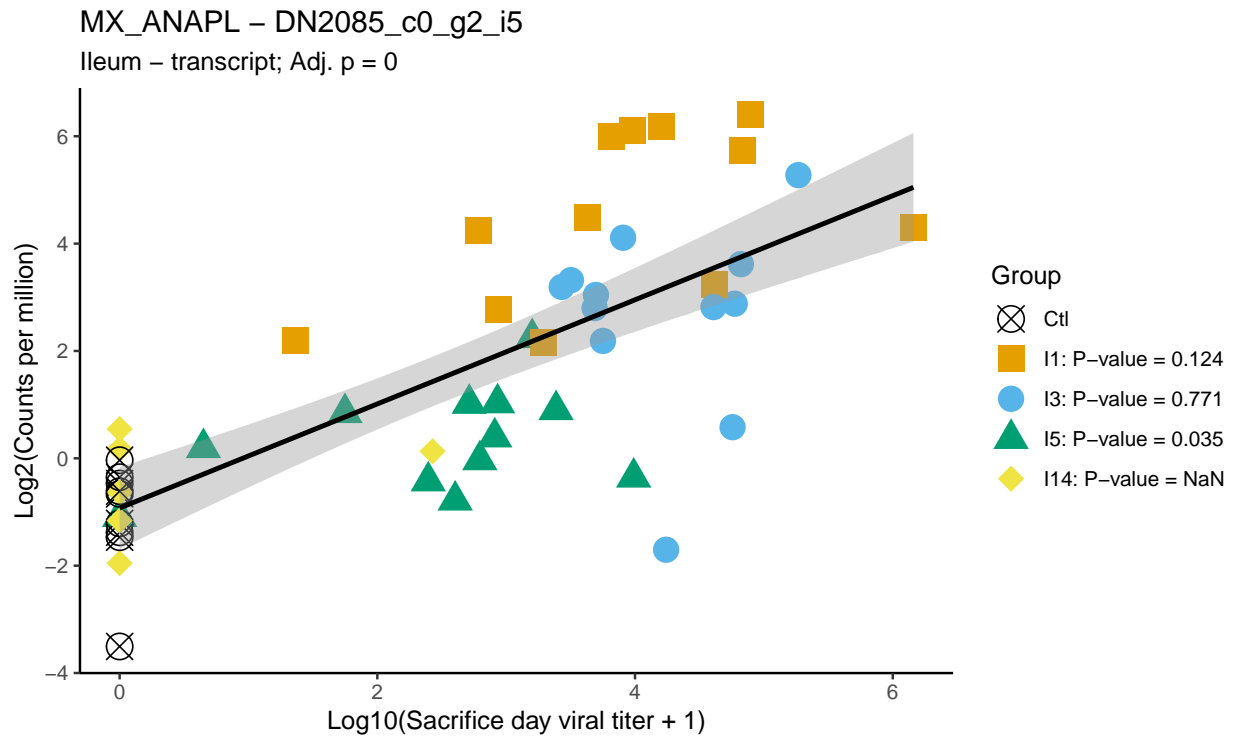






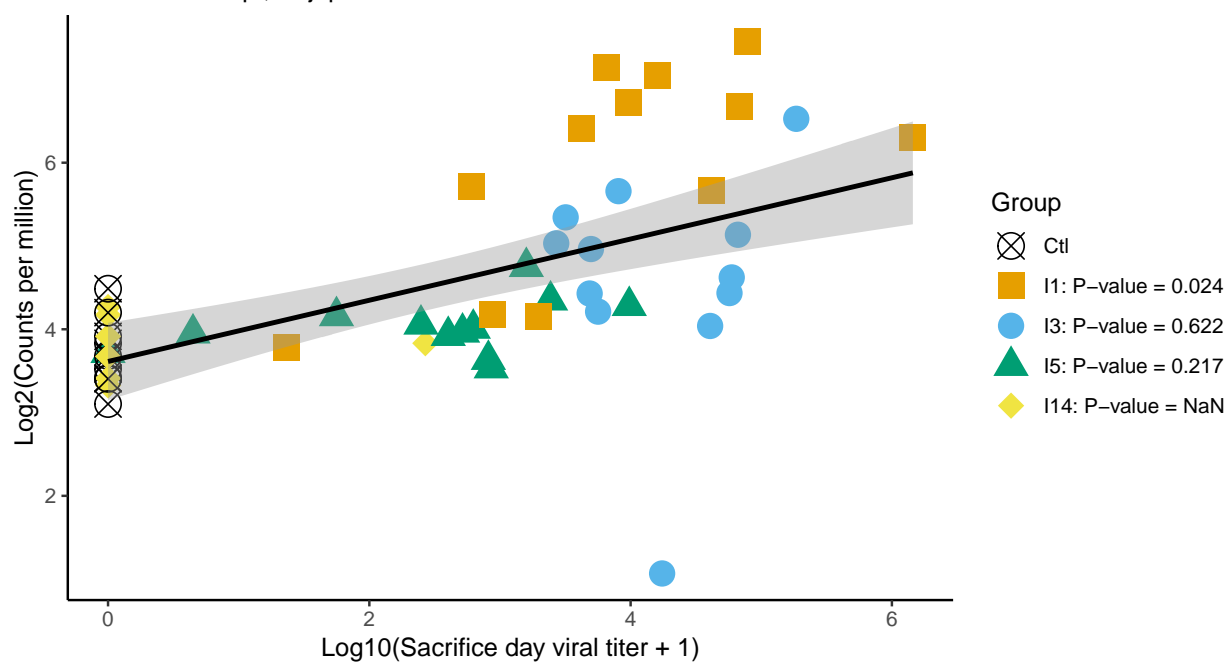






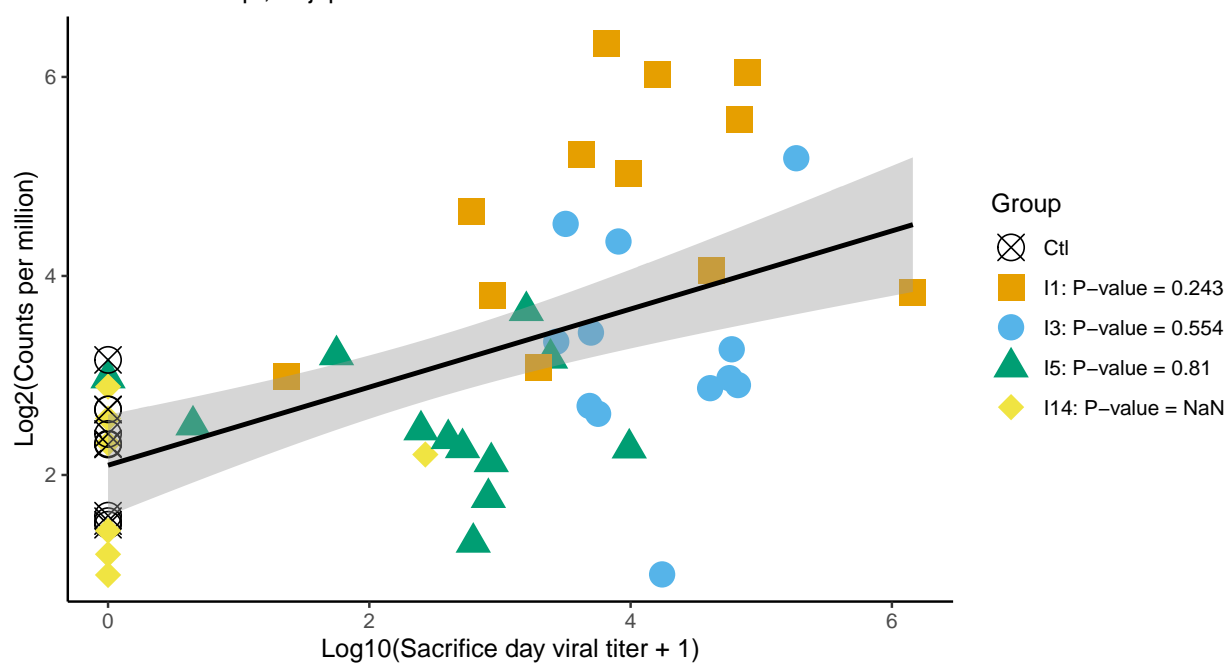
PAR12_HUMAN – DN20874_c0_g1_i10

Ileum – transcript; Adj. p = 0.00019



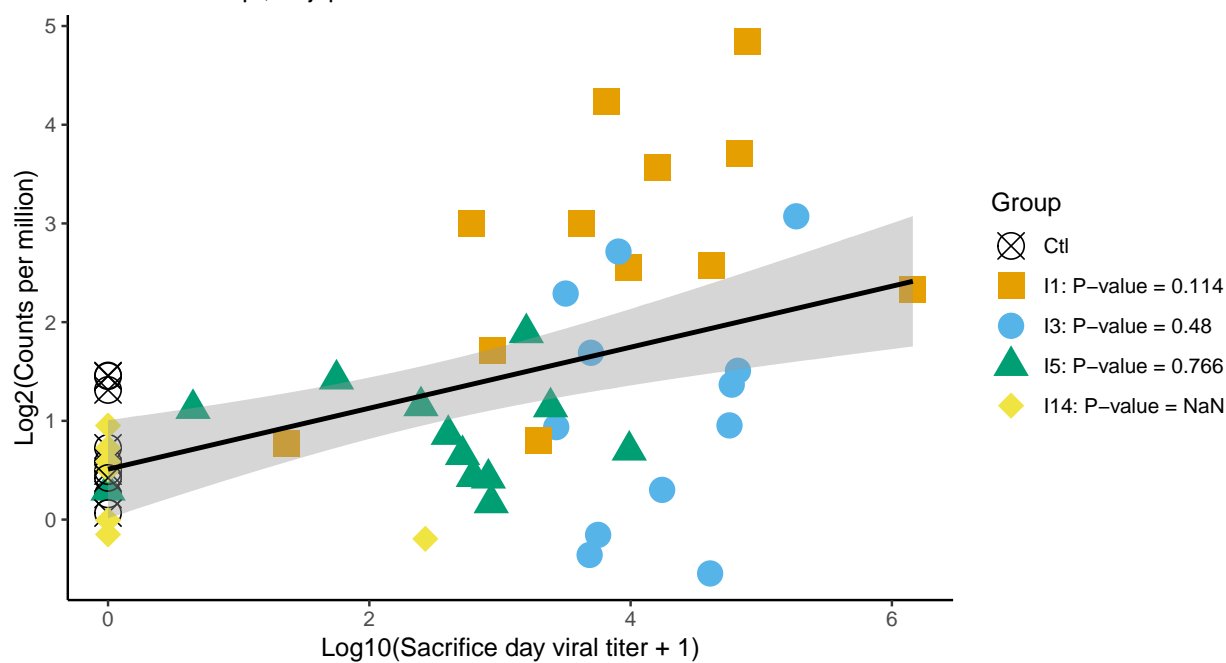
PAR12_HUMAN – DN20874_c0_g1_i11

Ileum – transcript; Adj. p = 0.00188



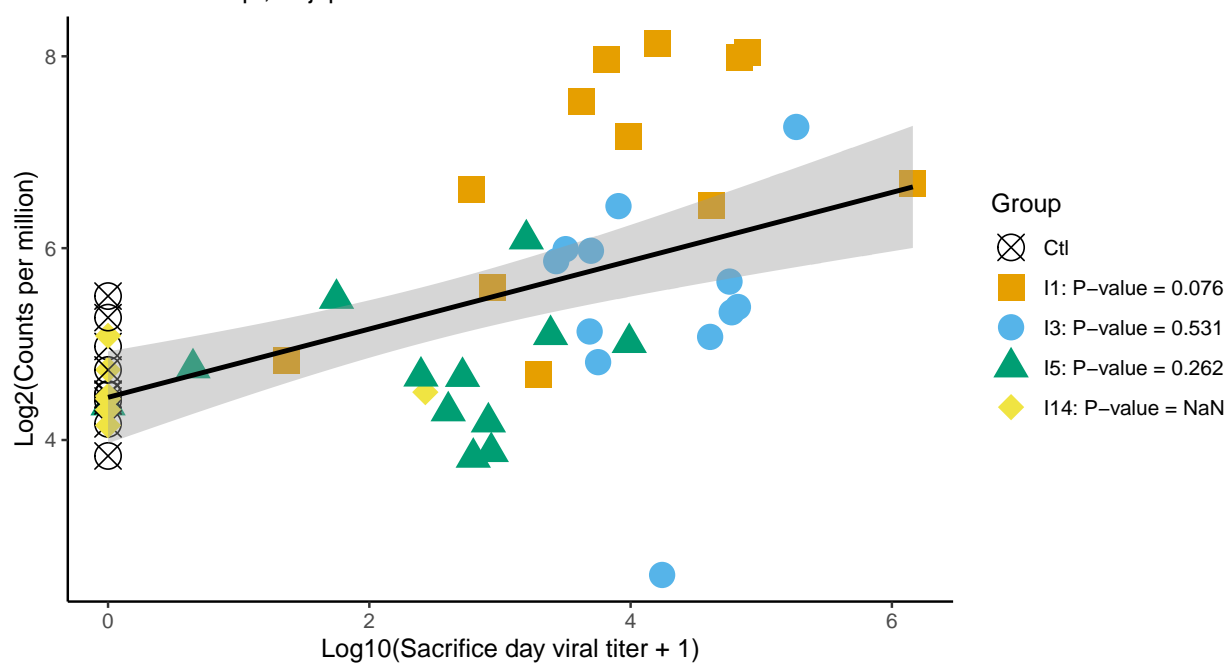
PAR12_MOUSE – DN20874_c0_g1_i8

Ileum – transcript; Adj. p = 0.03286



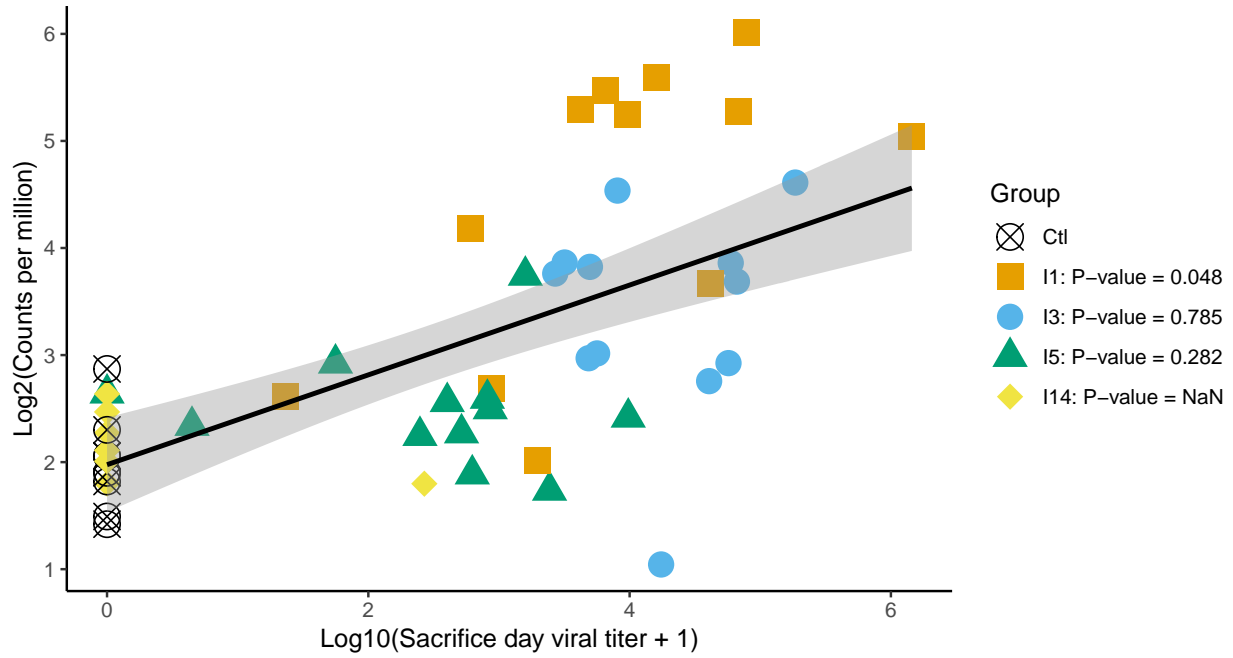
PAR12_MOUSE – DN20874_c0_g1_i9

Ileum – transcript; Adj. p = 0.00064



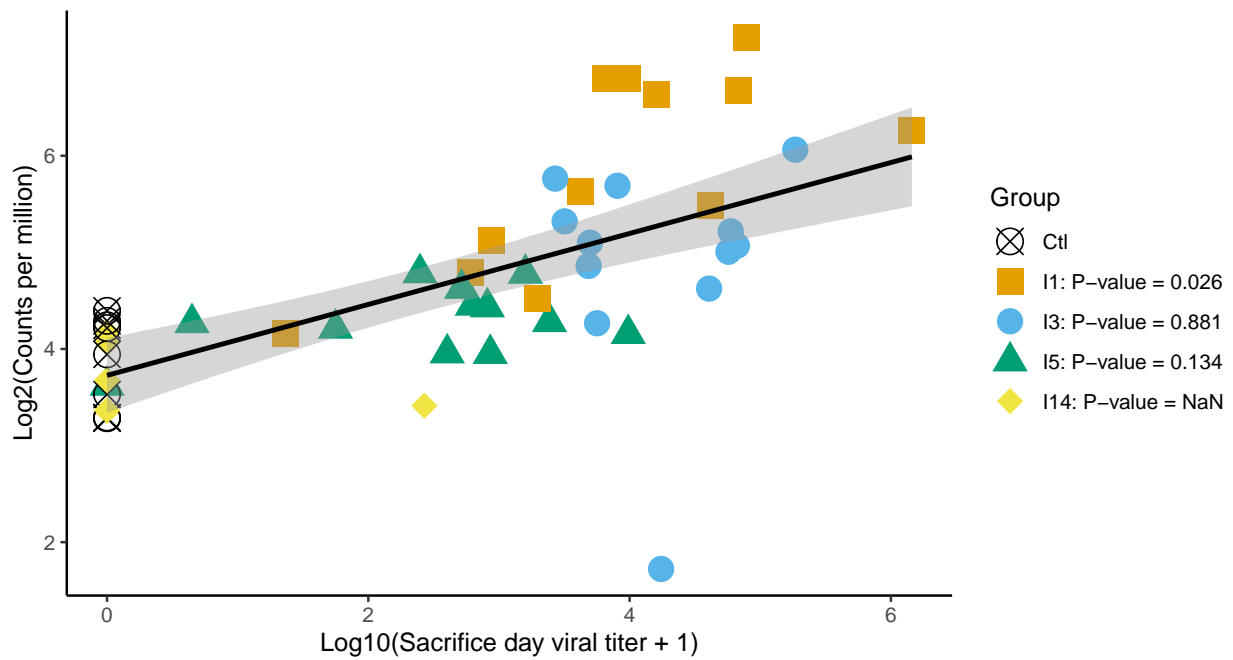
MIRO1_CHICK – DN22_c0_g1_i12

Ileum – transcript; Adj. p = $4e-05$



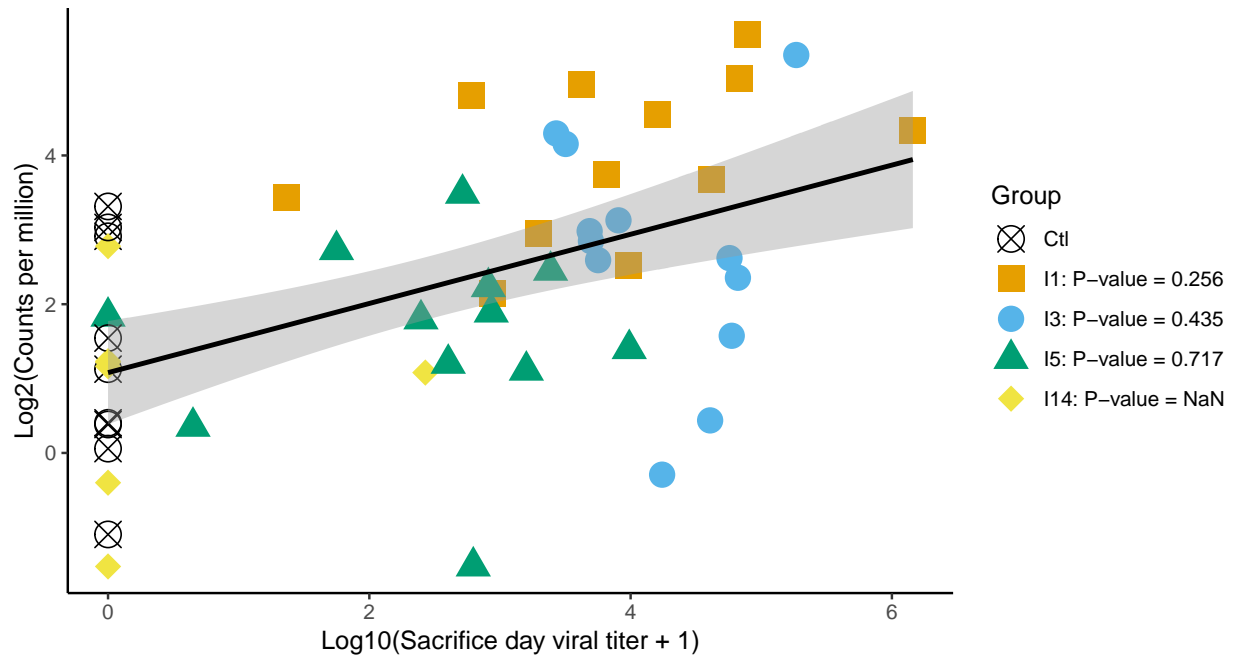
STAT1_PIG – DN2413_c0_g1_i2

Ileum – transcript; Adj. p = $6e-05$



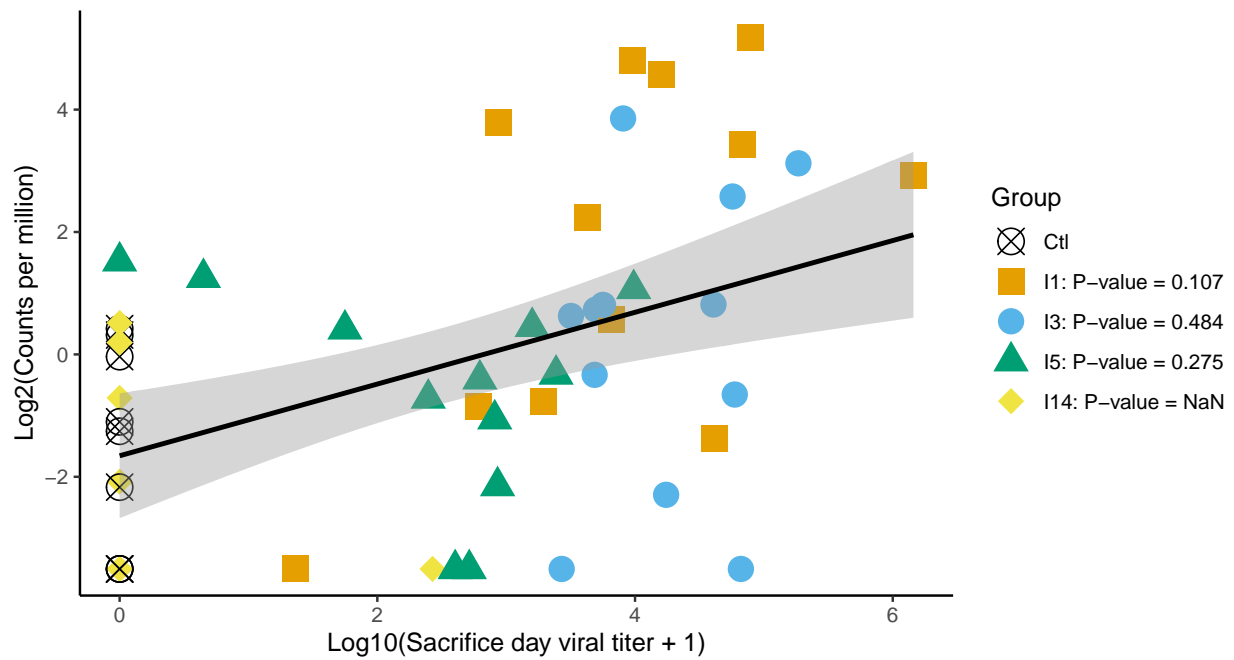
STAT1_PIG – DN2413_c0_g1_i3

Ileum – transcript; Adj. p = 0.00683



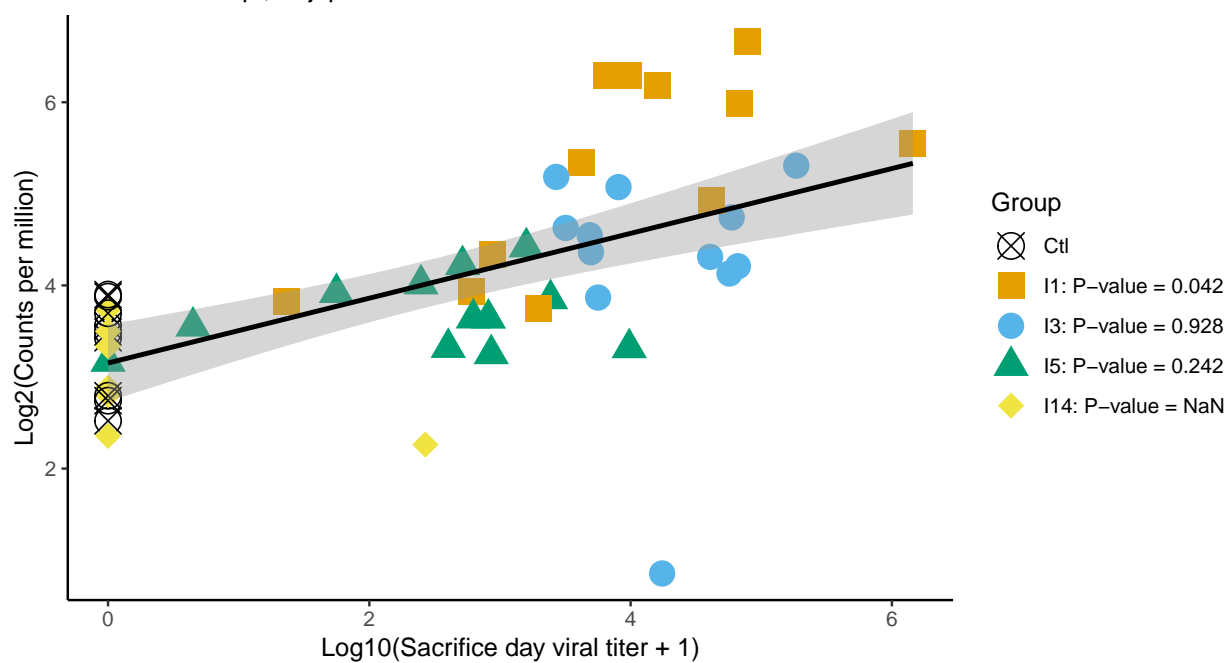
STAT1_PIG – DN2413_c0_g1_i5

Ileum – transcript; Adj. p = 0.01725



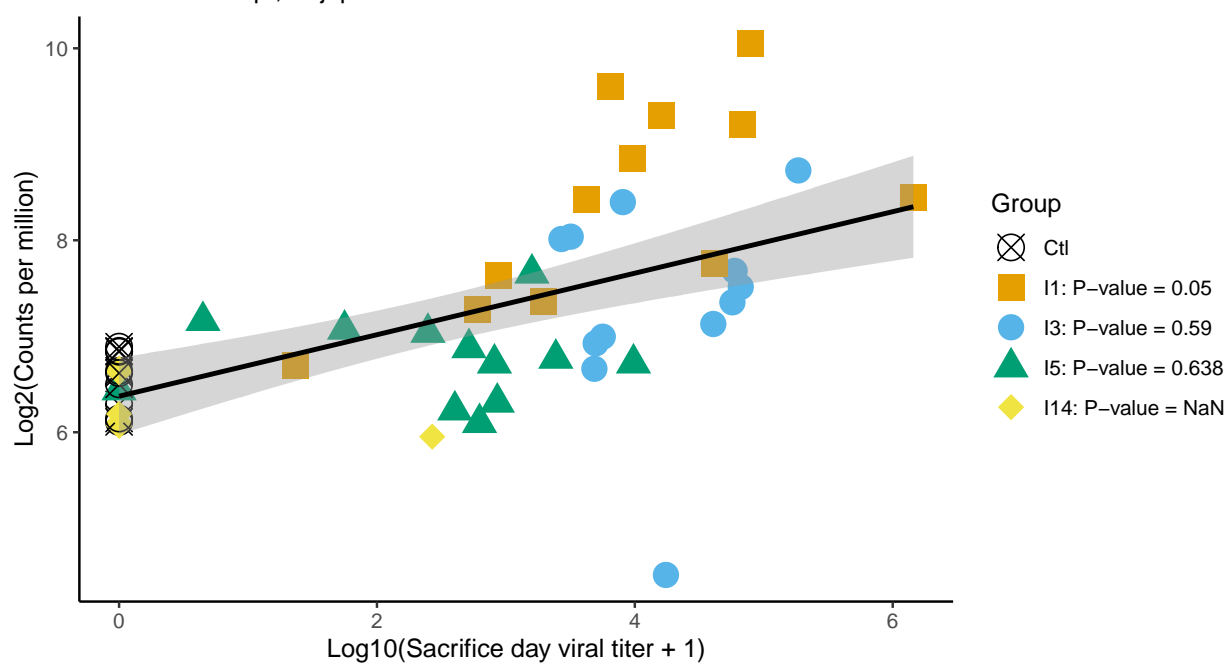
STAT1_PIG – DN2413_c0_g1_i6

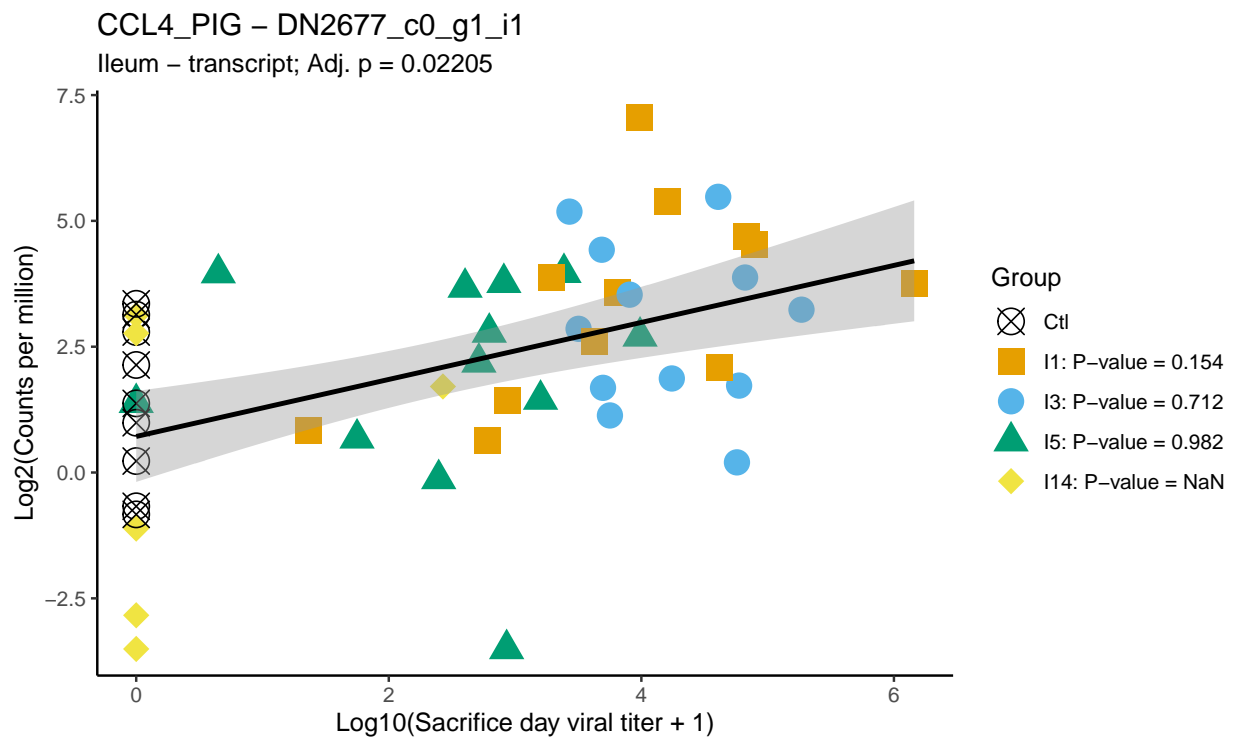
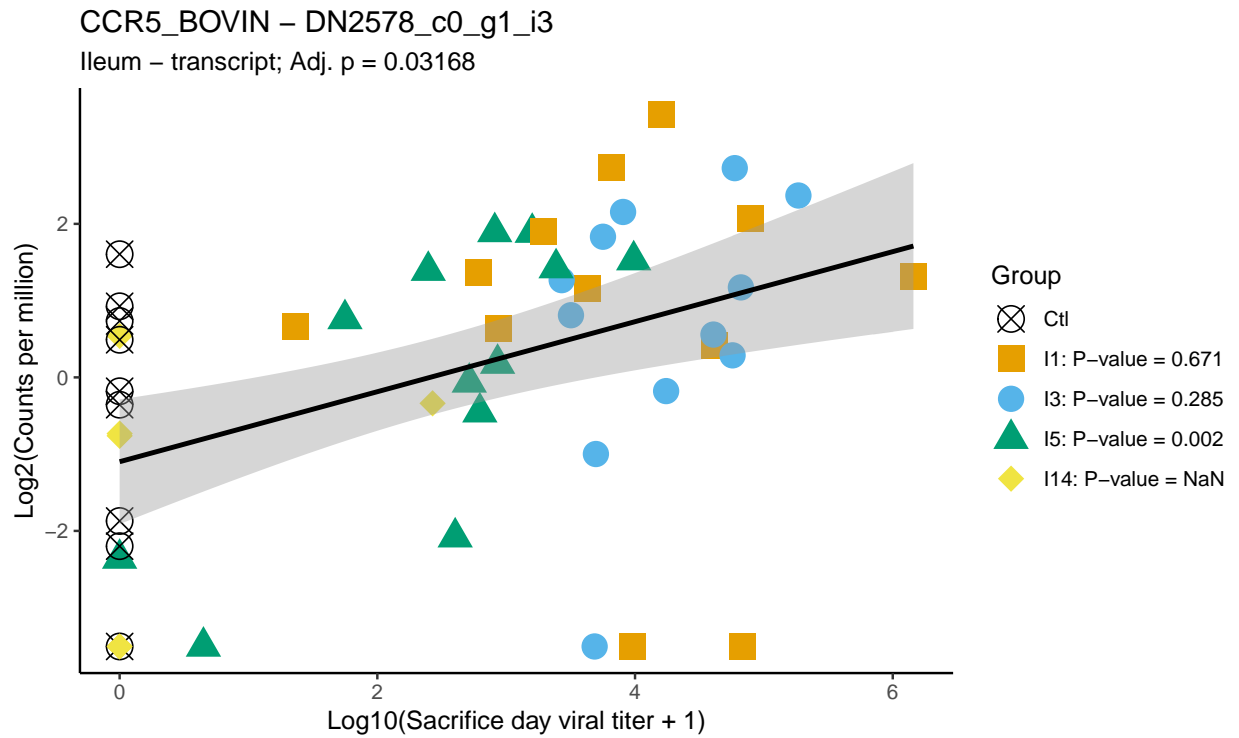
Ileum – transcript; Adj. p = 6e-04



STAT1_PIG – DN2413_c0_g1_i8

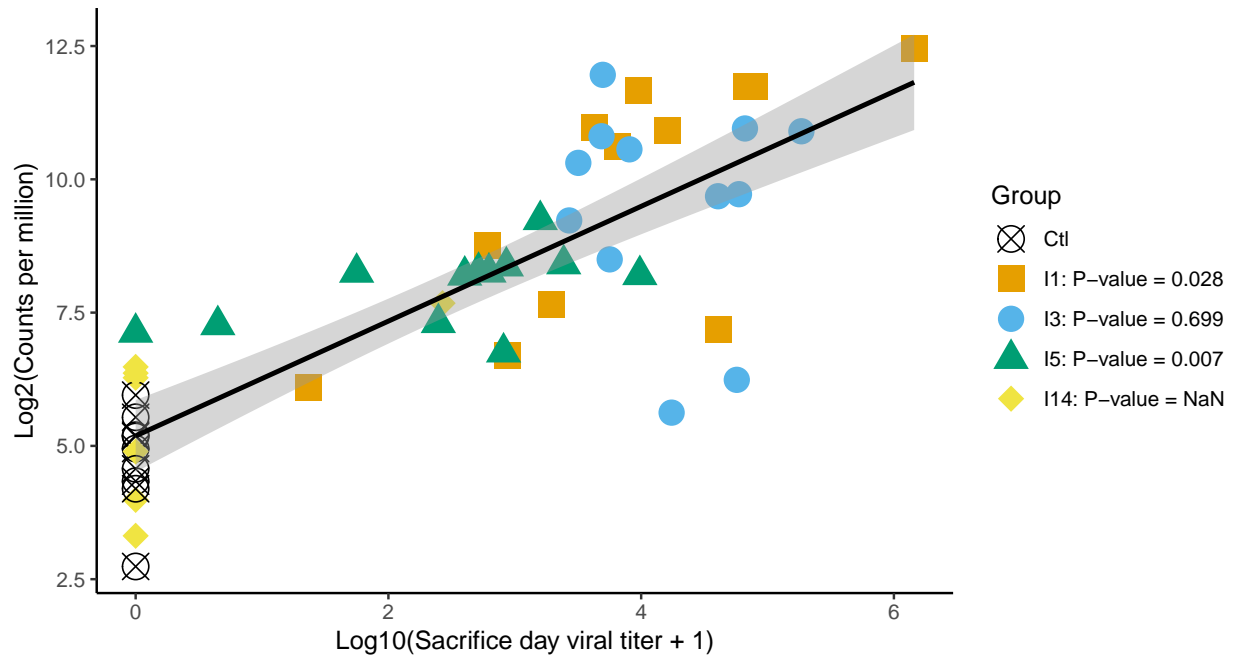
Ileum – transcript; Adj. p = 0.00139





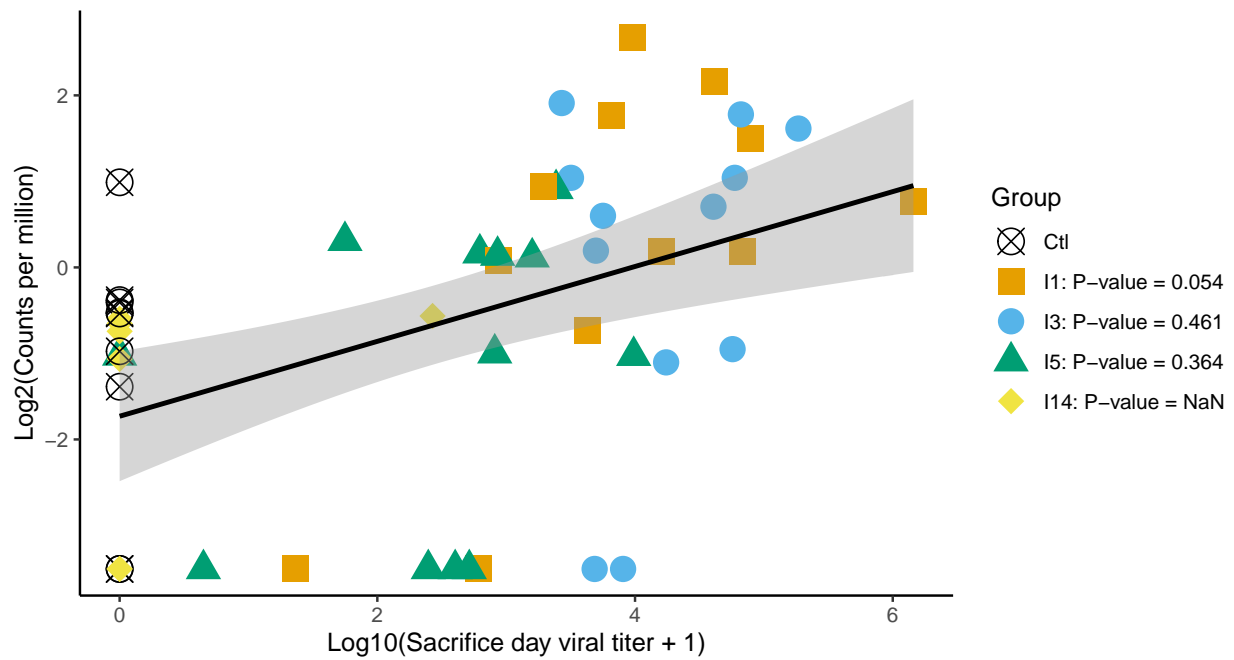
IFI6_BOVIN – DN2932_c0_g1_i6

Ileum – transcript; Adj. p = 0



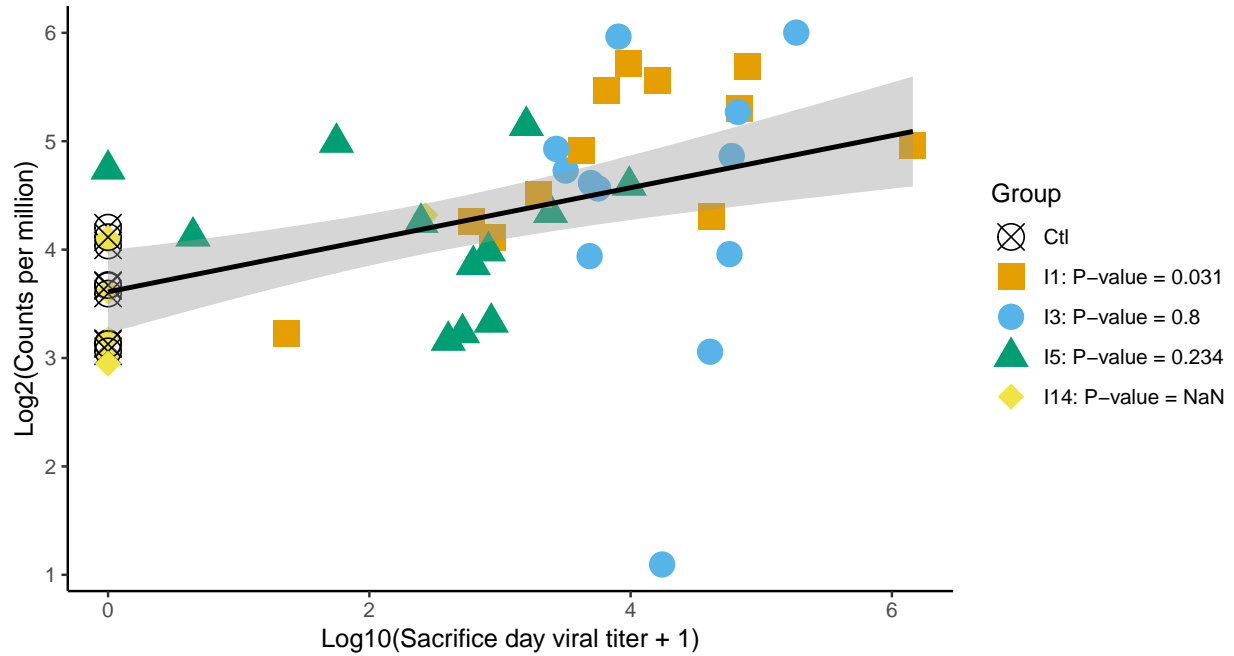
NLRC5_HUMAN – DN3089_c0_g1_i6

Ileum – transcript; Adj. p = 0.0266



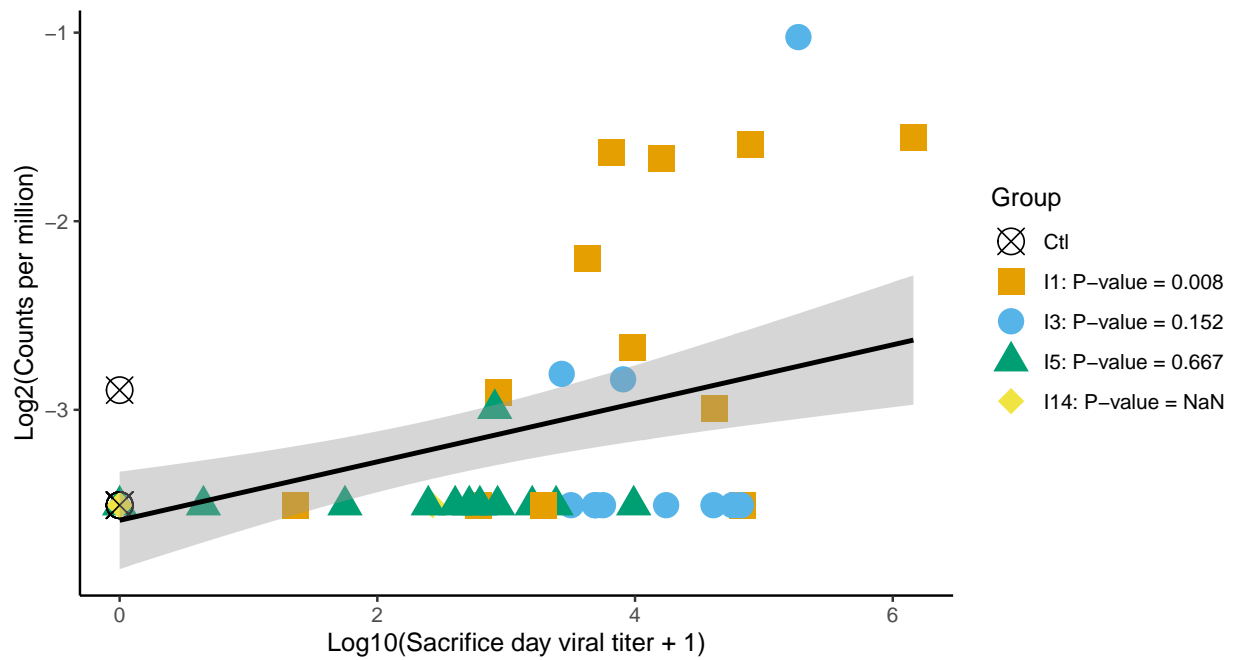
TAP1_GORGO – DN3236_c0_g1_i10

Ileum – transcript; Adj. p = 0.00093



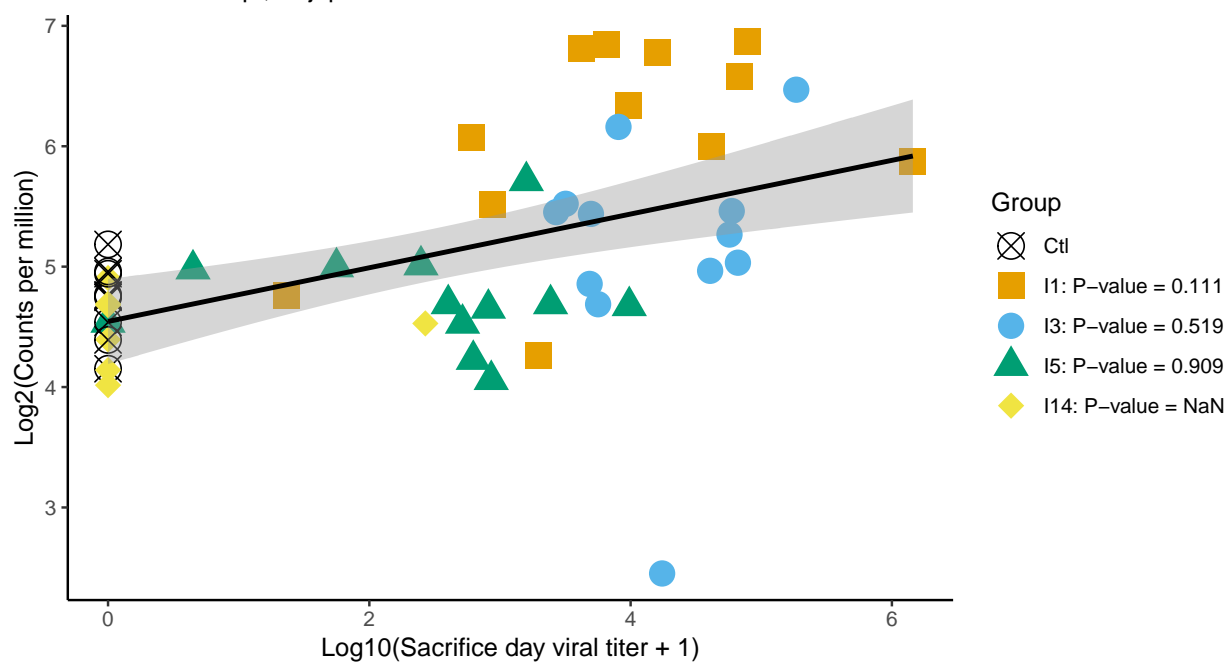
STAT1_HUMAN – DN51353_c2_g1_i2

Ileum – transcript; Adj. p = 0.01886



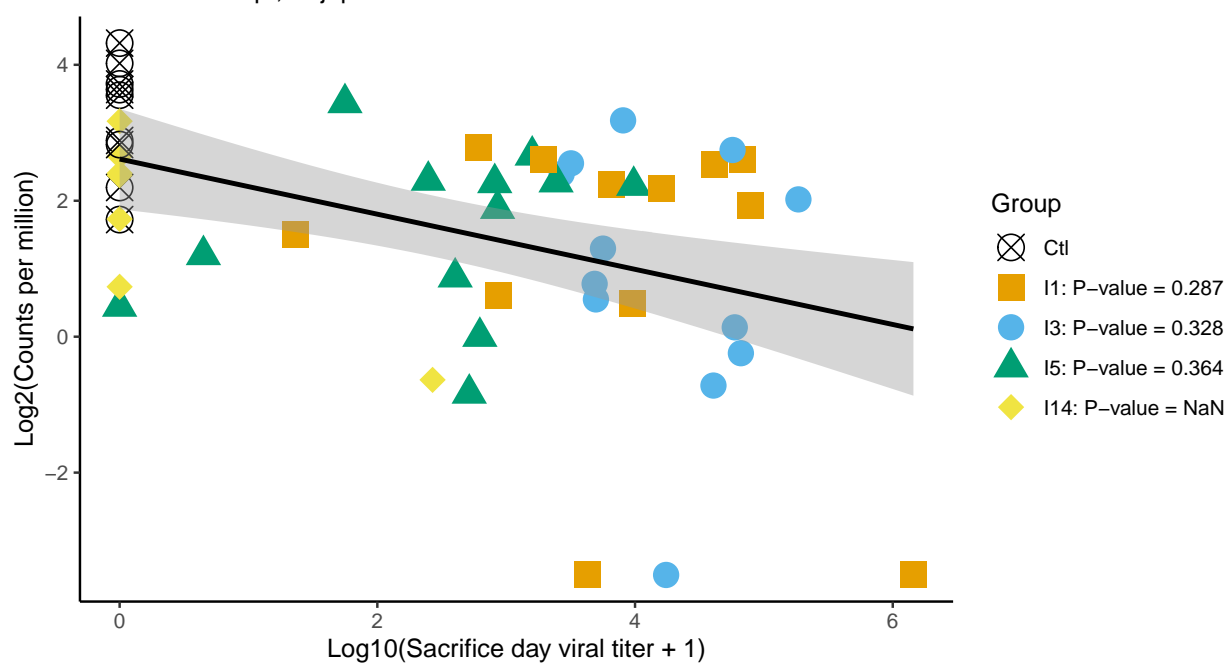
PAR12_HUMAN – DN5594_c0_g1_i10

Ileum – transcript; Adj. p = 0.00316



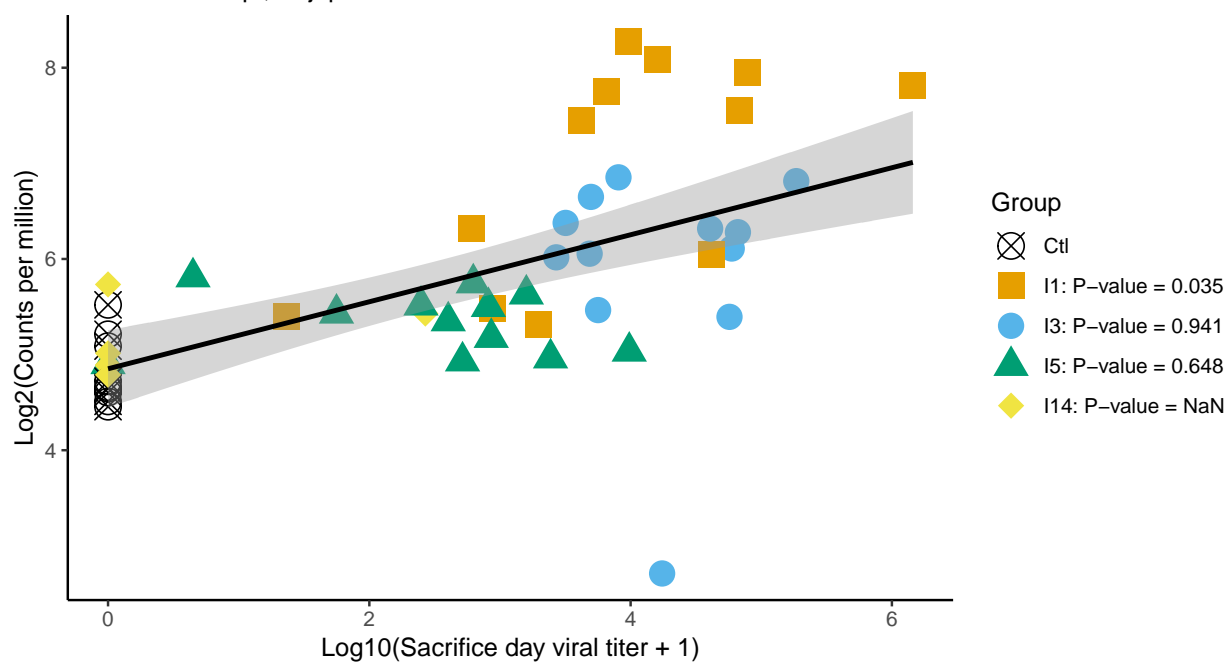
MXRA5_HUMAN – DN5715_c0_g1_i1

Ileum – transcript; Adj. p = 0.0423



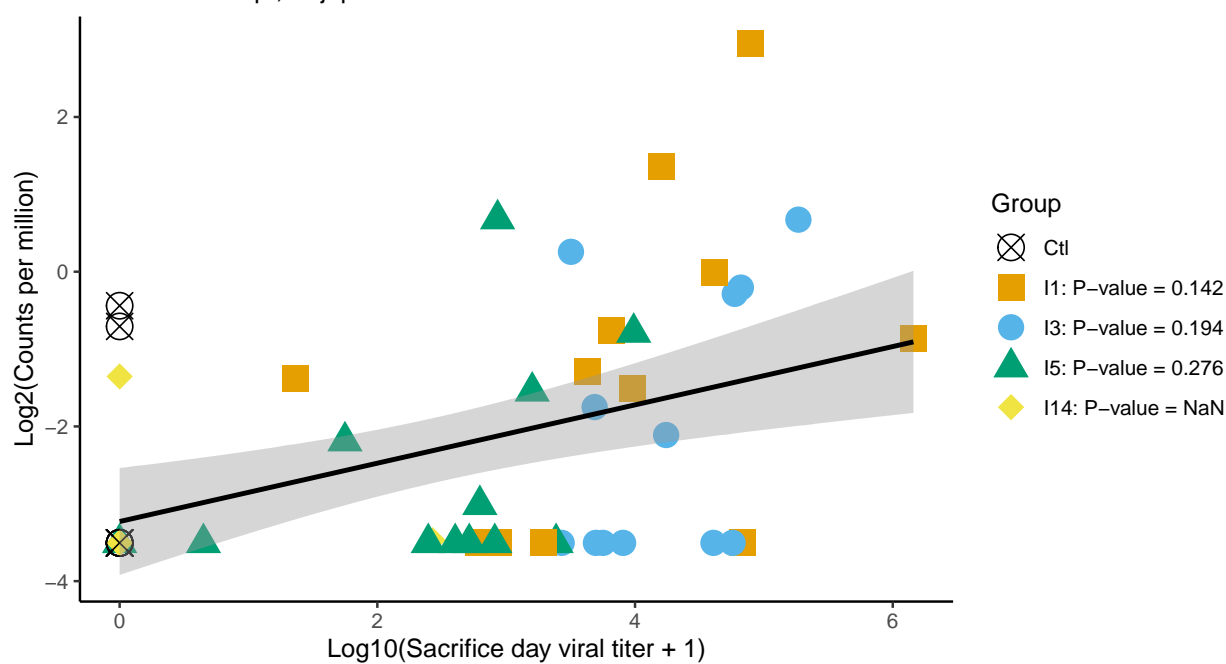
IN35_HUMAN – DN6170_c0_g1_i10

Ileum – transcript; Adj. p = 4e-05



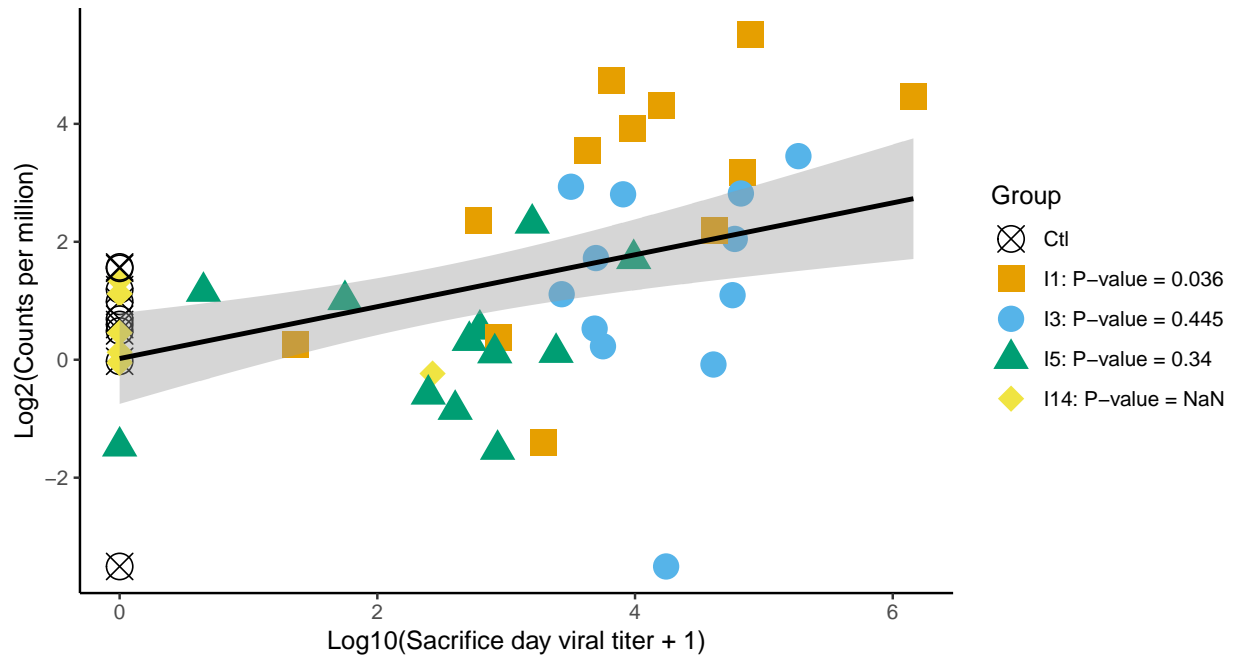
IN35_HUMAN – DN6170_c0_g1_i3

Ileum – transcript; Adj. p = 0.04943



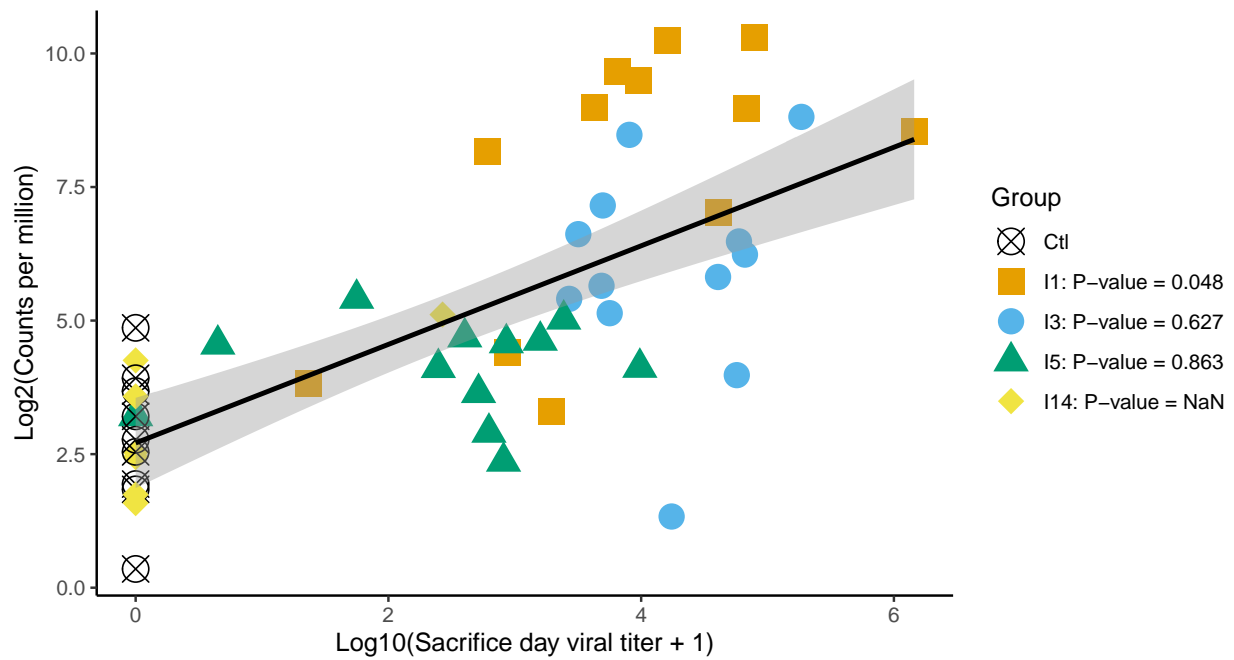
IN35_HUMAN – DN6170_c0_g1_i5

Ileum – transcript; Adj. p = 0.0132



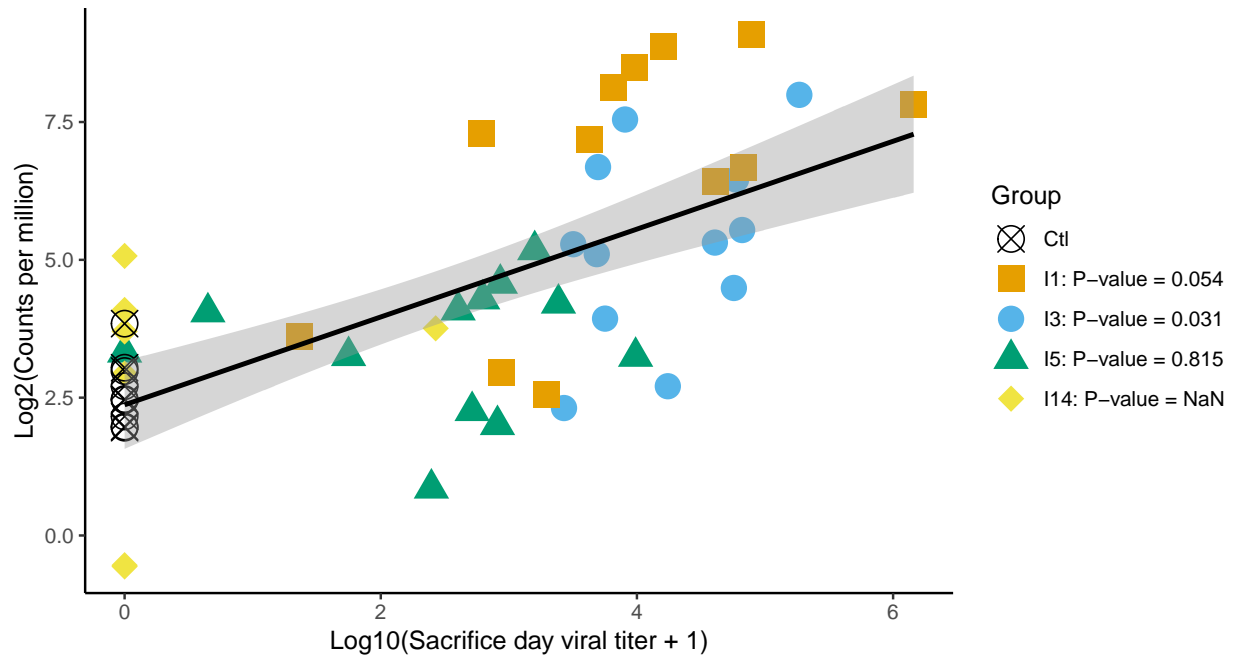
IFIT5_HUMAN – DN6178_c0_g1_i1

Ileum – transcript; Adj. p = 0



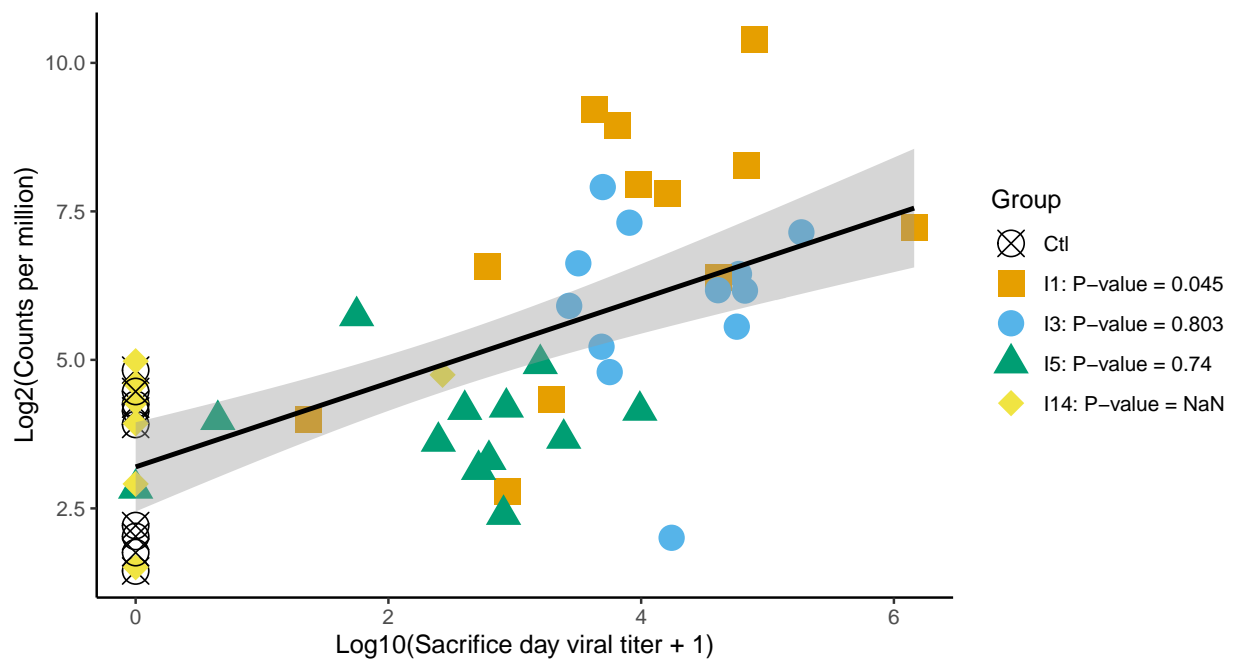
OASL1_RAT – DN6190_c0_g1_i1

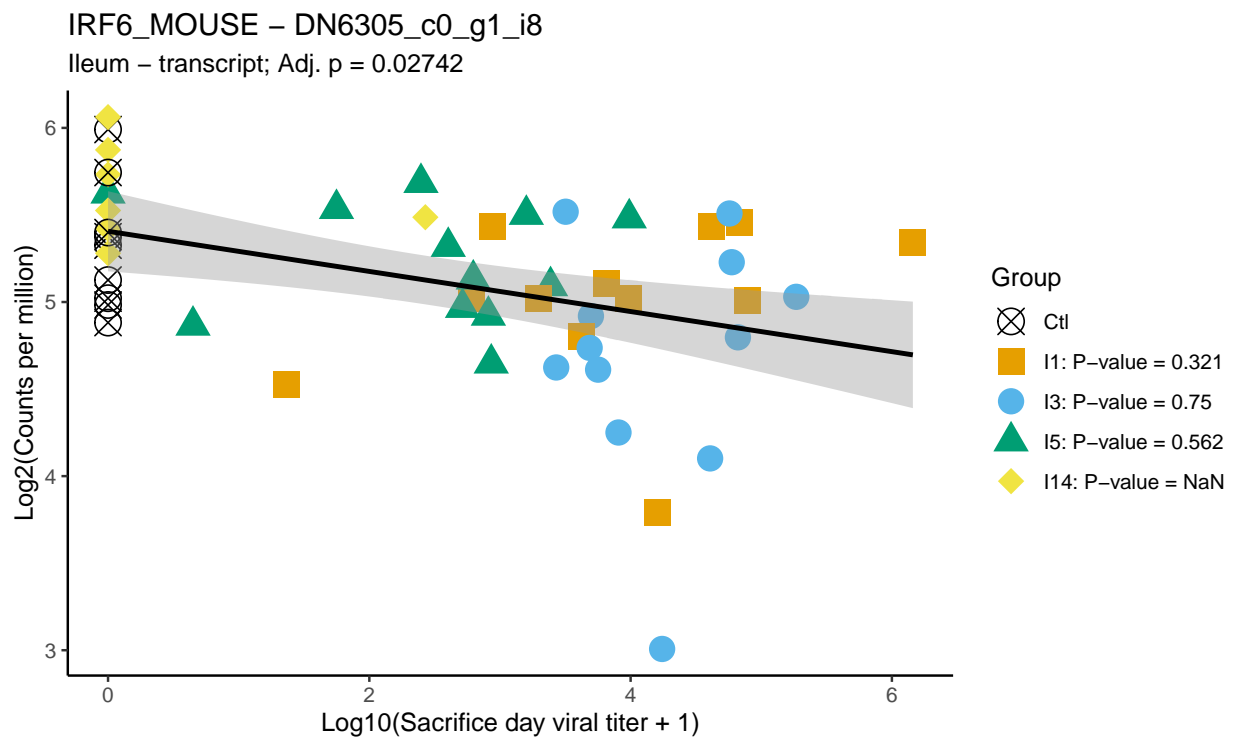
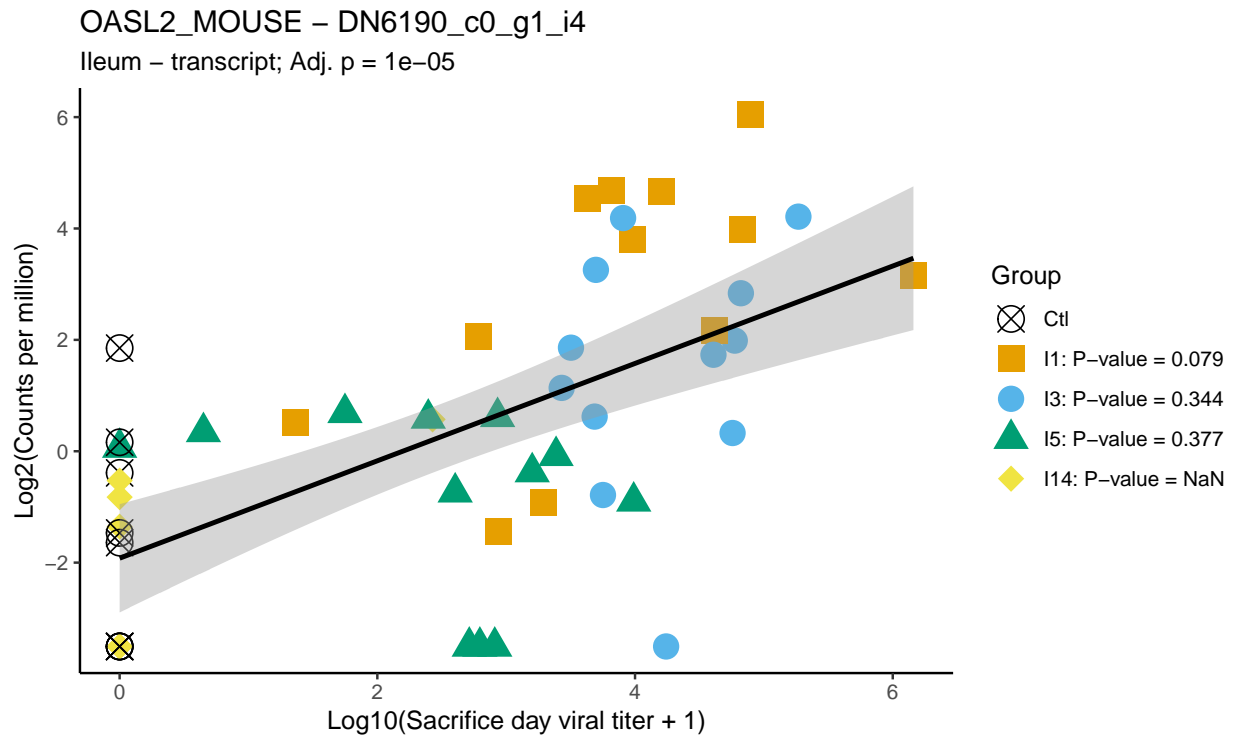
Ileum – transcript; Adj. p = 0.04312



OASL1_RAT – DN6190_c0_g1_i2

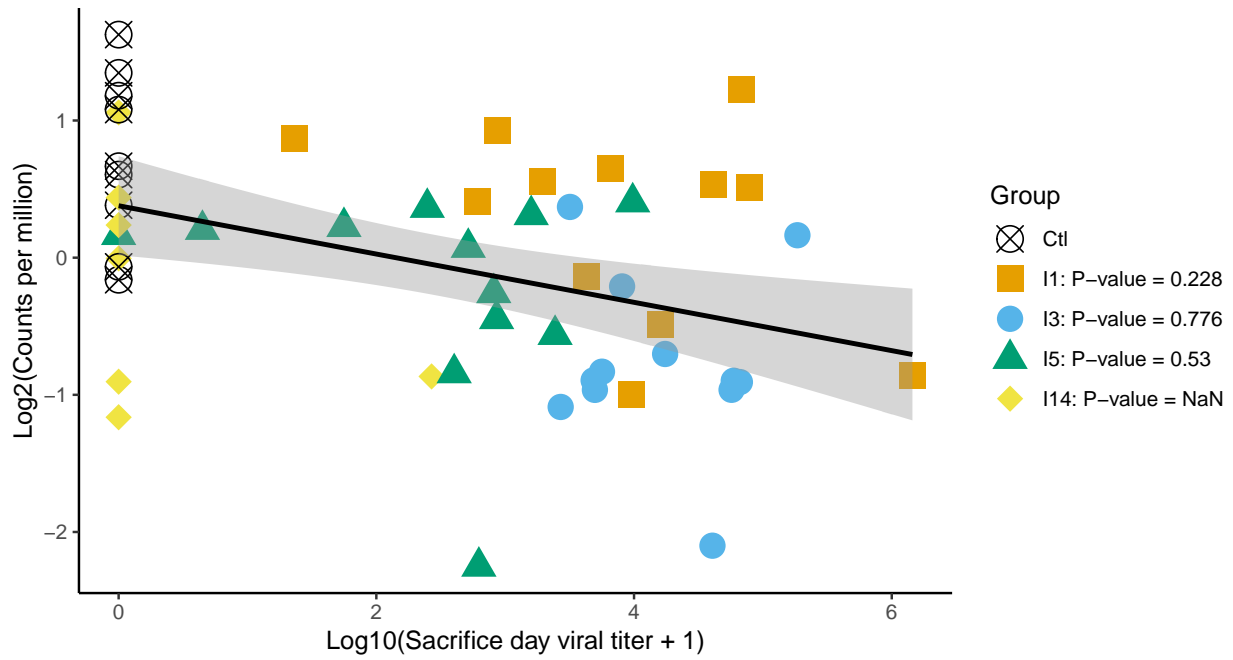
Ileum – transcript; Adj. p = 2e-05





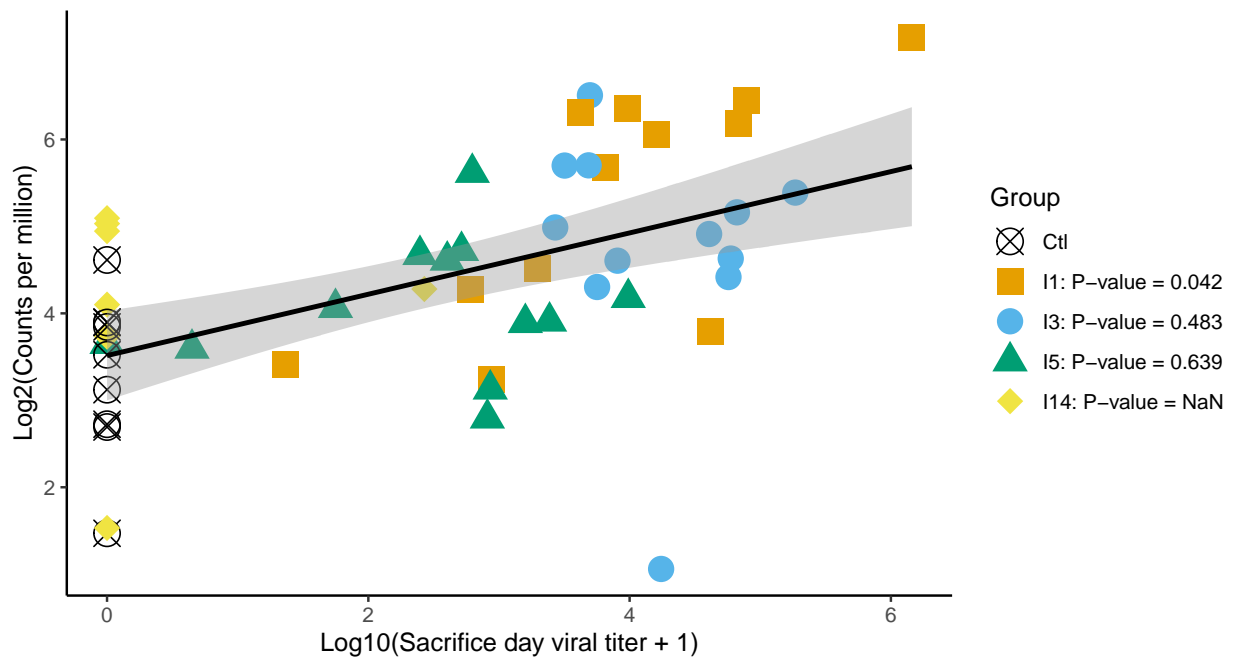
FGFR2_CHICK – DN71517_c0_g1_i5

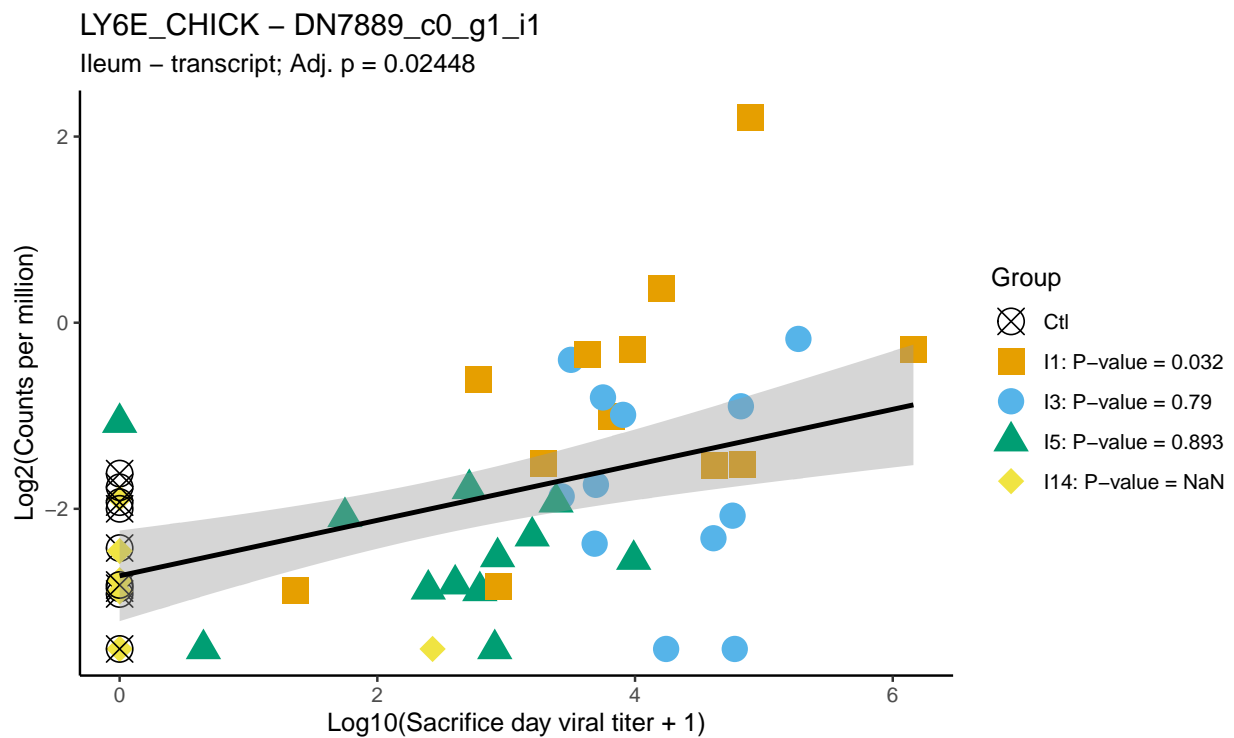
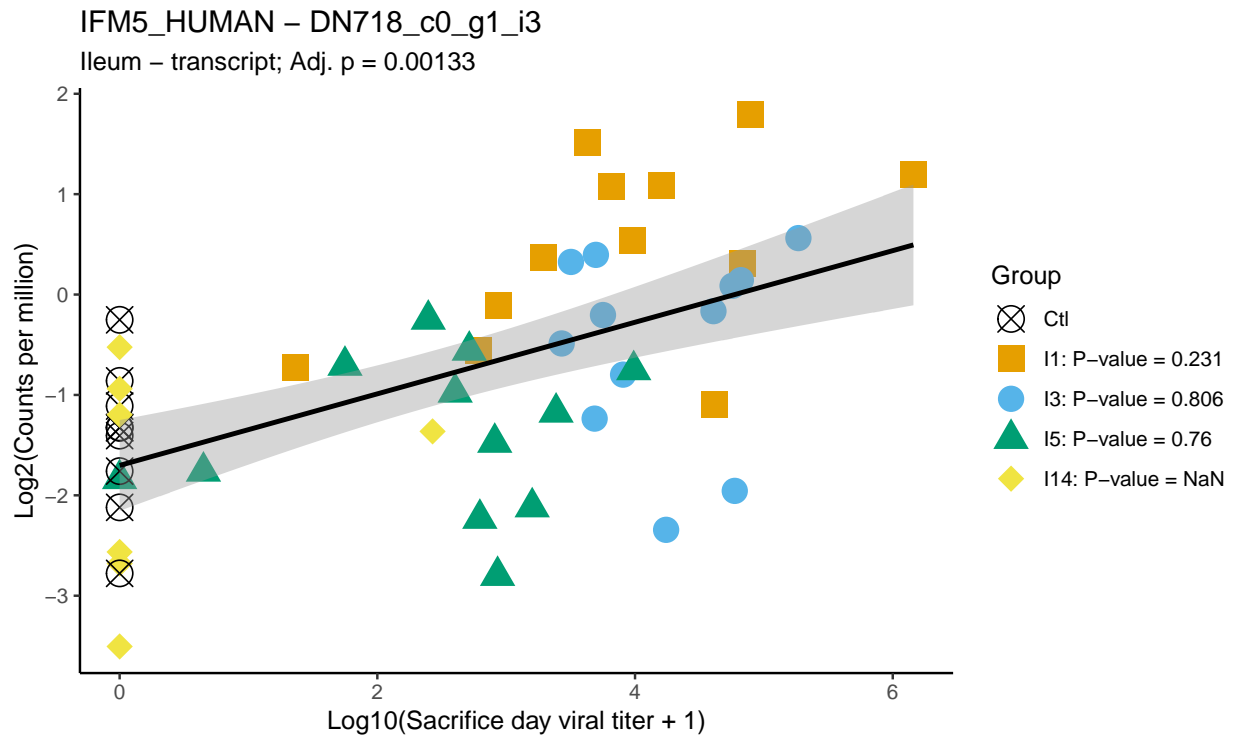
Ileum – transcript; Adj. p = 0.04925



DSA2B_TORMA – DN718_c0_g1_i1

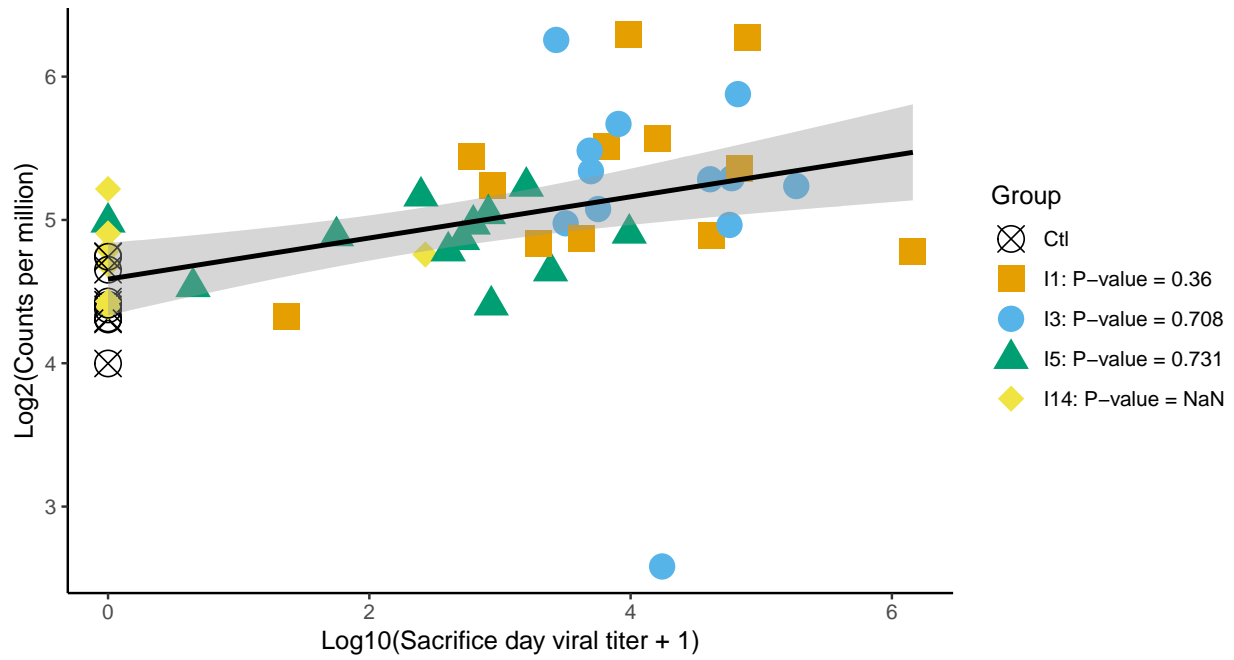
Ileum – transcript; Adj. p = 0.0032





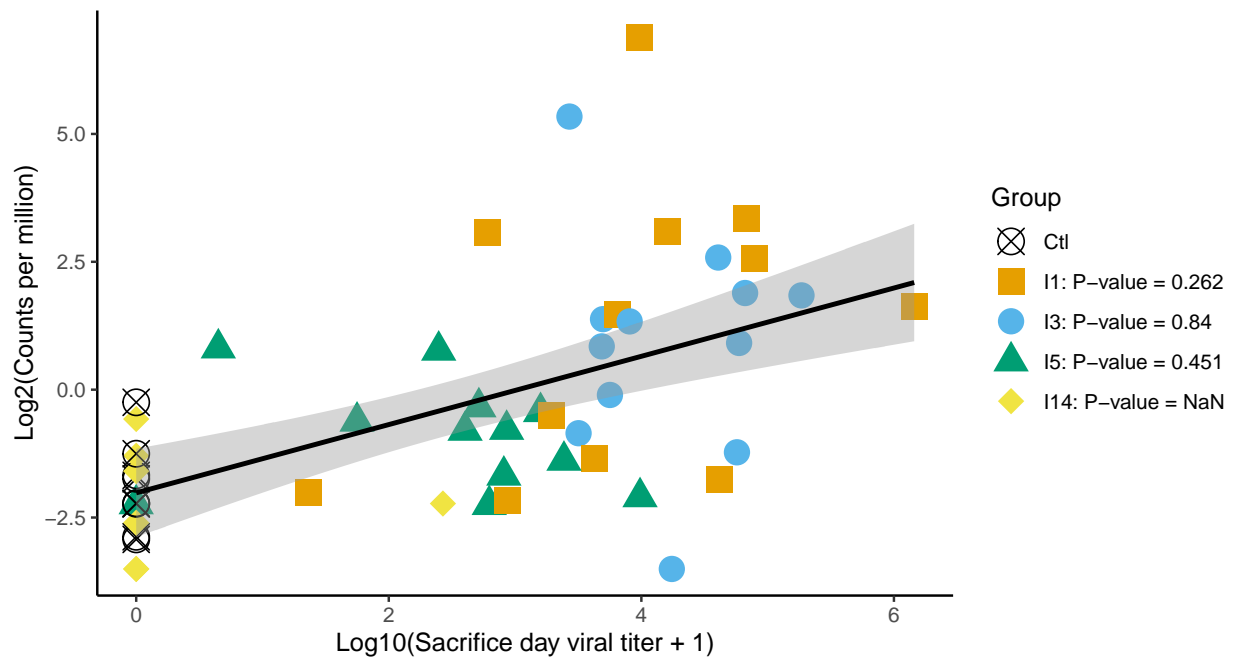
IKBE_MOUSE – DN7919_c0_g1_i9

Ileum – transcript; Adj. p = 0.02061



IL8_CHICK – DN861_c0_g1_i1

Ileum – transcript; Adj. p = 0.00142



CCL26_CANLF – DN9204_c0_g1_i7

Ileum – transcript; Adj. p = 0.02459

