

**Table S1.** Characteristics of included studies.

Study	Species (English name)	Species (scientific name)	Dosing regimen	Sample size (n)	Condition of birds	Time points for data collection	Control	Environ ment	Comments
<b>Enrofloxacin</b>									
[48]	Caribbean flamingo	Phoenicopterus ruber	PO 15mg/kg SD SC 15mg/kg SD	7 7	Healthy Healthy	0.25, 0.5, 1, 2,4,8,12, and 24h post-administration	None	Have access to indoor facility & outdoor exhibit	-
[45]	Southern crested caracara	Caracara plancus	IV 5 mg/kg SD IM 10mg/kg SD	4 4	Healthy Healthy	0,5,15,35min and 1,2,4,6,8,10,12,24,29,34h after injection 0,10,20,40min and 1,2,4,6,8,10,12,24,29,34h after injection	None None	-	-
[42]	African penguin	Spheniscus demersus	IV 15mg/kg SD PO pill 15mg/kg PO pill in fish 15mg/kg	5 5 5	Healthy Healthy Healthy	0, 0.5, 1,2,4,8,12,24,36, and 48h	None None None	24 °C	-
[35]	Common ostrich	Struthio camelus	IM 15mg/kg q12h x 3 days	6	Healthy	Before and at 10,20,30,45 min and at 1,1.5,2,3,4,6,8,12 and	None	-	-

			SC	15mg/kg	6	Healthy	24h after the first administration. Before and 2h after each subsequent administration.	None		
[44]			IV	5mg/kg	SD	5	Healthy	0,5, 10,15,30, 45,60, 90 min	None	- -
			IM	5mg/kg	SD	5	Healthy	and 2,3,4,6,8,10,12, 24,48 and 72h after dosing	None	
[46]	Emu	<i>Dromaius novaehollandiae</i>	IV	2.2 ± 0.03 mg/kg	SD	3	kyphosis, lordosis and scoliosis since young but otherwise healthy	7.5, 15, 30, 60, 90 min and 2,4,6,8, 12,16 and 24h post-injection	None	Kept indoors -
[34]	Greater rhea	<i>Rhea americana albescens</i>	IM	15mg/kg	SD	6	Healthy	0,5,10,15,30,45,60,90 mins and at 2,3,4,6,8,10, 24,48h after dosing	None	- -
[4]	Houbara bustard	<i>Chlamydotis undulata</i>	IM	10mg/kg	SD	8	Healthy	0.25, 0.50, 0.75, 1, 2, 3, 4, 6, 8, 10, 12, 24,48h	None	19.8 - -
		<i>macqueenii</i>	PO	10mg/kg	SD	8	Healthy		None	45.7°C, 13.3-13.5h of light
			IV	10mg/kg	SD	8	Healthy	0.25, 0.50, 0.75, 1, 2, 3, 4, 6, 8, 10, 12, 24,48h and at 5min	None	26.5 - 46.7°C, 12.8h of light

[37]	Red-tailed hawk	Buteo jamaicensis	PO in prey 8	Chronic muco-skeletal or ocular abnormalities present but otherwise healthy	0.25, 0.5, 1, 2, 4, 8, 12, 24, 48h after administration	None	-	Fasted 12h before and 13h after drug administration
			15mg/kg SD					
			IM 15mg/kg SD					
	Great horned owl	Bubo virginianus	IV 15mg/kg SD 8					
			PO in prey 5					
			15mg/kg SD					
[36]	African grey parrot	Psittacus erithacus	IM 15mg/kg SD	Healthy	0.5, 1,2,4,6,8,12,24h after administration	None	Indoors, -	controll ed temperature and lighting
			PO 3mg/kg SD	Healthy				
			PO 15mg/kg SD	Healthy				
			PO 30mg/kg SD	Healthy				
			PO 30mg/kg q12 x 10 days	Healthy				
[47]	Greater rhea	Rhea americana albescens	IV 15mg/kg SD 6	Healthy	0,5,10,15,30,45,60,90 mins and at 2,3,4,6,8,10,24,48h after dosing	None	-	-

[49]	African grey parrot	Psittacus erithacus	0.09, 0.19, 0.38, 0.75, 1.5 and 3.0 mg/mL x 7 days	4 birds each	Healthy	8 am and 3pm on treatment days 4 and 7	4 birds received unmedicated water	13h light (7am-8pm)	-	-
	Common pheasant	Phasianus colchicus L.	IV 10mg/kg SD PO 10mg/kg SD	6 6	Healthy	8:00-8:30 AM at 0.25, 0.5, 1,2,4,6,8,10,24h after drug administration	None	-	-	Fasted 12h prior to drug administration
<b>Marbofloxacin</b>										
[50]	Eurasian buzzard	Buteo buteo	IO 2mg/kg SD	5	Healthy	0,5,15,30,45,60min and 2,4,6,8,10,12,24h	None	-	-	-
[51]	Eurasian griffon vulture	Gyps fulvus	IV 2mg/kg SD	6	Healthy		None	-	-	-
[52]	Blue and gold macaw	Ara araranua	IV 2.5mg/kg SD PO 2.5mg/kg SD	10 10	Healthy Healthy	0, 0.5, 1,3,6,12,24,48,72,96h after administration	None None	Housed outdoors	-	-
[53]	Common ostrich	Struthio camelus	IV 5mg/kg SD IM 5mg/kg SD	6 6	Healthy Healthy	0,5,10,15,30,45,60,90 min and 2,3,4,6,8,10,12,24,48,72h after dosing	None None	-	-	-
	Common pheasant	Phasianus colchicus L.	IV 5mg/kg SD PO 5mg/kg SD	6 6	Healthy	8:00-8:30 AM at 0.25, 0.5, 1,2,4,6,8,10,24h after drug administration	-	-	-	Fasted 12h prior to drug

administration												
[54]	Eurasian buzzard	Buteo buteo	IV 2mg/kg SD	4	Healthy	0,5,15,30,45,60min and 2,4,6,8,10,12,24,30h post-administration	None	-	-	-	-	-
[56]	Eurasian buzzard	Buteo buteo	PO 10mg/kg SD	8	Healthy	0, 0.25, 0.5, 0.75, 1,2,4,8,6,12,24,36h,48h post-administration	None	Outdoor flight enclosure	Fasted before of study	24h start	-	-
<b>Gentamicin</b>												
[57]	Budgerigar	Melopsittacus undulatus	IM 5mg/kg SD	20	Healthy	15,30,45,60,120minutes after drug administration	-	-	-	-	-	-
[62]	Scarlet macaw	Ara macao	IM 10mg/kg SD	20	Healthy	0.5,1,3,6,9, and 12h after drug administration	None	-	-	-	-	-
			IM 10mg/kg SD	30	Healthy							
			IM 5mg/kg q12h x 7 days	10	Healthy							
	Galah	Eolophus roseicapilla	IM 5mg/kg SD	15	Healthy	0.5,1,3,6,9, and 12h after drug administration	None	-	-	-	-	-
			IM 10mg/kg SD	15	Healthy							
			IM 5mg/kg q12h x 7 days	10	Healthy							

								physiolog ical saline			
[58]	Great horned owl	Bubo virginianus	IM 10mg/kg q12h x 5 days	8	Healthy			8 owls given sterile saline	-	-	
[59]	Red-tailed hawk	Buteo jamaicensis	IV 10mg/kg q12h x 4 days	5	Permanently crippled but	Days 1,2, and 4		None	-	-	
			IV 20mg/kg q12h x 6 days	5	otherwise healthy			None	-	-	
[60]	Lanner falcon	Falco biarmicus	IM 5mg/kg OD x 4 days	2	Severe respiratory tract infection with rapid weight loss	Not mentioned		none	-	-	
<b>Amikacin</b>											
[61]	Cockatiel	Nymphicus hollandicus	IM 5mg/kg q12h x 3 days	12	Healthy	before the sixth injection and at 1.5, 3.3, 4.5, 6 and 7h following the sixth injection		2 birds given IM lactated ringers solution	Outdoor aviary	-	
	Ring- necked pheasant	Phasianus colchicus	IM 5mg/kg SD IM 10mg/kg SD	5 7	Healthy Healthy			None None			

			IM	20mg/kg	3	Healthy		None	
			SD						
	Greater sandhill crane	Grus canadensis tabida	IM	5mg/kg	SD 8	Healthy		None	
			IM	10mg/kg	1	Healthy		None	
			SD						
			IM	20mg/kg	1	Healthy		None	
			SD						
[64]	Red-tailed hawks	Buteo jamaicensis	IV	10mg/kg	SD 5	Wing injuries but otherwise healthy	0, 0.5, 1,2,4,6,8,10,18 and 24h post injection	None	21-23°C, -
			IM	10mg/kg	5			None	10h light
			SD						
	Great horned owl	Bubo virginianus	IV	10mg/kg	SD 5			None	
			IM	10mg/kg	5			None	
			SD						
	Golden eagle	Aquila chrysaetos	IV	10mg/kg	SD 3			None	
			IM	10mg/kg	3			None	
			SD						
[68]	Blue-fronted amazon parrot	Amazona aestiva aestiva	IV	15mg/kg	SD 8	Healthy	immediately, 15, 30, and 1,2,4,6,8h after IV administration	None	26-30 °C, -
			IM	15mg/kg	8	Healthy	1,2,4,6,8h after IM administration	None	12h light
			SD						
[69]	Red-tailed hawks	Buteo jamaicensis	IM	20mg/kg	6	Healthy	5,15,30,45min and 1,3,4,6,8,10,12, and 24h post-injection	None	- -
			SD						

[70]	Emu	Dromaius novaehollandiae	IV 7.2 ± 0.12 mg/kg SD	3	Healthy	5,15,30,45,60,75,90 min and 2,4,5,6,8,10,12 and 24h post-injection	None	Indoor enclosure	-
[67]	African grey parrot	Psittacus erithacus	IV 5mg/kg SD	30	Healthy	0,5,15,30 and 45min and 1,2,4,8,24h post-administration. 0min is before injection	None	-	-
			IV 10mg/kg SD	30	Healthy		None		
			IV 20mg/kg SD	30	Healthy		None		
			IM 5mg/kg SD	24	Healthy	0,15,45min and 1,2,4,8,24h post-administration	None		
			IM 10mg/kg SD	24	Healthy		None		
			IM 20mg/kg SD	24	Healthy		None		
Ceftiofur									
[73]	Red-tailed hawks	Buteo jamaicensis	IM 10mg/kg SD	7	Healthy	-	None	-	-
			IM 20mg/kg SD	7	Healthy		None		
[74]	Ringneck dove	Streptopelia risoria	IM 50mg/kg SD	30	Healthy	0, 1,2,4,8,12,24,48,72,96,120,144, 168 and 192h post injection	0.5, 6 untreated birds	-	-
[75]	Cattle egret	Bubulcus ibis	IM 20mg/kg SD	18	Healthy	1,2,4,8,12,24,48,72,96,120,144, 168,192,216,240h	None	-	-
[72]	Cockatiel	Nymphicus hollandicus	IM 10mg/kg SD	60	Healthy	0, 0.5, 1, 2,4, 8,12h	None	-	-
[72]	Orange-winged	Amazona amazonica	IM 10mg/kg SD	27	Healthy	0.5, 1,2 ,4 12, 24h	None		



	amazon parrot									
[77]	Helmeted guineafowl	Numida meleagris	IM SD	10mg/kg	14	Healthy	-	None	-	-
[76]	American flamingo	Phoenicopte- rus ruber	IM SD	10mg/kg	11	Healthy	just prior to administration	None	-	-
			SC SD	10mg/kg	2	Healthy	and 2,4,8,12,24,32,48,56,72,96,144 and 192h post administration	None		
[78]	American black duck	Anas rubripes	IM SD	10mg/kg	14	-	-	None	-	-
<b>Doxycycline</b>										
[79]	Houbara bustard	Chlamydotis undulata	IM 100mg/kg x 7 doses at intervals of 7,7,7,6,6,5 days	10	Healthy	After the first and seventh injection at the following intervals: 0 (before injection),12,24,36,48,72,96,14	None	9.4- 31.8 °C, 13h light	-	
			SC 100mg/kg x 7 doses at intervals of 7,7,7,6,6,5 days	4	Healthy	4,168 (just before the second injection),180h	None			
[80]	Orange- winged amazon parrot	Amazona amazonica	IM 100mg/kg commercial formulation (20mg/mL) SD	5	All were slightly to moderately overweight	3,24,48,72,96,120,144 hours after injection 22,23,26	None	18-22°C, 12h light	-	
			IM 100mg/kg PC 75mg/mL SD	4	at the start but were	3,12,24,32,48,72,96,168 hours after injection	None			

			IM 100mg/kg 4	otherwise healthy	0900-1030 on days 1,3,7,10,13,15,17,20	None after			
			(PC 100mg/mL) SD		injection				
	Goffin's cockatoo	Cacatua goffini	IM 100mg/kg 4 (PC 75mg/mL) SD	Healthy	3,12,24,32,48,72,96,168	hours	None		
			IM 100mg/kg 4 (PC 100mg/mL) SD	Healthy	0900-1030 on days 1,3,7,10,13,15,17,20	after	None		
	Tinneh African grey parrot	Psittacus Erithacus tinneh	IM 100mg/kg 4 (PC 100mg/mL) SD	Healthy	0900-1030 on days 1,3,7,10,13,15,17,20	after	None		
			SC 100mg/kg 4 (PC 100mg/mL) SD	Healthy			None		
[81]	Cockatiel	Nymphicus hollandicus	IM 100mg/kg 6 q10 days x 5 doses	Healthy	7am on days 7,10,20,30,40,51	4 birds fed unmedicated pellets and water	18-25°C, 12h light	No calcium or other dietary supplements were provided	
			0.28mg/mL x 3 45 days MW	Healthy	7am on days 10,20,30,45				
			0.83mg/mL x 6 45 days MW	Healthy	7am on days 3,7,15,25,35,45				
			500mg/kg seed mixture x 45 days	Healthy		6 birds fed unmedicated mixed			

			1000mg/kg mash x 45 days	6	Healthy	7am on days 3 and 7	seeds and water 6 birds fed unmedica ted mash and water		
[82]	Cockatiel	Nymphicus hollandicus	300mg/kg pellets x 47 days	9 of 47	Healthy	830am on 3,7,14,21,28,35,42 days	6 birds fed unmedica ted pellets	20-24°C, 10h light	No cuttlebone, mineral blocks or other nutritional supplements provided
[83]	Cockatiel	Nymphicus hollandicus	400mg/L x 30 days MW	11	Naturally infected with spiral bacteria	-	7 birds naturally infected with spiral bacteria fed unmedica ted water	-	-
[84]	Budgerigar	Melopsittacu s undulatus	300mg/kg seeds x 42 days	- of	Healthy	morning on treatment days 4,7,14,21,28,35,42 or in the	Fed unmedica	-	-

			0,50,100,200,400mg/L x14d MW	-	Healthy	afternoon on days 12,26, and 40	ted seeds and water		
[85]	African grey parrot	Psittacus	400mg/L x 7 4 days MW		Healthy	Days 3 and 7	None	18-22°C, 12h light	Birds switched from pelleted feed to commercial parrot seed diet 8 days before starting the trial to avoid possible chelation of doxycycline by calcium present in the pelleted feed.
		Erithacus tinneh	800mg/L x 7 4 days MW		Healthy		None		
			800mg/L x 42 7 days MW		Healthy	0830 on days 4,7,14,21,28,35,42	4 birds fed unmedicated water		
	Goffin's cockatoo	Cacatua goffini	400mg/L x 7 4 days		Healthy	Days 3 and 7	None		
			800mg/L x 7 4 days		Healthy		None		
			800mg/L x 42 8 days MW		Healthy	0830 on days 4,7,14,21,28,35,42	4 birds fed unmedicated water		
	Orange-winged amazon parrot	Amazona amazonica	400mg/L x 7 4 days		Some were moderately	Days 3 and 7	None		
			800mg/L x 7 4 days		obese but otherwise healthy	Days 3 and 7	None		
[86]	Blue-and-gold macaw,	Ara ararauna Ara macao	1000mg/kg of corn x 45 days	10 3	Healthy	Days 3,15,30,45	None	-	-

	scarlet macaw									
[87]	beautiful fruit black-naped dove, Jambu fruit doves, ring-necked dove	Ptilinopus pulchellus, Ptilinopus melanospila, ptilinopus jambu, streptopelia capicola	500mg/L x 45 days MW	18	5/18 birds were tested positive for C.psittaci by PCR testing of choano-cloacal swabs	1100 on days 3,8,14,21,35,42	None	10.5h light	-	
[88]	Common ostrich	Struthio camelus	IV 15mg/kg SD IM 15mg/kg SD PO 15mg/kg SD	10 10 10	Healthy	At 0 (pretreatment), 0.08, 0.25, 0.5,1,2,4,6,8,12,24,48h after administering the drug	None	Isolated open system pen	Food withheld 12h before and 6h after drug administration	
[89]	Cockatiel	Nymphicus hollandicus	PO gavage 35mg/kg q24h x 21 days PO gavage 35mg/kg q24h x 45 days	crop 8 crop 8	Healthy cockatiels artificially infected with Chlamydia psittaci	On days 14 and 21 2-4h after drug administration	6 artificially infected and non-treated birds	12h photoperiod	-	

[90]	Exotic columbiformes for a zoo (species not mentioned)	-	PO oral gavage 50mg/kg x OD 45d	38	Birds infected with chlamydia psittaci	Not measured	None	-	-
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