Supplementary Figures

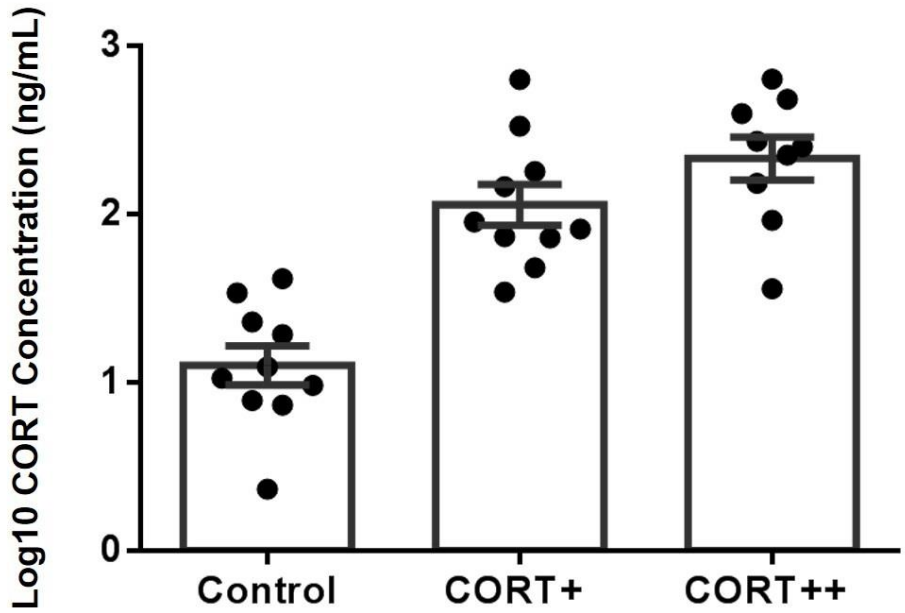


Figure S1: Validation of experimental hormone manipulation method. Implantation of CORT in zebra finches caused an increase in circulating levels of the glucocorticoid stress hormone in circulating serum (One-way ANOVA $F_{2,26} < 0.001$). Birds in the CORT + and CORT ++ treatments had higher levels of circulating hormone than control birds (Tukey HSD test, $P < 0.0001$ for both pairwise comparisons to the Control group; difference between CORT + and CORT ++ treatments was not significant, $P = 0.270$).

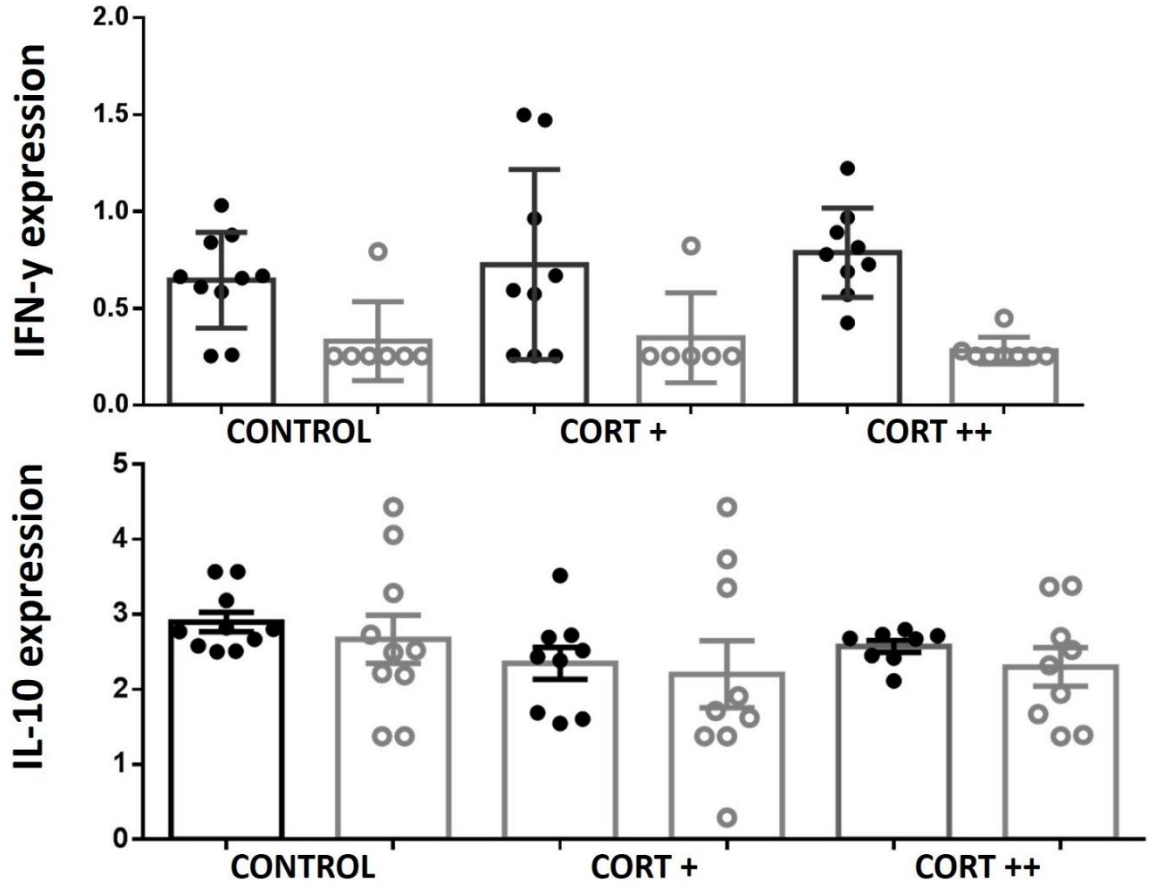


Figure S2A-B: Inflammatory and anti-inflammatory cytokine (IFN-γ and IL-10) expression levels (ng/mL) over time and across experimental CORT treatments. Black bars and points represent expression levels 2 days-post-inoculation and grey bars and points represent expression levels responses 4 days-post-inoculation. Circle symbols represent individuals, bar height indicates group average; error bars are +/- 1 SE of the mean. CORT treatment did not predict host cytokine expression levels ($X^2_2 = 0.503$, $P = 0.778$ for IFN-γ and $X^2_2 = 3.34$, $P = 0.188$ for IL-10). IFN-y, but not IL-10 expression decreased significantly from day 2 to 4 post-inoculation with WNV ($X^2_1 = 27.32$, $P < 0.0001$ for IFN-γ and $X^2_1 = 1.55$, $P = 0.213$ for IL-10).

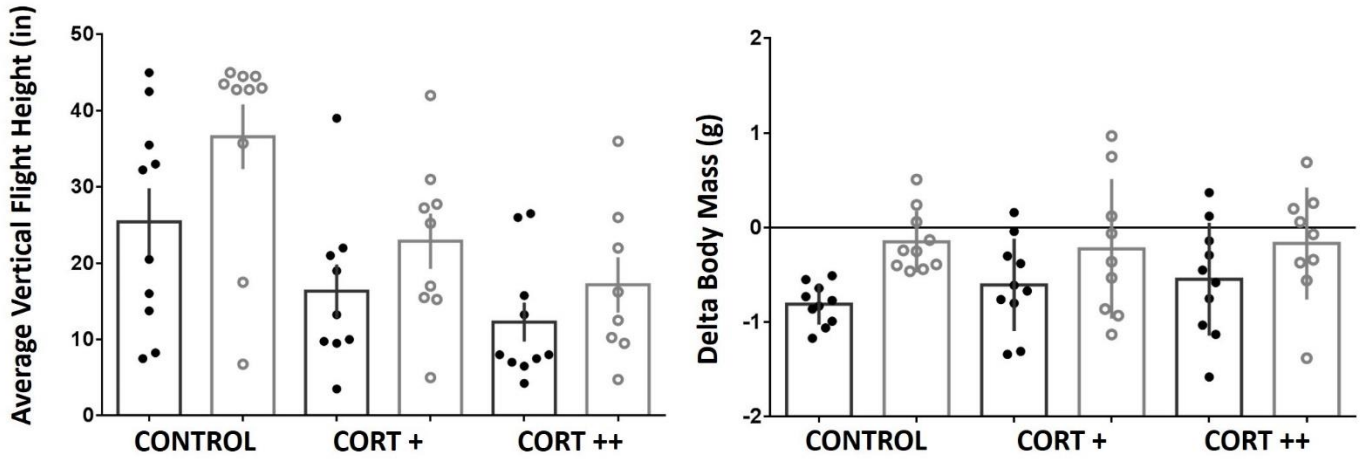


Figure S3A-B: Treatment and temporal differences in host performance after exposure to West Nile virus. Black outline and points corresponds to 2 days-post-inoculation; grey outline and points corresponds to 4 days-post-inoculation. (**A**) CORT treatment ($X^2_2 = 11.75$, $P = 0.0028$) and time ($X^2_1 = 40.77$, $P < 0.0001$) predicted vertical flight performance of hosts exposed to West Nile virus. (**B**) Time ($X^2_1 = 21.95$, $P < 0.0001$), but not CORT treatment ($X^2_2 = 0.3159$, $P = 0.8539$) predicted average mass performance (e.g., delta mass, or average change in body mass, in grams, from day 0-2 post-inoculation and day 2-4 post-inoculation.

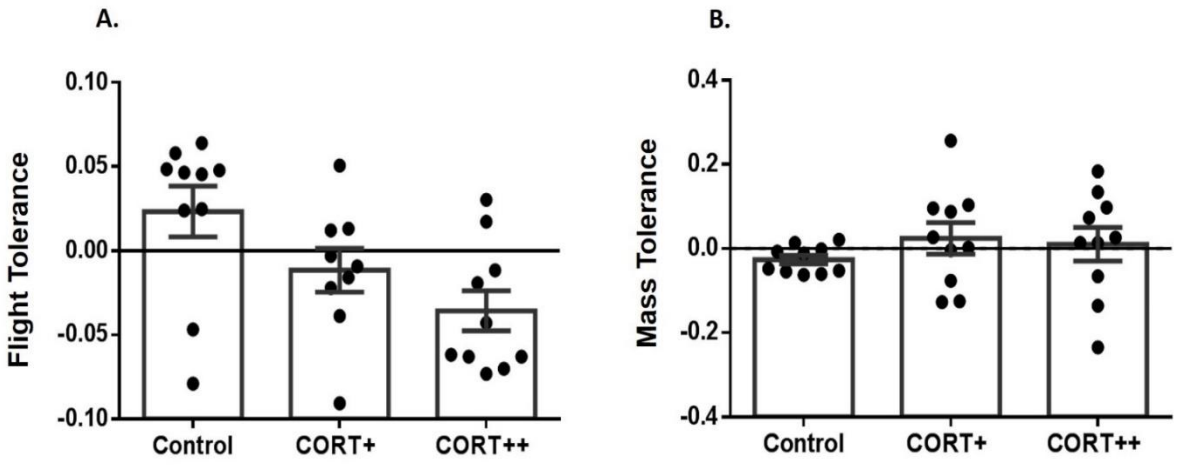


Figure S4A-B: CORT treatment tended to predict (**A**) host vertical flight tolerance (mean +/- 1 SE of the slope coefficients for the regressions between vertical flight height and viremia) of zebra finches ($F_{2,22}$ = 3.24, P = 0.0584). CORT treatment did not predict (**B**) host mass tolerance (mean +/- 1 SE of the slope coefficients for the regressions between body mass loss and viremia) in zebra finches ($F_{2,22}$ = 2.015, P = 0.1572). Bars depict group means and circle symbols indicate individual tolerance estimates.

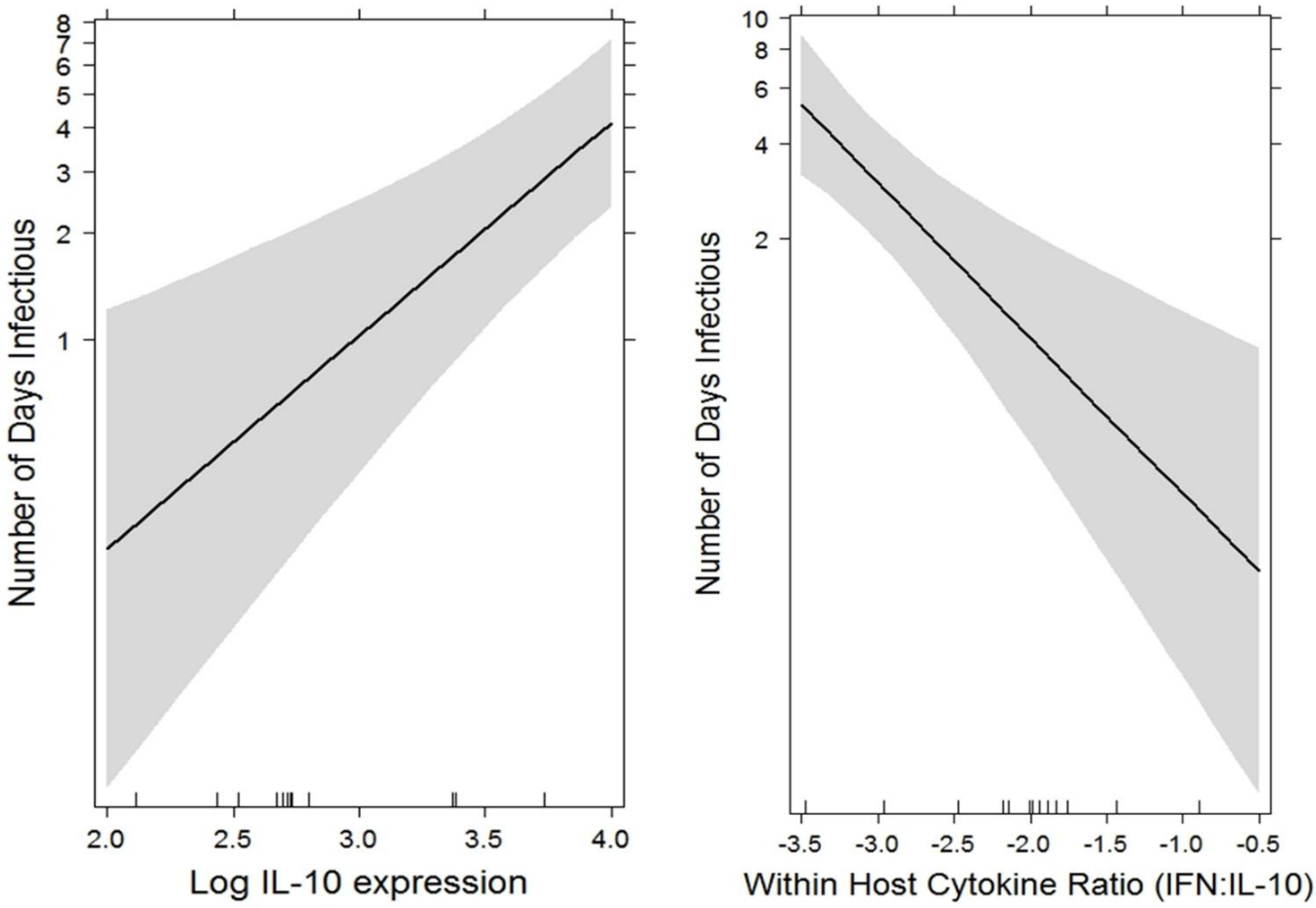
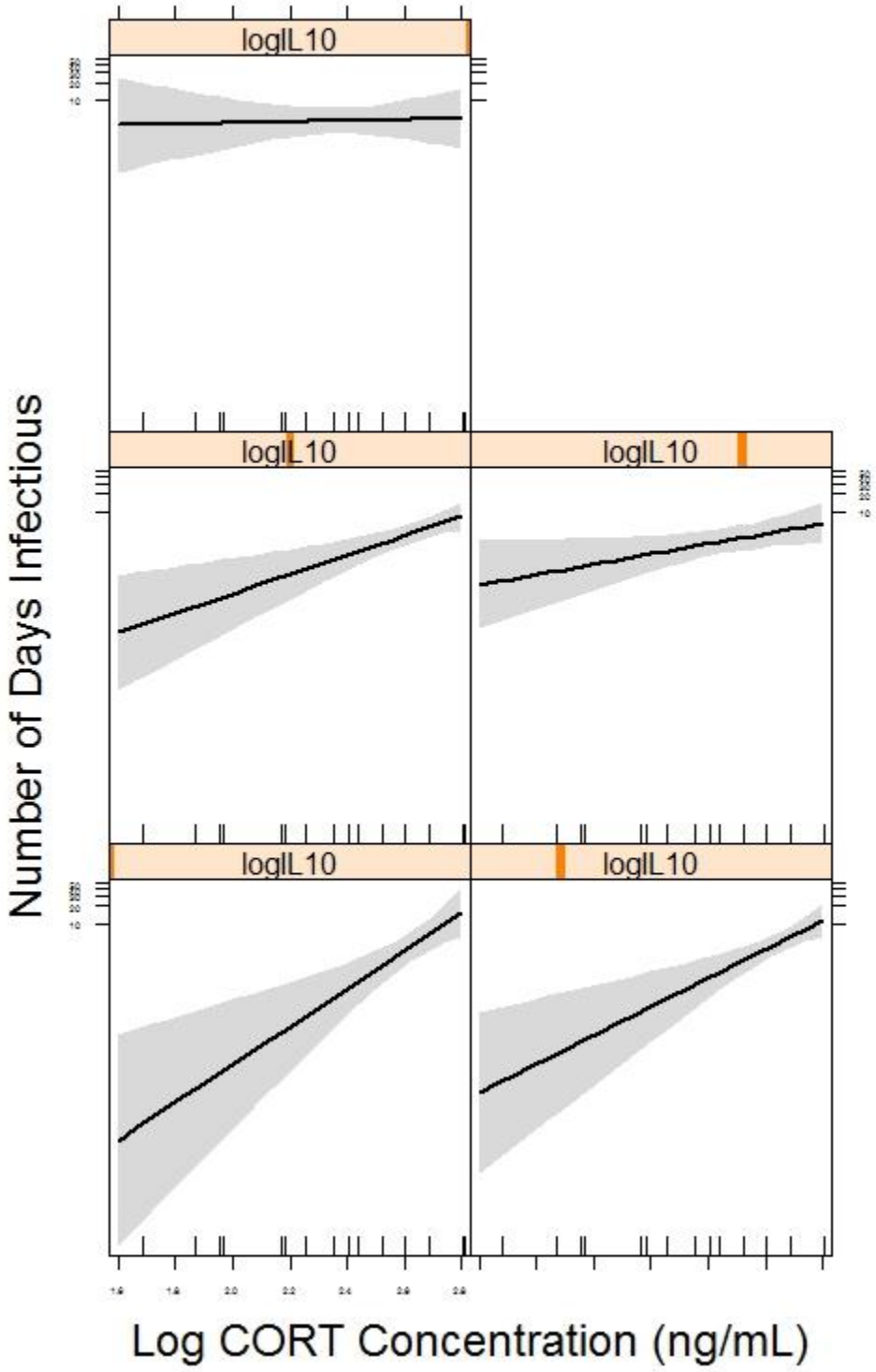


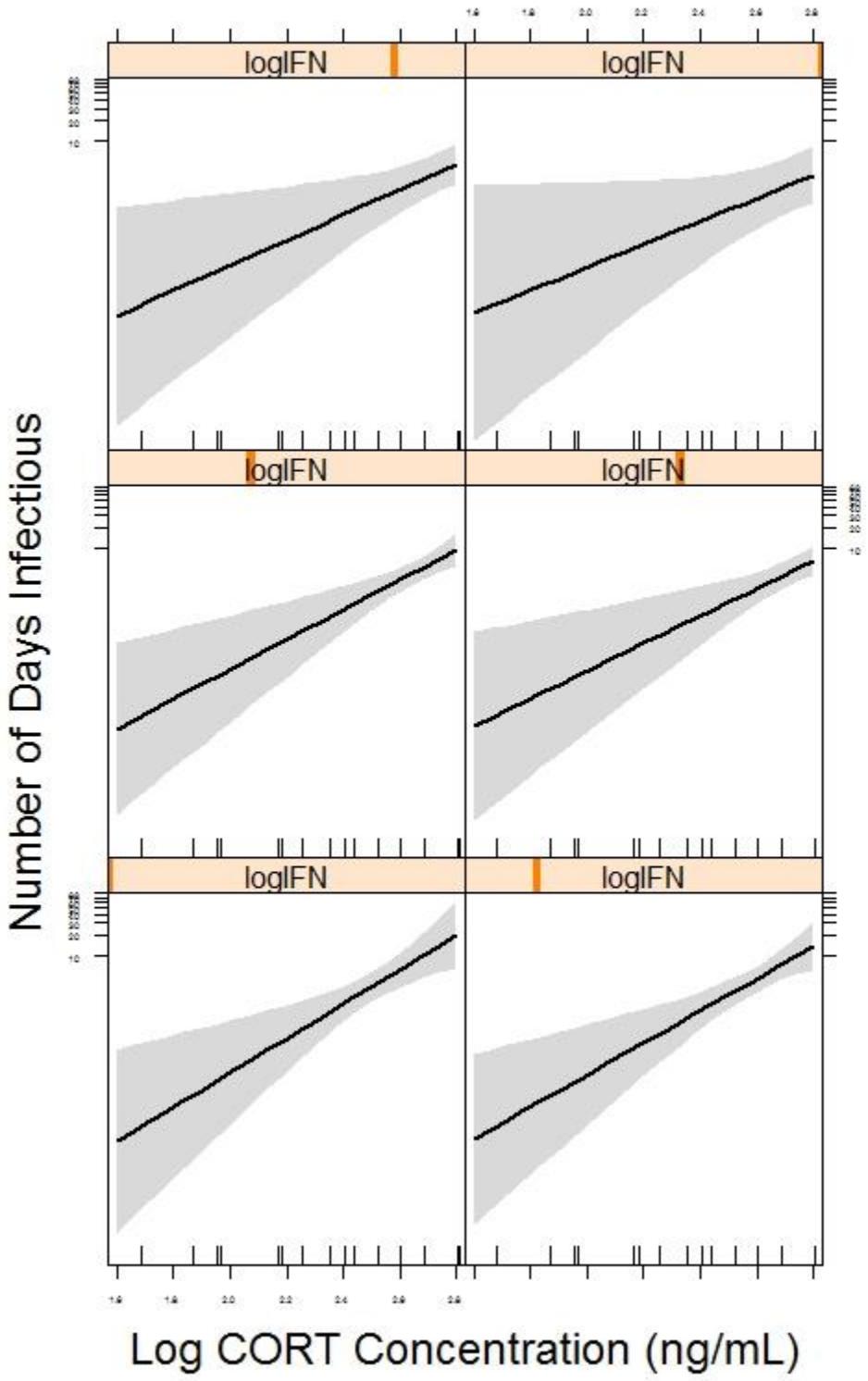
Figure S5A-B: Host cytokine expression predicted duration of infectiousness (i.e., the number of days a host was detected with viremia levels at or above the 10^5 pfu/mL transmission threshold). (**A**) Higher levels of the anti-inflammatory cytokine, IL-10, were predictive of a longer duration of infectiousness; $\beta = 8.75 \pm 4.21$, P = 0.038 for the null hypothesis of slope = 0 and P = 0.007 for the contribution of the main effect of IL-10 in a full versus reduced model using a likelihood ratio test. (**B**) Similarly, the ratio of inflammatory to anti-inflammatory cytokines (IFN-γ:IL-10) within an individual host predicted infectiousness; larger cytokine ratios (more IFN: IL-10) were associated with fewer days infectious ($\beta = -4.452 \pm 1.85$, P = 0.016 for the null hypothesis of slope = 0 and P = 0.015 for contribution of the main effect of cytokine ratio in a full versus

reduced model using a likelihood ratio test). In the effects displays, the lines depict the estimates and shaded regions represents the 95% confidence interval around the estimated effect on number of days infectious from a generalized linear model with a Poisson distribution. The vertical axis is labeled on the response variable scale, effects are plotted on the scale of the linear predictor, and the results come from a full model for infectiousness (which included CORT concentration and interactions with CORT concentration, Tables S2 and S3).

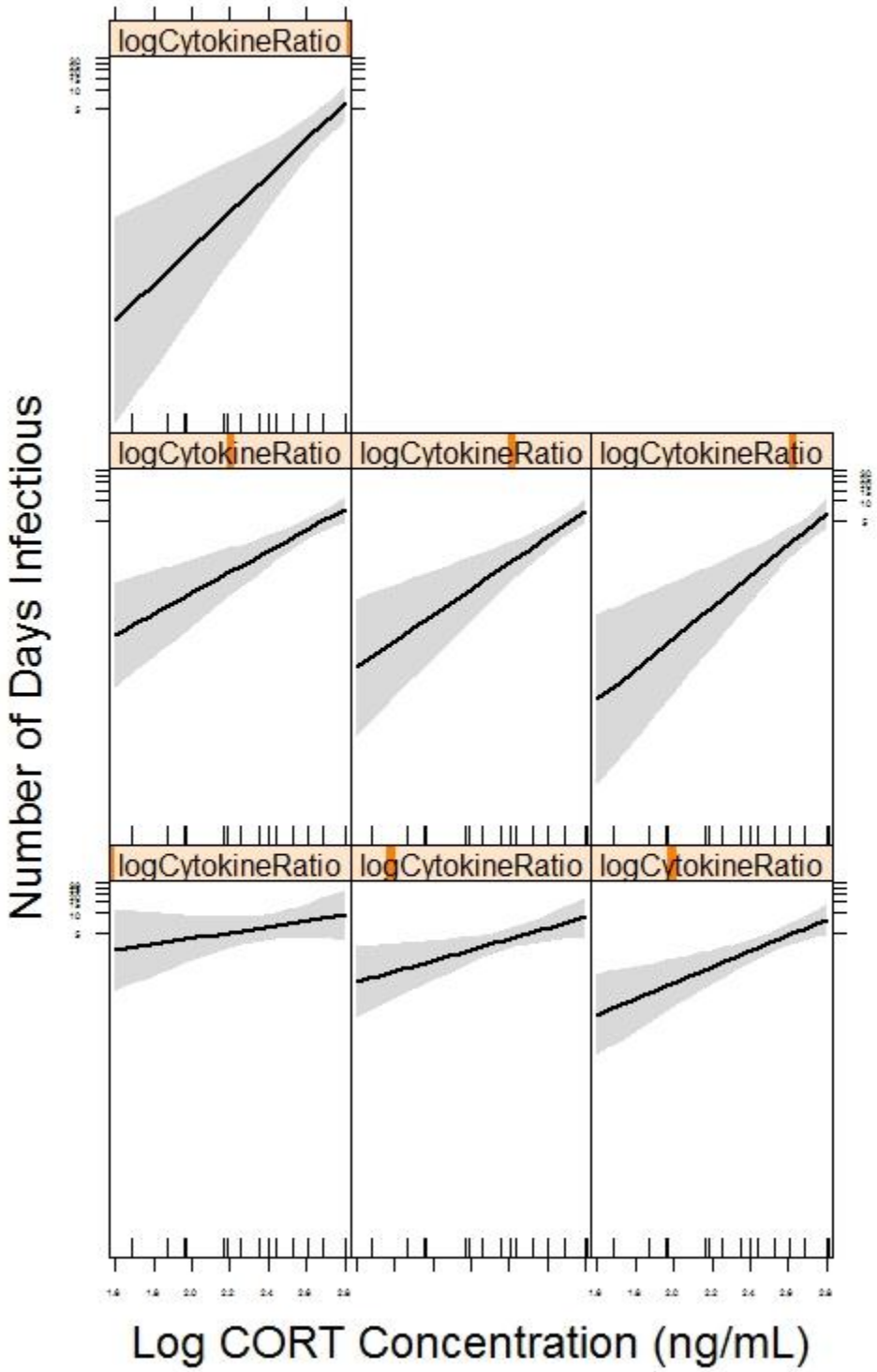
A.


logIL10
logIL10
logIL10
logIL10
logIL10
Number of Days Infectious
Log CORT Concentration (ng/mL)

B.


logIFN
logIFN
logIFN
logIFN
logIFN
logIFN
Number of Days Infectious
Log CORT Concentration (ng/mL)

C.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Number of Days Infectious
Log CORT Concentration (ng/mL)

Figure S6A-C: Effects displays for interactive effects of individual pre-inoculation CORT concentration and cytokine expression. (**A**) An interaction between individual pre-inoculation CORT concentration and IL-10 predicted number of days infectious ($\beta = -3.31 \pm 1.66$, $P = 0.046$); at high IL-10 expression levels, there was a weak or no relationship between individual pre-inoculation CORT concentration and individual duration of infectiousness, but at low IL-10 expression levels, pre-inoculation CORT concentration positively predicted duration of host infectiousness. (**B**) There was no interactive effect of IFN-γ and pre-inoculation CORT concentrations on infectiousness ($\beta = -1.53 \pm 2.53$, $P = 0.545$). (**C**) Within-host cytokine ratios interacted with pre-inoculation CORT concentrations to predict days infectious; when IFN-γ expression was high relative to IL-10 within a host, CORT strongly and positively predicted duration of infection. Conversely, when a host expressed little IFN-γ relative to IL-10 (smaller ratios), there was a weak relationship between CORT concentration and number of days infectious, $\beta = 1.546 \pm 0.694$, $P = 0.026$, Table S3. Predicted values in effects plots are from generalized linear models with a Poisson distribution (Table S2). A 95% confidence interval is drawn around the estimated effects for each level of the continuous explanatory variables. Each cube indicates a different level of IL-10 or IFN-γ or the size of the cytokine ratio across a range of host pre-inoculation CORT concentration values (x-axis). Orange bars in the headings of the cubes correspond to the level of cytokine expression (the orange bar is to the far left when values of the predictors (cytokine or cytokine ratios) are lowest and the orange bar is the far right when values of the predictors are highest). Also see Table S2 and S3.

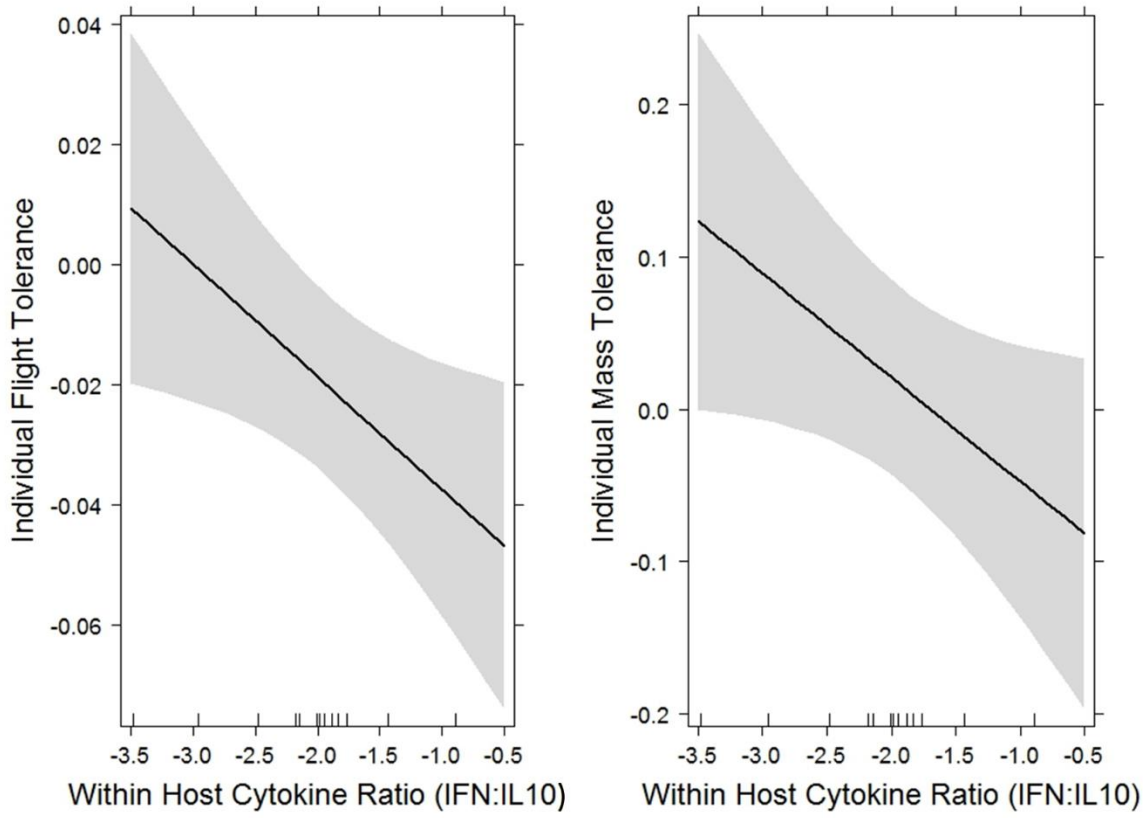

Figure S7A-B: (**A**) Host flight tolerance of WNV infection was predicted by within-host cytokine ratios ($F_{1,13} = 6.465$, $P = 0.024$); more tolerant hosts expressed less IFN-γ relative to IL-10 ($\beta = -0.019 \pm 0.007$). (**B**) Host mass tolerance of WNV infection was also predicted by within-host cytokine ratios ($F_{1,13} = 4.81$, $P = 0.047$). As with flight tolerance, smaller cytokine ratios, or less IFN-γ relative to IL-10 expression predicted greater individual mass tolerance ($\beta = -0.068 \pm 0.031$). In the above effects displays, lines depict estimates and shaded areas represent the 95% confidence interval around the estimated effect of the predictor on host tolerance. The vertical axis is labeled on the response variable scale, effects are plotted on the scale of the linear predictor, and the results come from linear model regression models fitted with main effects of cytokines and pre-inoculation CORT concentrations on flight or mass tolerance, respectively.