

ESM4. Table of alternative models for the post-hibernation titer and relative mRNA expression of cytokine genes including post-hibernation SMI and time to euthanasia as covariates. Type II sums of squares were obtained with function Anova from package car, and estimates and standard errors for the main effects with function lm in R. Effects that were not included in the final models are shown in parentheses. Significant effects ( $p < 0.05$ ) are shown in bold. No significant effects on *Il-4* were found. *Ifn $\gamma$*  expression was below detection level in most individuals.

Response variable	Independent variables	Type II Sum Sq	Df	F	Estimate $\pm$ SE	Pr(>F)
February anti- <i>Pd</i> titer	<b>September titer (high vs. low)</b>	<b>1454.48</b>	<b>1</b>	<b>54.70</b>	<b>-34.34<math>\pm</math>5.59</b>	<b>9.53E-08 ***</b>
	<b>Infection</b>	<b>760.64</b>	<b>1</b>	<b>28.61</b>	<b>25.46<math>\pm</math>3.12</b>	<b>1.52E-05 ***</b>
	<b>Time to euthanasia</b>	<b>127.05</b>	<b>1</b>	<b>4.78</b>	<b>-0.43<math>\pm</math>0.07</b>	<b>3.84E-02 *</b>
	Post-hibernation SMI	41.49	1	1.56	-1.47 $\pm$ 1.17	2.23E-01
	<b>September titer (high vs. low) x Infection</b>	<b>1007.48</b>	<b>1</b>	<b>37.89</b>	<b>-24.97<math>\pm</math>4.05</b>	<b>1.95E-06 ***</b>
	<b>September titer (high vs. low) x Time to euthanasia</b>	<b>798.15</b>	<b>1</b>	<b>30.02</b>	<b>0.47<math>\pm</math>0.08</b>	<b>1.09E-05 ***</b>
	(September titer (high vs. low) x Post-hibernation SMI)	18.62	1	0.68	2.94 $\pm$ 3.55	4.17E-01
	(Infection x Time to euthanasia)	3.75	1	0.14	0.04 $\pm$ 0.12	7.14E-01
	(Infection x post-hibernation SMI)	0.67	1	0.02	-0.53 $\pm$ 3.39	8.77E-01
	Residuals	664.73	25			
Interleukin-6, wing	<b>Infection</b>	<b>4.80</b>	<b>1</b>	<b>6.977</b>	<b>0.78<math>\pm</math>0.3</b>	<b>1.28E-02 *</b>
	<b>Post-hibernation SMI</b>	<b>6.05</b>	<b>1</b>	<b>8.792</b>	<b>0.52<math>\pm</math>0.17</b>	<b>5.78E-03 **</b>
	(Time to euthanasia)	0.30	1	0.400	0.007 $\pm$ 0.008	5.31E-01
	(Infection x Time to euthanasia)	0.31	1	0.42	-0.008 $\pm$ 0.012	5.22E-01
	(Infection x post-hibernation SMI)	0.11	1	0.15	0.15 $\pm$ 0.38	6.97E-01
	Residuals	21.35	31			
Interleukin-1 $\beta$ , wing	Infection	0.58	1	1.46	0.28 $\pm$ 0.23	2.36E-01
	<b>Post-hibernation SMI</b>	<b>3.08</b>	<b>1</b>	<b>7.71</b>	<b>0.36<math>\pm</math>0.13</b>	<b>9.24E-03 **</b>
	(Time to euthanasia)	0.3046	1	0.77	0.001 $\pm$ 0.006	3.88E-01
	(Infection x Time to euthanasia)	0.94	1	2.37	-0.01 $\pm$ 0.01	1.35E-01
	(Infection x post-hibernation SMI)	0.10	1	0.24	0.13 $\pm$ 0.27	6.26E-01
	Residuals	12.38	31			
Interleukin-6, lymph node	<b>Infection</b>	<b>1.82</b>	<b>1</b>	<b>5.71</b>	<b>0.53<math>\pm</math>0.22</b>	<b>2.47E-02 *</b>
	Post-hibernation SMI	1.34	1	4.22	-0.27 $\pm$ 0.13	5.06E-02 .
	(Time to euthanasia)	0.21	1	0.61	-0.002 $\pm$ 0.006	4.42E-01
	(Infection x Time to euthanasia)	0.09	1	0.20	-0.004 $\pm$ 0.01	6.61E-01
	(Infection x post-hibernation SMI)	0.04	1	0.12	-0.10 $\pm$ 0.29	7.29E-01
	Residuals	7.96	25			
Interleukin-17A, lymph node	<b>Infection</b>	<b>8.81</b>	<b>1</b>	<b>8.92</b>	<b>1.15<math>\pm</math>0.39</b>	<b>6.23E-03 **</b>
	Post-hibernation SMI	1.13	1	1.15	-0.24 $\pm$ 0.22	2.94E-01
	(Time to euthanasia)	0.27	1	0.26	-0.01 $\pm$ 0.01	6.18E-01
	(Infection x Time to euthanasia)	0.85	1	0.79	-0.01 $\pm$ 0.02	3.83E-01
	(Infection x post-hibernation SMI)	0.26	1	0.24	-0.24 $\pm$ 0.48	6.26E-01
	Residuals	24.68	25			