Detailed statistical results

Significant terms are marked in red

Non-specific gill score

AVERAGE Non-specific gill score

Exposure day + 1 dphe

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)
Treatment	1	1.5313	1.5313	5.8136	0.0245
Time	1	0.28125	0.28125	1.0678	0.3216
Treatment x Time	1	0.78125	0.78125	2.9661	0.098
Residuals	28	7.375	0.26339		
Total	31	9.9688			

3 dphe onwards

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	P(MC)
Treatment	3	0.083333	0.027778	0.13333		0.9409
Time	5	1.65	0.33	1.1061	0.3912	
Tank (Treatment)	4	0.83333	0.20833	0.90909	0.4734	
Treatment x Time	15	5.3167	0.35444	1.1881	0.3498	
Tank (Treatment) x Time	20	5.9667	0.29833	1.3018	0.1726	
Residuals	192	44	0.22917			
Total	239	57.85				

Pooled terms
Tank (Treatment) x Time

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	P(MC)
Treatment	3	0.083333	0.027778	0.13333		0.9382
Time	5	1.65	0.33	1.4001	0.2168	
Tank (Treatment)	4	0.83333	0.20833	0.88392	0.4814	
Treatment x Time	15	5.3167	0.35444	1.5038	0.1068	
Pooled	212	49.967	0.23569			
Total	239	57.85				

Pooled terms
Tank (Treatment)
Tank (Treatment) x Time

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)
Treatment	3	0.083333	0.027778	0.11811	0.949
Time	5	1.65	0.33	1.4031	0.2176
Treatment x Time	15	5.3167	0.35444	1.5071	0.0961
Pooled	216	50.8	0.23519		
Total	239	57.85			

No significant differences

PREVALENCE for positive non-specific gill score

Fishers Exact Test:

C-group vs. H-group	p
Exposure day	0.343
1 dphe	0.029

AGD gill score

Average AGD score

3 dphe onwards

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	P(MC)
Treatment	3	218.02	72.672	792.79		0.0001
Time	5	97.233	19.447	60.456	0.0001	
Tank (Treatment)	4	0.36667	0.091667	0.47826	0.7633	
Treatment x Time	15	68.733	4.5822	14.245	0.0001	
Tank (Treatment) x Time	20	6.4333	0.32167	1.6783	0.0398	
Residuals	192	36.8	0.19167			
Total	239	427.58				

PAIR-WISE TESTS

Term 'Treatment x Time'

Within level '3 dphe' of factor 'time'

Groups	t	P(MC)
Control, hydroids	Denominator is 0	
Control, P.per.	6	0.0001
Control, Hydroids + P.per.	3	0.0076
Hydroids, P.per.	6	0.0001
Hydroids, Hydroids + P.per.	3	0.0079
P.per., Hydro + P.per.	1.4056	0.1722

Within level '7 dphe' of factor 'time'

Groups	t	P(MC)
Control, hydroids	Denominator is 0	
Control, P.per.	1.964	0.0668
Control, Hydroids + P.per.	2.3333	0.0303
Hydroids, P.per.	1.964	0.0672
Hydroids, Hydroids + P.per.	2.3333	0.0338
P.per., Hydro + P.per.	1.1882	0.2503

Within level '14 dphe' of factor 'time'

Groups	t	P(MC)
Control, hydroids	Denominator is 0	
Control, P.per.	9	0.0001
Control, Hydroids + P.per.	Denominator is 0	
Hydroids, P.per.	9	0.0001
Hydroids, Hydroids + P.per.	Denominator is 0	
P.per., Hydroids + P.per.	1.5	0.1539

Within level '21 dphe' of factor 'time'

Groups	t	P(MC)
Control, hydroids	1	0.3212
Control, P.per.	15	0.0001
Control, Hydroids + P.per.	16.5	0.0001
Hydroids, P.per.	12.348	0.0001
Hydroids, Hydroids + P.per.	12.6	0.0001
P.per., Hydroids + P.per.	1.4056	0.1764

Within level '28 dphe' of factor 'time'

Groups	t	P(MC)
Control, hydroids	1	0.3308
Control, P.per.	15.922	0.0001
Control, Hydroids + P.per.	11	0.0001
Hydroids, P.per.	13.056	0.0001
Hydroids, Hydroids + P.per.	9.3915	0.0001
P.per., Hydroids + P.per.	1.5492	0.1386

Within level '35 dphe' of factor 'time'

Groups	t	P(MC)
Control, hydroids	5.0138	0.0001
Control, P.per.	17.335	0.0001
Control, Hydroids + P.per.	18.974	0.0001
Hydroids, P.per.	10.04	0.0001
Hydroids, Hydroids + P.per.	11.196	0.0001
P.per., Hydroids + P.per.	1	0.3332

Thrombi score

Exposure day + 1 dphe

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)
Treatment	1	7.0313	7.0313	28.636	0.0001
Time	1	9.0313	9.0313	36.782	0.0001
Treatment x Time	1	7.0313	7.0313	28.636	0.0001
Residuals	28	6.875	0.24554		
Total	31	29.969			

PAIR-WISE TESTS

Term 'Treatment x Time' for pairs of levels of factor 'Treatment'

Within level 'Exposure day' of factor 'Time'

Groups	t	P(perm)
Control. hydroids	Denominator is 0	

Within level '1 dphe' of factor 'Time'

Groups	t	P(MC)
Control. hydroids	5.3513	0.0001

3 dphe onwards

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	P(MC)
Treatment	3	12.713	4.2375	19.189		0,0092
Time	5	21.387	4.2775	15.794	0.0002	
Tank (Treatment)	4	0.88333	0.22083	0.99065	0.4057	
Treatment x Time	15	22.363	1.4908	5.5046	0.0003	
Tank (Treatment) x Time	20	5.4167	0.27083	1.215	0.2534	
Residuals	192	42.8	0.22292			
Total	239	105.56				

Pooled terms
Tank (Treatment) x Time

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	P(MC)
Treatment	3	12.713	4.2375	19.189		0,0072
Time	5	21.387	4.2775	18.807	0.0001	
Tank (Treatment)	4	0.88333	0.22083	0.97096	0.424	
Treatment x Time	15	22.363	1.4908	6.5549	0.0001	
Pooled	212	48.217	0.22744			
Total	239	105.56				

Pooled terms
Tank (Treatment)
Tank (Treatment) x Time

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)
Treatment	3	12.713	4.2375	18.642	0.0001
Time	5	21.387	4.2775	18.818	0.0001
Treatment x Time	15	22.363	1.4908	6.5585	0.0001
Pooled	216	49.1	0.22731		
Total	239	105.56			

PAIR-WISE TESTS

Term 'Treatment x Time' for pairs of levels of factor 'Treatment'

Within level '3 dphe' of factor 'Time'

Groups	t	P(MC)
Control, Hydroids	6.862	0.0001
Control, P.per	1.5	0.1493
Control, Hydroids + P.per	5.5816	0.0001
Hydroids, P.per	5.5317	0.0001
Hydroids, Hydroids + P.per	1.0366	0.3094
P.Per, Hydroids + P.per	4.3333	0.0004

Within level '7 dphe' of factor 'Time'

Groups	t	P(MC)
Control, Hydroids	2.2778	0.0365
Control, P.per	Negative	
Control, Hydroids + P.per	3.8571	0.0011
Hydroids, P.per	2.2778	0.0334
Hydroids, Hydroids + P.per	0.55709	0.5883
P.Per, Hydroids + P.per	3.8571	0.0011

Within level '14 dphe' of factor 'Time'

Groups	t	P(MC)
Control, Hydroids	Denominator is 0	
Control, P.per	1	0.3358
Control, Hydroids + P.per	1.4056	0.1802
Hydroids, P.per	1	0.328
Hydroids, Hydroids + P.per	1.4056	0.1766
P.Per, Hydroids + P.per	0.84853	0.4053

Within level '21 dphe' of factor 'Time'

Groups	t	P(MC)
Control, Hydroids	Negative	
Control, P.per	1	0.3272
Control, Hydroids + P.per	1.2362	0.2297
Hydroids, P.per	1	0.3375
Hydroids, Hydroids + P.per	1.2362	0.2338
P.Per, Hydroids + P.per	1.8091	0.089

Within level '28 dphe' of factor 'Time'

Groups	t	P(MC)
Control, Hydroids	0.84853	0.3997
Control, P.per	Negative	
Control, Hydroids + P.per	1.44E-08	1
Hydroids, P.per	0.84853	0.3991
Hydroids, Hydroids + P.per	0.84853	0.4084
P.Per, Hydroids + P.per	Negative	

Within level '35 dphe' of factor 'Time'

Groups	t	P(MC)
Control, Hydroids	1	0.3215
Control, P.per	Negative	
Control, Hydroids + P.per	Negative	
Hydroids, P.per	1	0.3387
Hydroids, Hydroids + P.per	1	0.3295
P.Per, Hydroids + P.per	Negative	

PREVALENCE for positive Thrombi score

Fishers Exact Test:

C-group vs. H-group	p
Exposure day	0.342
1 dphe	0.01

Hyperplasia score

AVERAGE Hyperplasia score

Exposure day + 1 dphe

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)
Treatment	1	1.5313	1.5313	3.0901	0.0946
Time	1	0.03125	0.03125	0.063063	0.8315
Treatment x Time	1	1.5313	1.5313	3.0901	0.0906
Residuals	28	13.875	0.49554		
Total	31	16.969			

No significant differences

3 dphe onwards

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	P(MC)
Treatment	3	14.733	4.9111	147.33		0,0002
Time	5	24.583	4.9167	8.1492	0.0006	
Tank (Treatment)	4	0.13333	0.033333	0.048193	0.9961	
Treatment x Time	15	29.617	1.9744	3.2726	0.0089	
Tank (Treatment) x Time	20	12.067	0.60333	0.87229	0.6216	
Residuals	192	132.8	0.69167			
Total	239	213.93				

Pooled terms
Tank (Treatment) x Time

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	P(MC)
Treatment	3	14.733	4.9111	147.33		0,0002
Time	5	24.583	4.9167	7.1951	0.0001	
Tank (Treatment)	4	0.13333	0.033333	0.04878	0.995	
Treatment x Time	15	29.617	1.9744	2.8894	0.0006	
Residuals	212	144.87	0.68333			
Total	239	213.93				

Pooled terms
Tank (Treatment)
Tank (Treatment) x Time

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)
Treatment	3	14.733	4.9111	7.3159	0.0002
Time	5	24.583	4.9167	7.3241	0.0001
Treatment x Time	15	29.617	1.9744	2.9412	0.0004
Pooled	216	145	0.6713		
Total	239	213.93			

PAIR-WISE TESTS

Term 'Treatment x Time' for pairs of levels of factor

Within level '3 dphe' of factor 'Time'

Groups	t	P(MC)
Control, Hydroids	0.67082	0.523
Control, P.per	3.82E-08	1
Control, Hydroids + P.per	1.3416	0.1978
Hydroids, P.per	0.47434	0.6312
Hydroids, Hydroids + P.per	0.6396	0.5316
P.Per, Hydroids + P.per	0.94868	0.3548

Within level '7 dphe' of factor 'Time'

Groups	t	P(MC)
Control, Hydroids	0.25631	0.8027
Control, P.per	1.47E-08	1
Control, Hydroids + P.per	0.70065	0.489
Hydroids, P.per	0.3046	0.7621
Hydroids, Hydroids + P.per	1.1442	0.2634
P.Per, Hydroids + P.per	0.80498	0.4275

Within level '14 dphe' of factor 'Time'

Groups	t	P(MC)
Control, Hydroids	0.46291	0.6541
Control, P.per	0.43759	0.6688
Control, Hydroids + P.per	1.5213	0.1473
Hydroids, P.per	1.78E-08	1
Hydroids, Hydroids + P.per	2.4	0.0262
P.Per, Hydroids + P.per	2.1909	0.0365

Within level '21 dphe' of factor 'Time'

Groups	t	P(MC)
Control, Hydroids	0.91499	0.3726
Control, P.per	1.6348	0.1214
Control, Hydroids + P.per	0.3873	0.7035
Hydroids, P.per	4.0931	0.0009
Hydroids, Hydroids + P.per	1.5213	0.1438
P.Per, Hydroids + P.per	1.3007	0.2061

Within level '28 dphe' of factor 'Time'

Groups	t	P(MC)
Control, Hydroids	1.89E-08	1
Control, P.per	2.4495	0.0247
Control, Hydroids + P.per	2.3333	0.0319
Hydroids, P.per	2.2283	0.0411
Hydroids, Hydroids + P.per	2.0896	0.0507
P.Per, Hydroids + P.per	0.39736	0.6942

Within level '35 dphe' of factor 'Time'

Groups	t	P(MC)
Control, Hydroids	0.84665	0.4079
Control, P.per	6.3258	0.0001
Control, Hydroids + P.per	6.5485	0.0001
Hydroids, P.per	4.4272	0.0006
Hydroids, Hydroids + P.per	4.6663	0.0002
P.Per, Hydroids + P.per	0.44721	0.6585

PREVALENCE for positive Hyperplasia score

Fishers Exact Test:

C-group vs. H-group	p
Exposure day	0.342
1 dphe	0.01

AGD lesion score

AVERAGE AGD lesion score

3 dphe onwards

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	P(MC)
Treatment	3	27.546	9.1819	48.97		0.0013
Time	5	39.237	7.8475	101.26	0.0001	
Tank (Treatment)	4	0.75	0.1875	1.9565	0.101	
Treatment x Time	15	40.179	2.6786	34.563	0.0001	
Tank (Treatment) x Time	20	1.55	0.0775	0.8087	0.709	
Residuals	192	18.4	0.095833			
Total	239	127.66				

Pooled terms
Tank (Treatment) x Time

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	P(MC)
Treatment	3	27.546	9.1819	48.97		0.002
Time	5	39.237	7.8475	83.392	0.0001	
Tank (Treatment)	4	0.75	0.1875	1.9925	0.0979	
Treatment x Time	15	40.179	2.6786	28.464	0.0001	
Residuals	212	19.95	0.094104			
Total	239	127.66				

PAIR-WISE TESTS

Term 'Treatment x Time' for pairs of levels of factor 'Treatment'

Too little data available for 3, 7 and 14 dphe. Treatment groups "Control" and "Hydroids" had only 0 values

Within level '21 dphe' of factor 'Time'

Groups	t	P(perm)	P(MC)
Control, Hydroids	Denominator is 0		
Control, P.per	5	0,3368	0,0394
Control, Hydroids + P.per	1	1	0,427
Hydroids, P.per	5	0,3386	0,0379
Hydroids, Hydroids + P.per	1	1	0,4192
P.Per, Hydroids + P.per	1,3416	0,6626	0,3141

Within level '28 dphe' of factor 'Time'

Groups	t	P(perm)	P(MC)
Control, Hydroids	Denominator is 0		
Control, P.per	Denominator is 0		
Control, Hydroids + P.per	4,3333	0,3234	0,0553
Hydroids, P.per	Denominator is 0		
Hydroids, Hydroids + P.per	4,3333	0,3358	0,0502
P.Per, Hydroids + P.per	1	1	0,4308

Within level '35 dphe' of factor 'Time'

Groups	t	P(perm)	P(MC)
Control, Hydroids	Denominator is 0		
Control, P.per	Denominator is 0		
Control, Hydroids + P.per	11	0,3277	0,0092
Hydroids, P.per	Denominator is 0		
Hydroids, Hydroids + P.per	11	0,3245	0,0076
P.Per, Hydroids + P.per	1	1	0,4276

PREVALENCE for positive AGD lesion score

Fishers Exact Test:*

PP- vs. H+PP group	p
21 dphe	0.626
28 dphe	0.1

*Conducted for days with sufficient data