

Supplementary

Table A. Hematological parameters in mammalian species.

Animal	species	HCT/ Pcv %	Hb %	Rbc # X 10 ⁶ μL ⁻¹	Mcv fL	Wbc # μL ⁻¹	references
Sub-class <i>Prototheria</i>							
Order <i>Monotremata</i>							
Platypus	<i>Ornithorhynchus anatinus</i>	49	18	8.97	52	30,500	Mean of Clark, 2004 and Geraghty et al., 2011
Short-beaked Echida	<i>Tachyglossus aculeatus</i>	42.9	15.9	6.7	66.6	10,700	mean 9 studies cited in Clark, 2004
Long beaked Echida	<i>Zaglossus bruijnii</i>	29	12.6	1.5	198		Cited Clark, 2004
Mean		40.3 3 5.93	15.5 + (3) 1.57	5.72 + (3) 2.21	105.5 + (3) 46.5	20,600 + (2) 10,000	
Sub-class <i>Marsupialia</i>							
Order <i>Dasyuromorphia</i>							
Family <i>Dasyuridae</i>							
Brown Antechinus	<i>Antechinus stuartii</i>	44.6	14.1	9.34	42.2	5,425	Mean 3 studies cited in Clark, 2004
Eastern Quoll	<i>Dasyurus viverrinus</i>	45	16.9	10.3	43.3	4,967	Mean from 4 studies cited in Clark, 2004
Northern Quoll	<i>Dasyurus hallucatus</i>	46.2	15.6	-		11,300	Mean from 3 studies cited in Clark, 2004
Western Quoll	<i>Dasyurus geoffroii</i>	40.9	14.5	7.91	53	7,112	Mean from 4 studies cited in Clark, 2004
Fat-tailed Dunnart	<i>Sminthopsis crassicaudata</i>	34.5	11.4	6.75	39.4	3,300	Mean from 3 studies cited in Clark, 2004
Striped-faced Dunnart	<i>Sminthopsis macroura</i>	-	-	6.65	-	8,550	Mean from 3 studies cited in Clark, 2004
Kowari	<i>Dasyuroides byrnei</i>	55	16.7	8.1	64	-	Clark, 2004
Red-tailed phascogale	<i>Phascogale calura</i>	47.5	16.4	11.15	45	3,900	Mean from 2 studies cited in Clark, 2004
Brush-tailed phascogale	<i>Phascogale tapoatafa</i>	46	16.15	9.2	51	3,150	Clark, 2004
Tasmanian devil	<i>Sarcophilus harrisi</i>	41.3	15.46	6.42	67	11,887	Mean 5 studies cited in Clark, 2004
Mean family and order		44.6 + (9) 1.86	15.25 + (9) 0.58	8.31 + (9) 0.59	50.6 + (8) 3.62	6621 + (9) 1,107	
Order <i>Didelphimorphia</i>							
Family <i>Didelphidae</i>							
American Woolly Opossum	<i>Caluromys derbianus</i>	37	13.8	4.7	78.8	11,800	Rothstein and Hunsaker, 1972
Grayshort-tailed Opossum	<i>Monodelphis domestica</i>	34.9	13.1	6.61	53	15,190	Evans et al., 2010
Virginia Opossum	<i>Didelphis virginiana</i>	39	11.2	4.9	82	10,000	Youatt et al., 1961
Mean family		37 + (3) 1.19	12.7 + (3) 0.78	5.4 + (3) 0.61	71.3 + (3) 9.19	12,330 + (3) 1523	
Order <i>Diprotodontia</i>							
Family <i>Macropodidae</i>							
Agile Wallaby	<i>Macropus agilis</i>	49	16.7	5.38	92.5	6,080	Clark, 2004
Antilopine Kangaroo	<i>Macropus antilopinus</i>	45	15.3	7.37	61	8,500	Cited in Clark, 2004
Black Striped Wallaby	<i>Macropus dorsalis</i>	52	17.3	6.84	76	5,350	Clark, 2004

Common Wallaroo	<i>Macropus robustus</i>	42	12.4	7.37	78	7,100	mean 5 studies cited in Clark, 2004
Eastern Grey Kangaroo	<i>Macropus giganteus</i>	45.1	15.3	5.86	81	10, 130	mean 5 studies cited in Clark, 2004
Parma Wallaby	<i>Macropus parma</i>	47.2	14.8	7.11	68.7	5,100	Clark et al., 2003; Clark, 2004
Red Kangaroo	<i>Macropus rufus</i>	44.3	16.4	4.95	94.7	4,500	Mean from 9 studies cited in Clark, 2004
Red-necked Wallaby	<i>Macropus rufogriseus</i>	47.3	16.47	5.42	87.5	4,975	Mean 6 studies cited in Clark, 2004
Tammar Wallaby	<i>Macropus eugenii</i>	37.5	14.2	5.9	73.2	4.75	Mean 6 studies cited in Clark, 2004
Western Grey Kangaroo	<i>Macropus fuliginosus</i>	47.5	16.6	5.25			Cited in Clark, 2004
Whip-tail Wallaby	<i>Macropus parryi</i>	52	17.4	4.93	113	4,200	Clark, 2004
Bridled Nail-tail Wallaby	<i>Onychogalea fraenata</i>	51	17.1	5.65	91	9,520	Clark, 2004
Northern Nail-tail Wallaby	<i>Onychogalea unguifera</i>	62	21.7	5.8	107	3,310	Clark, 2004
Swamp Wallaby	<i>Wallabia bicolor</i>	52	17.3	6.86	71	6,400	Clark, 2004
Allied Rock-wallaby	<i>Petrogale assimilis</i>	41.2	13.5	5.01	82.5	6,380	Mean 3 studies cited in Clark, 2004
Brush-tailed Rock-Wallaby	<i>Petrogale penicillata</i>	42	14.9	5.9	70	7,400	Barnes et al., 2008
Proserpine Rock-wallaby	<i>Petrogale persephone</i>	46	14.9	6.81	65	7,680	Clark, 2004
Purple-necked Rock-wallaby	<i>Petrogale purpureicollis</i>	55	18.9	5.87	94	7,610	Clark, 2004
Unadorned Rock-wallaby	<i>Petrogale inornata</i>	37	11.6	5.09	72	6,230	Clark, 2004
Yellow-footed Rock-wallaby	<i>Petrogale xanthopus</i>	44	14.6	5.54	79	7,800	Clark, 2004
Rufous Hare-Wallaby	<i>Lagorchestes hirsutus</i>	55	18.9	8	69	-	Clark, 2004
Spectacled Hare-Wallaby	<i>Lagorchestes conspicillatus</i>	51.5	17.5	6.65	69	5,269	Clark, 2004
Quokka	<i>Setonix brachyurus</i>	41	14.3	6.19	62.2	13,000	Mean 9 studies cited in Clark, 2004
Red-legged Pademelon	<i>Thylagale stigmatica</i>	52	17.03	7.36	70	4,985	Mean 3 studies cited in Clark, 2004
Tasmanian Pademelon	<i>Thylagale billardieri</i>	46.5	16.22	6.32	77.2		Mean 2 studies cited in Clark, 2004
Goodfellow's Tree-kangaroo	<i>Dendrolagus goodfellowi</i>	50	17.5	6.1	81.4	6,800	Clark, 2004
Lumholtz's tree-kangaroo	<i>Dendrolagus lumholtzi</i>	46	15.5	5.72	81	8,030	Clark, 2004
Matschie's Tree-kangaroo	<i>Dendrolagus matschiei</i>	46.2	17	6.18	77	5,700	Mean 2 studies cited in Clark, 2004
Family Mean		47.4 + (28) 1.05	16.1 + (28) 0.39	6.09 + (28) 0.16	79.8 + (28) 2.53	6540 + (28) 515	
Family Phascolarctidae							
Koala	<i>Phascolarctos cinereus</i>	38.96	12.19	3.54	112.2	7,125	Mean 13 studies cited in Clark, 2004
Family Phalangeridae							
Common Brush-tailed Possum	<i>Trichosurus vulpecula</i>	40.6	13.3	6.09	67	8,027	mean 9 studies cited in Clark, 2004
Mountain Brushtail Possum	<i>Trichosurus cunninghami</i>	36	12.3	4.95	74.1	4,450	Clark, 2004
Scaly-tailed Possum	<i>Wyluda squamicaudat</i>	43	14	-	-	4,400	mean 2 studies cited in Clark, 2004
Family Potoroidae							
Boodie	<i>Bettongia lesueur</i>	40	10.7				Clark, 2004
Gilbert's Potoroo	<i>Potorous gilbertii</i>	36	12.58	6.2	61.8	3,120	Vaughan et al., 2009 (9.2)
Long-nosed Potoroo	<i>Potorous tridactylus</i>	49	15.7	8.95	-	7,630	Mean 3 studies cited in Clark, 2004
Rufous Rat-kangaroo	<i>Aepyprymnus rufescens</i>	50	16.5	6.08	83	6,490	Clark, 2004
Family Mean		42.7 + (4) 3.42	13.9 + (4) 1.35	7.08 + (4) 0.94			
Family Pseudocheiridae							
Common Ringtail Possum	<i>Pseudocheirus peregrinus</i>	44	14.25	5.57	79.25	6,450	mean 2 studies cited in Clark, 2004

Herbert River Ringtail Possum	<i>Pseudochirulus herbertensis</i>					4,900	Clark, 2004
Greater Glider	<i>Petauroides volans</i>	37	12.15	5.4	66	3,950	Clark, 2004
Sugar Glider	<i>Petaurus breviceps</i>	45.5	14.5	7.4	64	15,950	Clark, 2004
Scaly-tailed possum	<i>Wynulla squamicaudata</i>	43	14.05	-	-	4,400	mean 2 studies cited in Clark, 2004
Family <i>Vombatidae</i>							
Common Wombat	<i>Vombatus ursinus</i>	38.08	12.6	5.438	69.1	11,800	Mean 6 studies cited in Clark, 2004
Northern Hairy-nosed Wombat	<i>Lasiorbinius krefftii</i>	36.5	12.3	4.27	85.5	7490	Reiss et al., 2008
Southern Hairy-nosed Wombat	<i>Lasiorbinius latifrons</i>	41	13.5	5.04	80.5	11,800	Mean 5 studies cited in Clark, 2004
Mean Order		45.2 + (43) 0.91	15.1 + (43) 0.35	5.98 + (39) 0.17	78.9 + (38) 2.17	6793 + (39) 470	
Order <i>Peramelemorphia</i>							
Family <i>Thalacomyidae</i>							
Bilby	<i>Macrotis lagotis</i>	55	17.1	7.47	73	13,500	Clark, 2004
Family <i>Peramelidae</i>							
Eastern Barred Bandicoot	<i>Perameles gunnii</i>	45	16.1	-	-	2,800	Clark, 2004
Northern Brown Bandicoot	<i>Isodon macrourus</i>	41	-	-	-	15,150	Mean 2 studies cited in Clark, 2004
Southern Brown Bandicoot	<i>Isodon obesulus</i>	44	14.6	-	-	3,700	Clark, 2004
Mean Order		46.2 + (4) 3.04	15.9 + (4) 0.73			8788 + (4) 3220	
Super-order <i>Afrotheria</i>							
Order <i>Proboscidea</i>							
African Elephant	<i>Loxodonta africana</i>		7.08	3.77		11,000	Debbie and Clausen, 1975
Asian Elephant	<i>Elephas maximus</i>	38	12.7	3.2	118	18,000	Silva and Kuruwita, 1993
Order <i>Hyracoidea</i>							
Rock hyraxes	<i>Procavia capensis</i>	31.4	8.3	4.66	69.5	16	Aroch et al., 2007
Order <i>Sirenia</i>							
West Indian Manatee	<i>Trichechus manatus</i>	35.1	11.2	2.76	128	5980	Harvey et al., 2009
Super-order <i>Xenarthra</i>							
Order <i>Cingulata</i>							
Big Hairy Armadillo	<i>Chaetophractus villosus</i>	34.7	19.95	3.83	91.6	9,717	Casanave and Polini, 1999
Nine-banded armadillo	<i>Dasybus novemcinctus</i>	38		3		12,287	Deem et al., 2009
Three-Banded armadillo	<i>Tolypeutes matacus</i>	33		3.1		10,048	Deem et al., 2009
Pichi	<i>Zaedyus pichiy</i>	49.3	16	4.3	120.2	4700	Superina et al., 2008
Order <i>Pilosa</i>							
Hoffmann's Two-Toed Sloths	<i>Choloepus hoffmanni</i>	39.9	14.25	3.15	122.7	13,500	Wallace and Oppenheim, 1996
Southern Two-toed Sloth							
	<i>Choloepus didactylus</i>	35.7	11.5	2.6	135.9	18,600	Vogel et al., 1999
Giant Anteater							
	<i>Myrmecophaga tridactyla</i>	37.7	11.8	2.36	165.2	11,870	Sanches et al., 2013
Collared Anteater							
	<i>Tamandua tetradactyla</i>	34.8	10.73	3.15	116.1	8,070	Sanches et al., 2013
Order means		37.0 + -4 1.13	12.1 + -4 0.76	2.81 + (4) 0.20	135 + (4) 10.9	13,010 4 2183	
Super-order <i>Xenarthra</i> mean		37.9 + -8 1.81	14.0 + -6 1.43	3.17 + (4) 0.22	125.3 + (4) 9.93	11,099 + (4) 1,447	
Order <i>Cetacea</i>							
Family <i>Balaenopteridae</i>							
Blue Whale	<i>Balaenoptera musculus</i>		9.6	3.84			Clark, 2004
Bryde's Whale	<i>Balaenoptera edeni</i>	48	15.4	3.6	133	6,000	Priddel and Wheeler, 1998
Bowhead whale	<i>Balaena mysticetus</i>	59	20.3	3.3	178		Castellini et al., 2010

Common Minke Whale	<i>Balaenoptera acutorostrata</i>	50	18.25				Clark, 2004
Fin Whale	<i>Balaenoptera physalus</i>					9,550	Clark, 2004
Sei Whale	<i>Balaenoptera borealis</i>		15.6				Clark, 2004
Family <i>Eschrichtiidae</i>							
Gray Whale	<i>Eschrichtius robustus</i>	48	14	3.3	129		Cited in Priddel and Wheeler, 1998
Family <i>Delphinidae</i>							
Killer Whale	<i>Orcinus orca</i>	44.4	15.9	4.03	110.8	8,550	mean 7 studies summarized in Clark, 2004
False Killer Whale	<i>Pseudorca crassidens</i>	48	15.2	4.43	108	7,900	Clark, 2004
Short-finned Pilot Whale	<i>Globicephala macrorhynchus</i>	43.3	15.7	3.69	116	8,530	mean 3 studies summarized in Clark, 2004
Common Bottlenose Dolphin	<i>Tursiops truncatus</i>	44.7	15.4	3.9	115.2	9,002	mean 9 studies Clark, 2004
Hector's Dolphin	<i>Cephalorhynchus hectori</i>		19.45			6,350	Clark, 2004
Pacific White-sided Dolphin	<i>Lagenorhynchus obliquidens</i>	48.9	17.1	5.32	92.4	5,928	Shirai and Sakai, 1998
Risso's Dolphin	<i>Grampus griseus</i>	51.5	21.4	4.63	112.5	5,000	mean 2 studies Clark, 2004
Short-beaked Common Dolphin	<i>Delphinus delphis</i>	50.5	17.7	4.75	107	4,730	Clark, 2004
Striped Dolphin	<i>Stenella coeruleoalba</i>	56.5	20.9	-	-	-	Clark, 2004
Family mean		48.5 + (8) 1.56	17.6 + (9) 0.80	4.39 + (7) 0.21	108.8 + (7) 3.02	6999 + (8) 602	
Family <i>Monodontidae</i>							
Beluga whale	<i>Delphinapterus leucas</i>	53	19.9	3.7	145.4	18,500	Norman et al., 2012
Family <i>Physeteridae</i>							
Sperm whale	<i>Physeter macrocephalus</i>	42	15.1	2.1	195		Clark, 2004
Pygmy Sperm Whale	<i>Kogia breviceps</i>	50	15.7				Clark, 2004
Mean Order		49.3 + (15) 1.25	16.8 + (18) 0.68	3.89 + (13) 0.22	128.5 + (12) 8.81	8,185 + (11) 1,201	
Order <i>Carnivora</i>							
Family <i>Phocidae</i>							
Crab-eater Seal	<i>Lobodon carcinophaga</i>		20	4.31			mean 5 studies Clark, 2004
Harbor Seal	<i>Phoca vitulina</i>	57.8	19.8	5.81	102	8100	Gregg et al., 2010
Harp Seal	<i>Phoca groenlandica</i>	55	23	3.85	135	7400	Boily et al., 2006
Hooded Seal	<i>Cystophora cristata</i>	61.5	26.3	3.88	141.5	7800	Boily et al., 2006
Leopard Seal	<i>Hydrurga leptonyx</i>	50	18.9	4.59	105.5		mean 2 studies Clark, 2004
Northern Elephant Seal	<i>Mirounga angustirostris</i>	57	22.3	2.5	225	10,612	Yochem et al., 2008
Southern Elephant Seal	<i>Mirounga leonina</i>	59.5	19.5	5.38	184.7	15,300	Mean 6 studies cited in Clark, 2004
Ringed Seal	<i>Pusa hispida</i>	51	26	4.2	122		Castellini et al., 2010
Weddell Seal	<i>Leptonychotes weddellii</i>	50.1	21.4	3.73	168		Mean 6 studies cited in Clark, 2004
Mean Family		55.2 + (8) 1.58	21.9 + (9) 0.92	4.25 + (9) 0.32	148 + (8) 14.9	9842 + (5) 1476	
Family <i>Otariidae</i>							
Antarctic Fur Seal	<i>Arctocephalus gazella</i>	49	-	6.2	78.5	-	Fayolle et al., 2000
Australian Sea Lion	<i>Neophoca cinerea</i>	56.3	19	5.53	102.9	11,300	Needham et al., 1980
California Seal Lion	<i>Zalophus californianus</i>	48.5	17.5	4.5	106.5	7350	Calculated from Norberg et al., 2011
New Zealand Sea lion	<i>Phocarcos bookeri</i>	51	-	-	-	-	
Northern Fur Seal	<i>Callorhinus ursinus</i>	46	15.1	4.6	101	9,310	Norberg et al., 2011
Steller Sea lion	<i>Eumetopias jubatus</i>		17.6	4.3	115.2		Calculated from Richmond et al., 2005
Mean Family		50.2 + (5) 1.73	17.3 + (4)	5.03 + (4) 0.36	100.8 + (5) 6.08	9320 + (3)	

			8.1			1142	
Family <i>Mustelidae</i>							
Eurasian otter	<i>Lutra lutra</i>	54.7	15.1	6.4	85.2	7,320	Fernández-Morán et al., 2001
North American River Otter	<i>Lontra Canadensis</i>	47.6	15.1	10.99	43.3	11,300	Tocidlowski et al., 2000
Sea Otter	<i>Enhydra lutris</i>	55.4	17.92	5.11	110.2	8,660	Williams and Pulley, 1983
Giant Otter	<i>Pteronura brasiliensis</i>	50.7	16.4	6.42	74.6	5,400	Rosas et al., 2008
European Badger	<i>Meles meles</i>	33.2	11.2	7.1	46.2	6,600	Mahmood et al., 1988
Ferret	<i>Mustela putorius</i>	45.9	15.1			8597	Lee et al., 1982
Long-tailed Weasel	<i>Mustela frenata</i>	44	12.3	7.4	36	8,800	Youatt et al., 1961
American Mink	<i>Mustela vison</i>	46.6	15.5	7.9	59	5,885	Weiss et al., 1994
Family <i>Feverriidae</i>							
Common Palm Civet	<i>Paradoxurus hermaphroditus</i>	41.7	13.3	13.3	32.5	6,262	Salakij et al., 2007
Family <i>Ursidae</i>							
American Black Bear	<i>Ursus americanus</i>	45.5	15.3	6.75	67.5	14,810	Schoeder, 1987
Andean Bear	<i>Tremarctos ornatus</i>	43	14.4	7.87	53.2	9,110	Castellanos et al., 2010
Asiatic Black Bear	<i>Ursus thibetanus</i>	43.2	15.3	6.44	66.4	8,934	Pospisil et al., 1987a; Chang et al., 2006
Brown Bear	<i>Ursus arctos</i>	46.7	15.7	6.48	71.9	12,900	Kusak et al., 2005
Malayan Sun Bear	<i>Helarctos malayanus</i>	36.7	13	5.06	73.6	10,140	Bush et al., 1980
Sloth Bear	<i>Melursus ursinus</i>	42.25	15.2	5.92	73.8	12,460	Mean Bush et al., 1980; Shanmugam et al., 2008
Spectacled Bear	<i>Tremarctos ornatus</i>	44.3	15.4	8.43	50.4	6,320	Bush et al., 1980
Family mean		43.1 + (7) 1.21	14.9 + (7) 0.35	6.71 + (7) 0.43	65.3 + (7) 3.64	10,668 + (7) 1091	
Family <i>Ailuridae</i>							
Red Panda	<i>Ailurus fulgens</i>	42.4		9		7050	Wolff et al., 1990
	<i>Ailurus fulgens</i>						
Family <i>Mephitidae</i>							
Striped Skunk	<i>Mephitis mephitis</i>	38.8	12.2	7.33	53	7,670	Mustonen et al., 2013
Western Spotted Skunk	<i>Spilogale gracilis</i>	33.6	10.4	7.54	44.2	8540	Crooks et al., 2003
Family <i>Procyonidae</i>							
Raccoon	<i>Procyon lotor</i>	31	8.3	8.7	37	11,300	Youatt et al., 1961
Family <i>Felidae</i>							
Canada Lynx	<i>Lynx canadensis</i>	39	14	7.4	52	9300	Moen et al., 2010
Eurasian Lynx	<i>Lynx lynx</i>	39.2	14.8	8.51	46.4	7920	Pospisil et al., 1987b
Domestic cat	<i>Felis domesticus</i>						O'Brien et al., 1998
European Wildcat	<i>Felis silvestris</i>	37.7	12.1	9.38	40.4	14,670	Marco et al., 2000
Sand Cat	<i>Felis margarita</i>	46.2	13.6	9.4		6,800	Chege et al., 2013
Bobcat	<i>Felis rufus</i>	36.44	11.88	8.03	44.42	11,880	Miller et al., 1999
Fishing Cat	<i>Felis viverrina</i>	41.5	12.1	6.9	63.1	7,070	Prihirunkit et al., 2007
Cougar	<i>Felis concolor</i>	43	16.39	8.51	46.3	7730	Pospisil et al., 1987b
Jungle Cat	<i>Felis chaus</i>	36	12	6.14	58.3	12,580	Salakij et al., 2010
Pampas Cat	<i>Leopardus colocolo</i>	47.8		6.8		8,400	Beltrán et al., 2009
Flat-headed Cat	<i>Prionailurus planiceps*</i>	27.5	9.15	6	45.9	13,900	Salakij et al., 2008b
* Infected with Hepatozoa HCT, Hb, rbc# excluded from calculations as outside mean +/- 2SD and wbc # excluded due to diseased state							
Clouded Leopard	<i>Neofelis nebulosa</i>	41.4	13.53	7.09	58.6	14,550	Mean: Pospisil et al., 1987b; Singh et al., 1999; Salakij et al., 2008a
Jaguar	<i>Panthera onca</i>	36.65	12.255	7.96	46.3	16,175	Mean: Pospisil et al., 1987b; Mus-sart et al., 2009

Tiger	<i>Panthera tigris</i>	53.4	15.7	8.7	54.45	12,557	Mean: Pospisil et al., 1987b; Singh et al., 1999; Sajjad et al., 2012
Leopard	<i>Panthera pardus</i>	44.9	14.6	8.58	53.55	10,700	Mean: Pospisil et al., 1987b; Singh et al., 1999
Lion	<i>Panthera leo</i>	40.85	13.85	8.47	48.8	14,375	Mean: Pospisil et al., 1987b; Maas et al., 2013
Cheetah	<i>Acinonyx jubatus</i>	38.45	13.375	7.445	52	9,850	Mean: Pospisil et al., 1987b; Bechert et al., 2002
Mean Family		41.5 + (15) 1.26	13.6 + (14) 0.38	7.95 + (15) 0.25	51.1 + (13) 1.8	10,970 + (15) 800	
				Or	50.8 + (14) 1.7	including	Flat-headed Cat
Family <i>Herpestidae</i>							
Egyptian Mongoose	<i>Herpestes</i>	41.7	14.9	8.6	48.3	13,900	Paromares et al., 1992
	<i>Ichneumon</i>						
Family <i>Hyaenidae</i>							
Striped Hyena	<i>Hyaena hyaena</i>	44.5	17.8	8.11	51.2	13,800	Pospisil et al., 1987a
Family <i>Canidae</i>							
Hunting Dog	<i>Lycan pictus</i>	43.3	17.34	8.45	50.95	12,880	Pospisil et al., 1987a
Grey Wolf	<i>Canus lupus</i>	46.5	17.2	7.45	63.8	7,330	Pospisil et al., 1987a
stray dogs		40.1	12.4	6.1	78.2	1000	55.9
Coyote	<i>Canis latrans</i>	49	14.7	7.7	63.4	8,900	Gates and Goering, 1976
Golden Jackal	<i>Canis aureus</i>	38.4	12.6	6.28	60	16,800	Aroch et al., 2005
Asian Wild Dog	<i>Cuon alpinus</i>					16,375	Salakij et al., 2000
Maned Wolf	<i>Chrysocyon brachyurus</i>	40.7	13.1	5	82.1	10,200	May-Júnior et al., 2009
Crab-eating Fox	<i>Cerdocyon thous</i>	38.1	12.9	4.27	89.8	7,350	Mattoso et al., 2012
Ranch Gray Fox	<i>Urocyon cinereoargenteus</i>	48	17	10.8		9,300	Benn et al., 1986
Family <i>Eupleridae</i>							
Fossa	<i>Cryptoprocta feroc</i>	48.4	15.2	9.6	51.3	9300	Langer et al., 2013
Order <i>Pholidota</i>							
Tree Pangolin	<i>Manis tricuspis</i>	40.4	10	4.2	97.7	4,800	Oyewale et al., 1997b
Order <i>Rodentia</i>							
Family <i>Cricetidae</i>							
Hispid Cotton Rat	<i>Sigmodon hispidus</i>	34.4	10.5	4.8	70.3		Robel et al., 1996
Norwegian Lemming	<i>Lemmus lemmus</i>	41.9	14.4	9.91	42.3	2,535	Wiger, 1977
Muskrat	<i>Ondatra zibethicus</i>	46.6	16.1	5.95	78.3	10,780	Ahlers et al., 2011
Pine Vole	<i>Microtus pinetorum</i>	40.8	15	11	37.5	4,102	Harvey et al., 2008
Family <i>Dipodidae</i>							
Northern Birch Mouse	<i>Sicista betulina</i>	43.8	14.7	9.85	45.4	1,655	Wolk, 1985
Family <i>Erethizontidae</i>							
Brazilian Porcupine	<i>Coendou prehensilis</i>	33.75	11	3.6	94	7,900	Moreau et al., 2003
Black-tailed Hairy Dwarf Porcupine	<i>Coendou melanurus</i>	33	10.8	3.5	93.7	8,400	Moreau et al., 2003
Bristle-spined Rat or Thin-spined Porcupine	<i>Chaetomys subspinosus</i>	33.2	10.3	3.45	100.8	8,350	de Almeida Curi et al., 2012
Family <i>Muridae</i>							
Algerian mouse	<i>Mus spretus</i>	47	13.2	7	70.1	3,677	Mira and da luz Mathias, 1994
Carpenterian Rock-rat	<i>Zyzyomys palatalis</i>	40	11.8	5.99	67	1,300	Old et al., 2007
Central Rock-rat	<i>Zyzyomys pedunculatus</i>	51	12.2	6.22	64	8,550	Old et al., 2005
House Mouse	<i>Mus musculus domesticus</i>	51.2	13.5	7.13	67.8	3,675	Mira and da luz Mathias, 1994
Libyan Jird	<i>Meriones libycus</i>	39.9	12.4	6.36	45.9	8535	Mean of Madjzadeh et al., 2011; Alagaili et al., 2013
Persian Jird	<i>Meriones persicus</i>			3.87		3,817	Madjzadeh et al., 2011
Dusky-footed Wood Rat	<i>Neotoma fuscipes</i>	36.96	11.23	7.72	48.4	10,858	Weber et al., 2002
Plains Rat	<i>Pseudomys australis</i>	42	13.3	7.25	58	6,100	Old et al., 2005

Short-tailed Bandicoot Rat	<i>Nesokia indica</i>			4.51		4,828	Madjdzadeh et al., 2011
Spinifex Hopping-mouse	<i>Notomys alexis</i>	38	12.8	7.78	48.7	3200	Old et al., 2005
Indian Gerbil	<i>Tatera indica</i>			4.07		4,067	Madjdzadeh et al., 2011
Lab Rat				4.78		4,775	Madjdzadeh et al., 2011
Sand Rat	<i>Psammomys obesus</i>	41.15	11.9	6.72	61.8	5,345	Kane et al., 2012
Swamp rat	<i>Rattus lutreolus</i>	48	18.9	7.1	70	13,500	Clark, 2004
Wood Mouse	<i>Apodemus sylvaticus</i>	48	17.3	10.1	47.9	7,340	Rogival et al., 2006
Family Myocastoridae							
Coypu	<i>Myocastor coypus</i>	43	9.6	4.5	96.8	11,550	Martino et al., 2012
Family Nesomyidae							
Gambian Pouched Rat	<i>Crictomys gambianus</i>	48.3	14.36	5.9	86.8	7,560	Oyewale et al., 1998
Family Scuridae							
American Red Squirrel	<i>Tamiasciurus hudsonicus</i>	43	11.5	8.9	50	900	Youatt et al., 1961
Grey Squirrel	<i>Sciurus carolinensis</i>						Hoff et al., 1976
Fox Squirrel	<i>Sciurus niger</i>	44	11.4	8.5	58	3,600	Youatt et al., 1961
Woodchuck	<i>Marmota monax</i>	41	11.6	7.4	35	10,900	Youatt et al., 1961
Family Thryonomyidae							
Greater Cane Rat	<i>Thryonomys swinderianus</i>	41.5	14.2	8.4	71.9	10,733	Opara et al., 2006
Order Lagomorpha							
Eastern Cottontail Rabbit	<i>Sylvilagus floridanus</i>	43	11.5	6.3	69	7,900	Youatt et al., 1961
European Brown Hare	<i>Lepus europaeus</i>	60	20.8	10	60.5	3,190	Marco et al., 2003
Riparian Brush Rabbit	<i>Sylvilagus bachmani</i>	37.75	12.1	5.95	63.7	8050	Black et al., 2009
Order Artiodactyla							
Family Cervidae							
Axis deer	<i>Axis axis</i>	38	14.2	12.5	30.3	3,900	Hawkey and Hart, 1985
Barasingha	<i>Cervus duvauceli</i>	43	15.3	8.7	48.8	4,300	Hawkey and Hart, 1985
Elk	<i>Cervus canadensis</i>	67.2	19.2	11	62	8,628	Pedersen and Pedersen, 1975
Red Deer	<i>Cervus elaphus</i>	48.8	16.3	9.8	49.5	8,070	Shideler et al., 2002
Fallow deer	<i>Dama dama</i>	41.4	15.9	9.6	43.4	4,690	English and Lepherd, 1981
Persian Fallow Deer	<i>Dama mesopotamica</i>		15	7.76	49.9	3,260	Mohri et al., 2000
Marsh deer	<i>Blastocerus dichotomus</i>	41	14.09	4.75	48.1	9,450	Szabó et al., 2005
Moose	<i>Alces alces</i>	46	16.1	6.8	69	3,200	Rostal et al., 2012
Mule Deer	<i>Odocoileus hemionus</i>	48	18.2	13	37	3,900	DelGiudice et al., 1990
White-tailed Deer	<i>Odocoileus virginianus</i>	32	11.7	11.96	26.5	3980	Presidente et al., 1973
Père David's Deer	<i>Elaphus davidianus</i>	42	15.2	8.3	50.3	3,600	Hawkey and Hart, 1985
Pudu	<i>Pudu pudu</i>	51.7	19.7	11.2	48.2	7,997	
Reindeer	<i>Rangifer tarandus</i>	44	17.2	9.29	47.8	6,330	Catley et al., 1990.
Roe Deer	<i>Capreolus capreolus</i>	44	16.7	12.42	35.9	4,817	Montane et al., 2002
Rusa Deer	<i>Cervus timorensis</i>	35	13.3	6.2	58.1	7,000	Tomkins and Jonsson, 2005
Sambar Deer	<i>Cervus unicolor</i>	42	13.1	9.6	44.3	4,500	Gono, 1993
Sika Deer	<i>Cervus nippon</i>	28	10.7	9	31	2,300	Yamanaka, 1989.
Eld's Deer	<i>Panolia eldii</i>	397	12.3				Nimitsuntiwong et al., 2000
Family mean		42.0 + (15) 1.57	15.1 + (16) 0.60	9.65 + (14) 0.61	44 + (14)2.84	4,420 + (14) 601	
Family Bovidae							
Sub-family Aepycerotinae							
Impala	<i>Aepyceros melampus</i>	44.2	15	22.89		5,600	Drevemo et al., 1974
Sub-family Antilopinae							
Erlanger's Gazelle	<i>Gazella erlangeri</i>	50.8	18.97	12.98	39.3	6140	Aljumaah and Hussein, 2011
Goitered Gazelle	<i>Gazella subgutturosa</i>	51.6	18.85	11.7	45.1	10,080	Yaralioglu et al., 2004
Grant's Gazelle	<i>Gazella granti</i>	40.9	15.7	9.64		2,580	Drevemo et al., 1974
Speke's Gazelle	<i>Gazella spekei</i>	46.6	17.5				Travis and Eby, 2006
Thompson's Gazelle	<i>Gazella thomsonii</i>	44.9	16.7	10.22		3,030	Drevemo et al., 1974
Sub-family Bovinae							
African Buffalo	<i>Syncerus caffer</i>	30.5	11.6	9.38	36	10,455	Mean of Drevemo et al., 1974; Beechler et al., 2009
American Bison	<i>Bison bison</i>	50	17.2			6,985	Marler, 1975

Greater Kudu	<i>Tragelaphus strepsiceros</i>	42	15.5	7.09	61.3	3,020	Pospíšil et al., 1984a
Subfamily Caprinae							
Spanish Ibex	<i>Capra pyrenaica</i>	39.5	14	17.16	23	14,700	Casas-Díaz et al., 2008
Mountain Goat	<i>Oreamnos americanus</i>	41.5	13.3	9.7	43.5	9,500	Rice and Hall, 2007
Rocky Mountain Bighorn Sheep	<i>Ovis Canadensis</i>	53.1	18.6	10.1		8,824	Woolf and Kradel, 1970; McDonald et al., 1981
Stone Sheep	<i>Ovis dalli</i>	50.6	18.5	6,842		5,400	261
Big horn Sheep	<i>Ovis canadensis</i>			-		10,800	228
Domestic Sheep	<i>Ovis aries</i>	35	12.3	9		4,700	98
Family Giraffidae							
Giraffe	<i>Giraffa camelopardalis</i>	43	14.4	10.15			Drevemo et al., 1974
Sub-family Hippotraginae							
Roan Antelope	<i>Hippotragus equinus</i>	38	13.5	11.5	35.1	4,700	Pospíšil et al., 1984a
Sable Antelope	<i>Hippotragus niger</i>	44	15.6	15.5	28.8	4,300	Pospíšil et al., 1984a
Mountain Reedbuck	<i>Redunca fulvorufula</i>	53	17.87	8.69	59.9	3,520	Pospíšil et al., 1984b
Waterbuck	<i>Kobus ellipsiprymnus</i>	44.7	15.35	11.24	40.7	4,890	Pospíšil et al., 1984b
Lechwe	<i>Kobus leche</i>	53.8	19.61	8.39	68.8	4,500	Pospíšil et al., 1984b
Mrs Gray's Waterbuck	<i>Kobus megaceros</i>	46.6	17.31	8.77	51.8	-	Pospíšil et al., 1984b
Springbok	<i>Antidorcas marsupialis</i>	48	15.59	11.06	43.3	7,170	Pospíšil et al., 1984b
Adax Antelope	<i>Addax nasomaclatus</i>	47.7	16.46	10.37	45.4	7,170	Pospíšil et al., 1984a
Gemsbok Oryx	<i>Oryx gazella</i>	43	14.75	12.62	34.05	7,080	Pospíšil et al., 1984a
Scimitar-horned Oryx	<i>Oryx dammah</i>	48.3	12.1	11.36	43.5	4,580	Pospíšil et al., 1984a
Nyala	<i>Tragelaphus angasii</i>	48.8	14.87	9.93	55.1	4,050	Pospíšil et al., 1984a
Common Eland	<i>Taurotragus oryx</i>	40.1	13.3	8.28	49.4	5245	Mean of Drevemo et al., 1974; Pospíšil et al., 1984a
Bongo	<i>Tragelaphus eurycerus</i>	42	10.55	6.44	65.4	4,760	Pospíšil et al., 1984a
Mountain Reedbuck	<i>Redunca fulvorupula</i>	43.3	15.4	8.34		2,200	Drevemo et al., 1974
Blue Wildebeest	<i>Connochaetes taurinus</i>	43	15.9	14.96		4610	Drevemo et al., 1974
Coke's Hartebeest	<i>Alcelaphus buselaphus</i>	41.5	16.1	9.49		4330	Drevemo et al., 1974
Topi	<i>Damaliscus korrigum</i>	38	13.6	11.76		3,560	Drevemo et al., 1974
Order Perissodactyla							
Feral horse	<i>Equus caballus</i>	47.5	17.7	9.3	50.7	6,900	Seal et al., 1985
Grevy's Zebra	<i>Equus grevyi</i>	45	14.3	9.5	49.1	7,600	Pospíšil et al., 1985
Mountain Zebra	<i>Equus zebra</i>	43	16.6	9.7	45	12,800	Pospíšil et al., 1985
Ongar	<i>Equus hemionus</i>	36.9	10.2	6.38	52.1	7,680	Jani et al., 2004
Plains Zebra	<i>Equus quagga</i>	40	11.9	8.4	48.5	7,600	Pospíšil et al., 1985
Baird's Tapir	<i>Tapirus bairdii</i>	25.7				6,130	Hernandez-Divers et al., 2005
Sumatran Rhinoceros	<i>Dicerorhinus sumatrensis</i>	39	13.2	5.1		7100	Andriansyah et al., 2013
Black Rhinoceros	<i>Diceros bicornis</i>	43	16.1	5.26	82.5	11,500	97.2
Order Chiroptera							
Sub-order Microchiroptera							
Family Emballonuridae							
Black-bearded Tomb Bat	<i>Taphozous melanopogon</i>	59.2	16	8.9	59.3	9214	Ratnasooriya et al., 2005
Proboscis Bat	<i>Rhynchonycteris naso</i>	62.2				2265	Schinnerl et al., 2011
Greater sac-winged Bat	<i>Saccopteryx bilineata</i>	54.6				2290	Schinnerl et al., 2011
Bonda mastiff bat	<i>Molossus bondae</i>	64				1714	Schinnerl et al., 2011
Sinaloan Mastiff Bat	<i>Molossus sinaloae</i>	65.8				1974	Schinnerl et al., 2011
Chestnut Short-tailed Bat	<i>Carollia castanea</i>	55				6135	Schinnerl et al., 2011
Seba's Short-tailed Bat	<i>Carollia perspicillata</i>	58.9				5395	Schinnerl et al., 2011
Sowell's Short-tailed Bat	<i>Carollia sowelli</i>	55.3				5573	Schinnerl et al., 2011
Commissaris's Long-tongued Bat	<i>Glossophaga commissarisi</i>	56.4				4070	Schinnerl et al., 2011
Hairy Big-eared Bat	<i>Micronycteris hirsuta</i>	56.1				3813	Schinnerl et al., 2011
Striped Hairy-nosed Bat	<i>Mimon crenulatum</i>	55.9				4505	Schinnerl et al., 2011
Pale Spear-nosed Bat	<i>Phyllostomus discolor</i>	51.8				5035	Schinnerl et al., 2011
Fringe-lipped Bat	<i>Trachops cirrhosus</i>	51.8				7339	Schinnerl et al., 2011
Jamaican Fruit Bat	<i>Artibeus jamaicensis</i>	54				5401	Schinnerl et al., 2011

Thomas's Fruit-eating Bat	<i>Artibeus watsoni</i>	57.2				5291	Schinnerl et al., 2011
Honduran White Bat	<i>Ectophylla alba</i>	57.2				836	Schinnerl et al., 2011
Elegant Myotis	<i>Myotis elegans</i>	56.5				2045	Schinnerl et al., 2011
Chestnut Sac-winged Bat	<i>Cormura brevirostris</i>	56.8				2248.7	Schinnerl et al., 2011
Big Naked-backed Bat	<i>Pteronotus gymnotus</i>	63.3				1357	Schinnerl et al., 2011
Great Fruit-eating Bat	<i>Artibeus lituratus</i>	53.3				4510	Schinnerl et al., 2011
Common Vampire Bat	<i>Desmodus rotundus</i>	57				-	Schinnerl et al., 2011
Underwood's Long-tongued Bat	<i>Hylonycteris underwoodi</i>	60.5				2237	Schinnerl et al., 2011
Greater Spear-nosed Bat	<i>Phyllostomus hastatus</i>	55.7				5701	Schinnerl et al., 2011
Heller's Broad-nosed Bat	<i>Platyrrhinus belleri</i>	64.3				5463	Schinnerl et al., 2011
Stripe-headed Round-eared Bat	<i>Tonatia saurophila</i>	55.85				3960	Schinnerl et al., 2011
Striped Yellow-eared Bat	<i>Vampyressa nymphaea</i>	60.9				2438	Schinnerl et al., 2011
Black Myotis	<i>Myotis nigricans</i>	49.5				5133	Schinnerl et al., 2011
Indian Roundleaf Bat	<i>Hipposideros lankadiva</i>	59.2		8.9	70	9,500	Ratnasooriya et al., 2005
Family Vespertilionidae							
Common Bent-wing Bat	<i>Miniopterus schreibersii</i>	50.5	18.5	10.9	49.3	14,346	Mean of Clark, 2004 and Ratnasooriya et al., 2005
Gould's Wattled Bat	<i>Chalinobius gouldii</i>	52	-	-	-	-	Clark, 2004
Lesser Long-eared Bat	<i>Nyctophilus geoffroyi</i>	54.5	-	-	-	-	Clark, 2004
Sub-order Megachiroptera							
Family Pteropodidae							
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	48.5	17.85	8.8	56.5	16,500	mean 2 studies cited in Clark, 2004
Little Red Flying -fox	<i>Pteropus scapulatus</i>	52	18.15	10.75	50.5	13,000	mean 2 studies cited in Clark, 2004
Malaysian Flying-fox	<i>Pteropus vampyrus</i>	44	14.6	8.88	49.1	12,550	Heard and Whittier, 1997
Rodriguez Island Flying-fox	<i>Pteropus rodricensis</i>	43	14.2	7.95	54.4	6460	Heard and Whittier, 1997
Small Flying-fox	<i>Pteropus hypomelanus</i>	46.2	11.5	8.6	51.5	15,168	Mean Heard and Whittier, 1997 and 4 studies cited in Clark, 2004
Mean family		46.6 + (6) 1.32	15.1 + (6) 1.14	8.95 + (6) 0.38	52.1 + (6) 1.14	12,684 + (6) 1487	
Red ruffed Lemur	<i>Varecia rubra</i>	45.7				8,550	Dutton et al., 2008
Ring-tailed lemur	<i>Lemur catta</i>	45	-	6.5	-	6,400	Moresco et al., 2012
White-Footed Tamarin	<i>Saguinus leucopus</i>	49	16.1	6.74	73.6	9,560	Fox et al., 2008
Order Erinaceomorpha	<i>Laurasiatheria</i>						
European Hedgehog	<i>Erinaceus europaeus</i>	33	12.5	8.1	40.6	7,400	Lewis et al., 2002
Eastern Mole	<i>Scalopus aquaticus</i>	56.4	19.2	12.6	46	-	Campbell et al., 2010
Coast Mole	<i>Scapanus orarius</i>	46.8	17.4	10.5	42.6	-	Campbell et al., 2010
Order Pholidota							
Tree Pangolin	<i>Manis tricuspis</i>	40.4	10	4.2	97.7	4,800	Oyewale et al., 1997

Table B. Differential leukocytes percentages in mammalian species.

Animal	species	Neutro-	lympho	mono	cosino	baso	references
Sub-class Prototheria							
Order Monotremata							
Tasmanian platypuses	<i>Ornithorhynchus anatinus</i>	44.4	49.8	4.5	1.3	0	Geraghty et al., 2011
Short-beaked Echida	<i>Tachyglossus aculeatus</i>	41.7	56.2	2.5		0	mean 9 studies cited in Clark, 2004
Long beaked Echida	<i>Zaglossus bruijnii</i>	54	39	1.5	5	0	Cited Clark, 2004
Mean							

Sub-class Marsuliala							
Order Dasyuromorphia							
Family Dasyuridae							
Brown Antechinus	<i>Antechinus stuartii</i>	31.25	62	7	0	0	Mean 4 seasons in one study cited in Clark, 2004
Eastern Quoll	<i>Dasyurus viverrinus</i>	48.3	42.6	5.7	3.4	0	Calculated from 3 studies cited in Clark, 2004
Western Quoll	<i>Dasyurus geoffroii</i>	43.7	39.9	2.6	12.6	1.2	Calculated from 4 studies cited in Clark, 2004
Fat-tailed Dunnart	<i>Sminthopsis crassicaudata</i>	41.9	51.5	2.1	0	0	Mean from 2 studies cited in Clark, 2004
Striped-faced Dunnart	<i>Sminthopsis macroura</i>	41.7	51.2	0.4	0	0	Mean from 2 studies cited in Clark, 2004
Red-tailed phascogale	<i>Phascogale calura</i>	43.6	52.6	3.8	0	0	Calculated from 2 studies cited in Clark, 2004
Brush-tailed phascogale	<i>Phascogale tapoatafa</i>	42.5	44.5	11.5	0.5	0	Calculated from Clark, 2004
Tasmanian devil	<i>Sarcophilus harrisii</i>	62.3	33.5	3.2	1	0	Mean 3 studies cited in Clark, 2004
Mean Family and Order		44.4	47.2	4.5	0.7	0.15	
		+ (8)	8	8	8	8	
		3.1	3.1	1.2	0.16	0.15	
Order Didelphimorphia							
Family Didelphidae							
American Woolly Opossum	<i>Caluromys derbianus</i>	33.6	57	1.2	6	0.8	Rothstein and Hunsaker, 1972
Gray Short-tailed Opossum	<i>Monodelphis domestica</i>	25.5	50	16.5	8	0.33	Evans et al., 2010
Virginia Opossum	<i>Didelphis virginiana</i>	37	54	2	7	0	Youatt et al., 1961
Mean Family and Order		32 + (3) 3.4	53.7 + (3) 2	6.6 + (3) 5	7 + (3) 0.6	0.4 + (3) 0.2	
Order Diprotodontia							
Family Macropodidae							
Agile Wallaby	<i>Macropus agilis</i>	32.4	56.7	1.24	9.61	0	Calculated from Clark, 2004
Antilopine Kangaroo	<i>Macropus antilopinus</i>	48.3	48.3	0.08	3.31	0	Calculated from Clark, 2004
Black Striped Wallaby	<i>Macropus dorsalis</i>	16.2	78.1	1.74	2.26	1.74	Calculated from Clark, 2004
Common Wallaroo	<i>Macropus robustus</i>	37.9	54.2	0	7.9	0	Calculated from Clark, 2004
Eastern Grey Kangaroo	<i>Macropus giganteus</i>	39	51.6	1.46	1.27	6.63	Calculated from Clark, 2004
Red Kangaroo	<i>Macropus rufus</i>	57.9	36.5	2.6	2.85	0.1	Calculated from 2 studies in Clark, 2004
Red-necked Wallaby	<i>Macropus rufogriseus</i>	50	39.9	3.42	4.79	1.9	Calculated from 5 studies in Clark, 2004
Tammar Wallaby	<i>Macropus eugenii</i>	37.66	55.3	4.2	2.47	0.36	Calculated from 3 studies in Clark, 2004
Whip-tail Wallaby	<i>Macropus parryi</i>	28.5	60.1	3.13	5.74	2.61	Calculated from Clark, 2004
Bridled Nail-tail Wallaby	<i>Onychogalea fraenata</i>	20.9	72.3	1.8	4.86	0.1	Calculated from Clark, 2004
Northern Nail-tail Wallaby	<i>Onychogalea unguifera</i>	40.8	44.1	1.2	13.51	0.3	Calculated from Clark, 2004
Allied Rock-wallaby	<i>Petrogale assimilis</i>	41.85	50.71	2.76	2.23	2.46	Calculated from 3 studies in Clark, 2004
Brush-tailed Rock-wallaby	<i>Petrogale penicillata</i>	35.7	53	4.18	6.58	0.51	Calculated from Barnes et al., 2008
Proserpine Rock-wallaby	<i>Petrogale persephone</i>	23.81	67.7	1.59	6.22	0.66	Calculated from Clark, 2004
Purple-necked Rock-wallaby	<i>Petrogale purpureicollis</i>	28.5	68.2	0	3.31	0	Calculated from Clark, 2004
Yellow-footed Rock-wallaby	<i>Petrogale xanthopus</i>	20.3	74.4	1.11	3.69	0.46	Calculated from Clark, 2004
Spectacled Hare-Wallaby	<i>Lagorchestes conspicillatus</i>	41.89	55.6	2.28	0.23	0	Calculated from Clark, 2004
Quokka	<i>Setonix brachyurus</i>	67	30.8	1.36	0.88	0	Calculated from 2 studies cited in Clark, 2004
Red-legged Pademelon	<i>Thylogale stigmatica</i>	25	67.8	1.97	4.76	0.41	Calculated from 3 studies cited in Clark, 2004
Goodfellow's Tree-kangaroo	<i>Dendrolagus goodfellowi</i>	58	23.1	14.5	4.35	0	Calculated from Clark, 2004
Lumholtz's Tree-kangaroo	<i>Dendrolagus lumholtzi</i>	43.9	46.5	1.79	7.68	0.13	Calculated from Clark, 2004
Matschie's Tree-kangaroo	<i>Dendrolagus matschiei</i>	54.7	34.8	3.99	5.81	0.69	Calculated from 2 studies cited in Clark, 2004
Family mean		38.7 + (22) 2.9	53.1 + (22) 3.1	2.6 + (22) 0.6	4.7 + (22) 0.7	0.8 + (22) 0.3	

Family <i>Phascolarctidae</i>							
Koala	<i>Phascolarctos cinereus</i>	33.5	57.6	3.4	4.8	0.65	Calculated from 9 studies cited in Clark, 2004
Family <i>Phalangeridae</i>							
Common Brush-tailed Possum	<i>Trichosurus vulpecula</i>	38.8	53.1	4.6	2.9	0.58	Calculated from 9 studies cited in Clark, 2004
Mountain Brushtail Possum	<i>Trichosurus cunninghami</i>	25.2	60	8.9	5.9	0	Calculated from Clark, 2004
Family <i>Potoroidae</i>							
Gilbert's Potoroo	<i>Potorous gilbertii</i>	33.3	58.4	1.7	2.7	1.4	Vaughan et al., 2009
Long-nosed Potoroo	<i>Potorous tridactylus</i>	38	50	9	3	0	Calculated from 2 studies cited in Clark, 2004
Family <i>Pseudocheiridae</i>							
Common Ringtail Possum	<i>Pseudocheirus peregrinus</i>	24.3	61.9	8.4	5.3	0	mean 2 studies cited in Clark, 2004
Herbert River Ringtail possum	<i>Pseudochirulus herbertensis</i>	27.1	52.2	33.8	2.2	0	Calculated from Clark, 2004
Greater Glider	<i>Petauroides volans</i>	27.6	67.8	3.4	1.1	0	Clark, 2004
Sugar Glider	<i>Petaurus breviceps</i>	6.7	89.4	0.7	3	0	Clark, 2004
Family <i>Vombatidae</i>							
Common Wombat	<i>Vombatus ursinus</i>	38.8	53.5	4.3	2.3	1.1	Calculated from 6 studies cited in Clark, 2004
Northern Hairy-nosed Wombat	<i>Lasiorbhinus krefftii</i>	68.7	20.8	5.6	4.1	0.8	Calculated from Reiss et al., 2008
Southern Hairy-nosed Wombat	<i>Lasiorbhinus latijrons</i>	44.5	49.9	1.2	4.4	0	Calculated from 5 studies cited in Clark, 2004
Mean Order							
Order <i>Peramelemorphia</i>							
Family <i>Peramelidae</i>							
Northern Brown Bandicoot	<i>Isodon macrourus</i>	9.2	85.5	1.3	4	0	Mean 2 studies cited in Clark, 2004
Super-order <i>Afrotheria</i>							
Order <i>Proboscidea</i>							
African elephant	<i>Loxodonta africana</i>	20.17 (1.17)	69.1	8.17	1.33	0.11	Debbie and Clausen, 1975
Asian Elephant	<i>Elephas maximus</i>	23	44	27	5	0.03	Silva and Kuruwita, 1993
Order <i>Hyracoidea</i>	<i>Order Hyracoidea</i>						
Rock hyraxes	<i>Procavia capensis</i>	75.4	16.2	3.6	4.6	0.25	Aroch et al., 2007
Order <i>Sirenia</i>							
West Indian Manatee	<i>Trichechus manatus</i>	39	48.5	8.5	3.3	0.7	Harvey et al., 2009
Super-order <i>Xenarthra</i>							
Order <i>Cingulata</i>							
Big hairy armadillo	<i>Chaetophractus villosus</i>	51	36	6	5.4	1	Casanave and Polini, 1999
Pichi	<i>Zaedyus pichiy</i>	55.5	26.5	8.9	7.7	1.4	Superina et al., 2008
Nine-banded armadillo	<i>Dasyus novemcinctus</i>	70.7	24.7	4	0.7	0	Deem et al., 2009
Three-Banded armadillo	<i>Tolypentes matacus</i>	54.4	40.6	1	1.15	0.29	Deem et al., 2009
Order <i>Pilosa</i>							
Captive Hoffmann's Two-Toed Sloths	<i>Choloepus hoffmanni</i>	24.2	69.7	2.3	3.2	1	Wallace and Oppenheim, 1996
Southern Two -toed Sloth	<i>Choloepus didactylus</i>	69.4	26.9	1.6	2.2	0.1	Vogel et al., 1999
Giant Anteater	<i>Myrmecophaga tridactyla</i>	72.6	18.8	1.7	6.9	0	Sanches et al., 2013
Collared Anteater	<i>Tamandua tetradactyla</i>	48.1	44.1	2	5.7	0	Sanches et al., 2013
Order <i>Cetacea</i>							
Family <i>Balaenopteridae</i>							
Bryde's Whale	<i>Balaenoptera edeni</i>	61	24	2	13	0	Priddel and Wheeler, 1998
Fin whale	<i>Balaenoptera physalus</i>	32.7	29.7	4.4	32.7	0	Cited in Priddel and Wheeler, 1998
Family <i>Delphinidae</i>							
Killer Whale	<i>Orcinus orca</i>	70.2	19.2	3	3.7	0	Calculated from 4 studies in Clark, 2004
False Killer Whale	<i>Pseudorca crassidens</i>	62.6	26	4.6	10.6	0	Clark, 2004
Short-finned Pilot Whale	<i>Globicephala macrorhynchus</i>	63.7	21	4.4	8.4	0	Calculated from 2 studies in Clark, 2004
Common Bottlenose Dolphin	<i>Tursiops truncatus</i>	60.9	19	2.7	16.4	0	Mean 6 studies Clark, 2004
Hector's Dolphin	<i>Cephalorhynchus hectori</i>	59.2	43.3	1.7	0.8	0	Clark, 2004

Pacific White-sided Dolphin	<i>Lagenorhynchus obliquidens</i>	61.9	21.6	3.9	10.3	0.9	Shirai and Sakai, 1998
Risso's Dolphin	<i>Grampus griseus</i>	68.6	19	8	0.4	0	mean 2 studies Clark, 2004
Short-beaked Common Dolphin	<i>Delphinus delphis</i>	65.2	11.9	4.5	18.4	0	Clark, 2004
Striped dolphin	<i>Stenella coeruleoalba</i>	56.3	41.3	1.6	0.8	0	Calculated from Clark, 2004
Family mean							
Family <i>Monodontidae</i>							
Beluga whale	<i>Delphinapterus leucas</i>	46.9	46.2	4.3	2.6	0	Norman et al., 2012
Order mean		59.1 + (12) 3	26.8 + -12 3.2	3.8 + -12 0.5	9.8 + -12 2.7	0.07 + (12) 0.07	
Order <i>Sirenia</i>							
West Indian Manatee	<i>Trichechus manatus</i>	39	48.5	8.5	3.3	0.7	Harvey et al., 2009
Order <i>Carnivora</i>							
Family <i>Phocidae</i>							
Harbor seal	<i>Phoca vitulina</i>	71.4	27.4	2	0	0	Gregg et al., 2010
Harp seal	<i>Phoca groenlandica</i>	59	26	8	7	0	Boily et al., 2006
Hooded seal	<i>Cystophora cristata</i>	68.9	10.5	2.6	6.6	1.3	Boily et al., 2006
Northern elephant seal	<i>Mirounga angustirostris</i>	72.1	14	7.5	6.4	0	Yochem et al., 2008
Southern Elephant Seal	<i>Mirounga leonina</i>	63	17	5	15	0	Clark, 2004
Mean Family		66.9 + (5)	19.0 +	5.0 +	7.0 +	0.26 + (5) 0.26	
		2.5	-5	-5	-5		
			3.3	1.22	2.38		
Family <i>Otariidae</i>							
Australian Sea lion	<i>Neophoca cinerea</i>	56.9	29.6	2	11.5	0	Needham et al., 1980
California Sea lion	<i>Zalophus californianus</i>	67	23.1	2.9	4.1	0.2	Calculated from Norberg et al., 2011
Northern fur seal	<i>Callorhinus ursinus</i>	70.2	14	3.2	12.4	0.1	Norberg et al., 2011
Family <i>Mustelidae</i>							
Sub-family <i>Lutrinae</i>							
Eurasian otter	<i>Lutra lutra</i>	68.9	20.6	5.1	5.5	0	Fernández-Morán et al., 2001
North American River Otter	<i>Lontra Canadensis</i>	80.8	11.4	4.1	2.8	0.8	Tocidowski et al., 2000
Sea Otter	<i>Enhydra lutris</i>	56.2	32.2	3.9	7.5	0.16	Williams and Pulley, 1983
Giant otter	<i>Pteronura brasiliensis</i>	80	16.2	1.1	0.87	0.3	Rosas et al., 2008
Family <i>Feverriidae</i>							
Common Palm Civet	<i>Paradoxurus hermaphroditus</i>	41.8	46.8	6.5	9	0.5	Salakij et al., 2007
Family <i>Ursidae</i>							
Andean bear	<i>Tremarctos ornatus</i>	72.1	24.5	1.4	1.8	0.1	Castellanos et al., 2010
Asiatic Black Bear	<i>Ursus thibetanus</i>	49.8	33.5	3.8	4.1	0.03	Pospíšil et al., 1987a. Chang et al., 2006
Brown Bear	<i>Ursus arctos</i>	81.5	15.2	0.9	2.3	0.04	Kusak et al., 2005
Malayan Sun Bear	<i>Helarctos malayanus</i>	76	19	4.6	0	1	Bush et al., 1980
Sloth Bear	<i>Melursus ursinus</i>	72	17	1.8	8.7	0.7	Mean Bush et al., 1980; Shanmugam et al., 2008
Spectacled Bear	<i>Tremarctos ornatus</i>	67.3	29.2	0.3	1.7	1.4	Bush et al., 1980
		69.8 + (6) 4.4	23.0 + (6) 3.0	2.1 + (6) 0.69	3.1 + (6) 1.24	0.5 + (5) 0.24	
Red Panda	<i>Ailurus fulgens</i>	48.6	45.4	3.8	0.8	1.5	Wolff et al., 1990
Western Spotted Skunk	<i>Spilogale gracilis</i>	58.2	33.3	2.4	0.5	1	Crooks et al., 2003
Striped skunk	<i>Mephitis mephitis</i>	66.3	24	7.4	2	0.4	Mustonen et al., 2013
Ferret	<i>Mustela putorius</i>	37.1	53.4	5.9	2.8	0.8	Lee et al., 1982
Family <i>Procyonidae</i>							
Raccoon	<i>Procyon lotor</i>	67	30	2	1	0	Youatt et al., 1961
Family <i>Felidae</i>							

Canada lynx	<i>Lynx canadensis</i>	84	13	2.2	2.3	0	Moen et al., 2010
Eurasian Lynx	<i>Lynx lynx</i>	75.5 (0.7)	18.5	2.7	1.7	0.7	Pospíšil et al., 1987b
Sand Cat	<i>Felis margarita</i>	53.5	41.5	3	-	-	Chege et al., 2013
Fishing cat	<i>Felis viverrina</i>	68.1 (1.3)	21.4	3.9	4.7	0.1	Prihirunkit et al., 2007
Jungle Cat	<i>Felis chaus</i>	70	23.8	1.2	4.5	0.1	Salakij et al., 2010
Pampas Cat	<i>Leopardus colocolo</i>	76	18.5	2	3	0.5	Beltrán et al., 2009
Cougar	<i>Puma concolor</i>	73.8 (1.1)	21.5	2.1	1.1	0.1	Pospíšil et al., 1987b
Clouded Leopard	<i>Neofelis nebulosa</i>	73.1 (1.5)	17.45	1.9	4.7	1	Pospíšil et al., 1987b
Jaguar	<i>Panthera onca</i>	63.1 (5.1)	28	2.1	3	0.1	Mean: Pospíšil et al., 1987b; Mussart et al., 2009
Tiger	<i>Panthera tigris</i>	69 (3)	23	2	3	0	Pospíšil et al., 1987b
Leopard	<i>Panthera pardus</i>	61 (4.0)	23	1	11	0	Pospíšil et al., 1987b
Lion	<i>Panthera leo</i>	64.2 (6.7)	23.7	0.7	4.5	0	Pospíšil et al., 1987b
Cheetah	<i>Acinonyx jubatus</i>	66.9	25.15	1.95	5.35	0	Mean: Pospíšil et al., 1987b; Bechert et al., 2002
Flat-headed Cat	<i>Prionailurus planiceps*</i>	58.1	34.2	3.6	2.1	1.62	Salakij et al., 2008b
* Infected with Hepatozoa and excluded from analysis							
Family <i>Felidae</i> mean		69.1 + (13) 2.15	23.0+ (13) 1.88	2.06+ (13) 0.23	4.11+ (12) 0.74	0.22+ (12) 0.096	
Egyptian Mongoose	<i>Herpestes Ichneumon</i>	81.2	14	5	0	0	Paromares et al., 1992
Striped hyena	<i>Hyaena hyaena</i>	64 (1.5)	27.5	5.1	1.6	0.8	Pospíšil et al., 1987a
Coyote	<i>Canis latrans</i>	69.7	20.9	3.3	5.9	0.1	Gates and Goering, 1976
Wolf	<i>Canis lupus</i>	57.8 (2.5)	24	4.8	10.3		Pospíšil et al., 1987a
Golden Jackal	<i>Canis aureus/syriacus</i>	70.9	15.3	5.4	7.6	0.8	Aroch et al., 2005
Asian Wild Dog	<i>Cuon alpinus</i>	62.2	18.2	3.5	13.7	1.9	Salakij et al., 2000
Hunting Dog	<i>Lycan pictus</i>	72 (2.1)	15.6	3.6	4	0.5	Pospíšil et al., 1987a
Fossa	<i>Cryptoprocta ferax</i>	71.1	20.4	2	6.3	0	Langer et al., 2013
Order <i>Pholidota</i>							
Tree Pangolin	<i>Manis tricuspis</i>	46.2	50.7	2.1	0.8	0.21	Oyewale et al., 1997
Order <i>Rodentia</i>							
Family <i>Cricetidae</i>							
Dusky-footed wood rat	<i>Neotoma fuscipes</i>	57.6	33	5	2.7	1.6	Weber et al., 2002
Hispid cotton rat	<i>Sigmodon hispidus</i>	50.4	21.8	24.1	0.8	3	Robel et al., 1996
Muskkrat	<i>Ondatra zibethicus</i>	88.6	14.9	3.5	0.13	0.02	Ahlers et al., 2011
Norwegian Lemming	<i>Lemmus lemmus</i>	55.5	38.9	2.3	3.4	0	Wiger, 1977
Pine Vole	<i>Microtus pinetorum</i>	26.8	67.6	4.4	0.7	0.54	Harvey et al., 2008
Family <i>Dipodidae</i>	Northern Birch Mouse (<i>Sicista betulina</i>)	29.35	66.5	0.725	2.75	0	Wolk, 1985
Family <i>Erethizontidae</i>							
Brazilian Porcupine	<i>Coendou prehensilis</i>	63.8	33.9	1.1	1.2	0	Moreau et al., 2003
Black-tailed Hairy Dwarf Porcupine	<i>Coendou melanurus</i>	57.3	37.5	5.2	0	0	Moreau et al., 2003
Bristle-spined Rat or Thin-spined Porcupine	<i>Chaetomys subspinosus</i>	34.5	55	7.3	3.2	0	de Almeida Curi et al., 2012
Family <i>Muridae</i>							
Carpenterian Rock-rat	<i>Zygomys palatalis</i>	29.5	62	2.3	6.2	0	Old et al., 2007
Central Rock-rat	<i>Zygomys pedunculatus</i>	36.4	57	5.3	1.4	0	Old et al., 2005
Plains Rat	<i>Pseudomys australis</i>	1.6	95.1	0.3	0	0.2	Old et al., 2005
Sand Rat	<i>Psammodomys obesus</i>	19.5	63.1	13.8	1.7	1.73	Kane et al., 2012
Spinifex hopping-mouse	<i>Notomys alexis</i>	26.5	58.5	15	0	0	Old et al., 2005
Family <i>Myocastoridae</i>							
Coypu	<i>Myocastor coypus</i>	45.9	53.6	2.5	0.9	0	Martino et al., 2012
Family <i>Nesomyidae</i>							
Gambian pouched rat	<i>Cricetomys gambianus</i>	19.6	67.9	5.7	2.8	4.1	Oyewale et al., 1998
Family <i>Sciuridae</i>							
Fox squirrel	<i>Sciurus niger</i>	77	21	2	0	0	Youatt et al., 1961

Woodchuck	<i>Marmota monax</i>	69	28	2	1	0	Youatt et al., 1961
Family <i>Thryonomyidae</i>							
Greater Cane Rat	<i>Thryonomys swinderianus</i>	35.2	62.7	1.2	0.6	0.3	Opara et al., 2006
Order <i>Lagomorpha</i>							
Eastern cottontail rabbit	<i>Sylvilagus floridanus</i>	33.3	60.3	1.9	0.6	1.1	Youatt et al., 1961; Jacobson et al., 1978
Riparian Brush Rabbit	<i>Sylvilagus bachmani</i>	24.4	67.7	4.1	1.7	2.1	Black et al., 2009
Order <i>Artiodactyla</i>							
Family <i>Cervidae</i>							
Axis deer	<i>Axis axis</i>	46.8	46.8	1.3	3.9	1.3	Hawkey and Hart, 1985
Barasingha	<i>Cervus duvauceli</i>	48.2	43.4	3.6	2.4	2.4	Hawkey and Hart, 1985
Elk	<i>Cervus canadensis</i>	67.6	24.55	4.35	2.7		Pedersen and Pedersen, 1975
Red Deer	<i>Cervus elaphus</i>	37	44	3	13	1.1	Shideler et al., 2002
Rusa Deer	<i>Cervus timorensis</i>	29.9	68.8	-	1.1	0.1	Tomkins and Jonsson, 2005
Fallow Deer	<i>Dama dama</i>	56.8	32	5.8	5.3	0	English and Lepherd, 1981
Moose	<i>Alces alces</i>	45.7	43	1.7	3.1	5.1	Rostal et al., 2012
Persian Fallow Deer	<i>Dama mesopotamica</i>	41.8	43.2	1.6	11.1	2.3	Mohri et al., 2000
Père David's deer	<i>Elaphus davidianus</i>	39	36.4	3.9	16.9	3.9	Hawkey and Hart, 1985
Reindeer	<i>Rangifer tarandus</i>	50.4	31.8	1.6	12.5	3.8	Catley et al., 1990.
Roe Deer	<i>Capreolus capreolus</i>	54.7	40.3	1.7	3.3	0.1	Montane et al., 2002
Sambar deer	<i>Cervus unicolor</i>	26.3	71.6	0.4	1.3	0.41	Calculated from Gono, 1993
Pudú	<i>Pudu pudu</i>	34	59.8	2.3	3.8	0	Montes et al., 2004
Mountain Goat	<i>Oreamnos americanus</i>	28.1	54.9	1	11	3	Rice and Hall, 2007
Big horn Sheep	<i>Ovis canadensis</i>	63	26	5	2		McDonald et al., 1981
Domestic Sheep	<i>Ovis aries</i>	62	34	1	2		McDonald et al., 1981
Rocky Mountain Bighorn	<i>Ovis Canadensis</i>	47.6	44.7	2.2	4.4		Woolf and Kradel, 1970
Erlanger's gazelles	<i>Gazella erlangeri</i>		54.4	8.8			Aljumaah and Hussein, 2011
Goitered Gazelle	<i>Gazella subgutturosa</i>	67.6	24.55	4.35	2.7	0	Yaralioglu et al., 2004
Mountain Reedbuck	<i>Redunca fulvorufula</i>	45.8	50.1	3.4	0.5	0.2	Pospisil et al., 1984b
Waterbuck	<i>Kobus ellipsiprymnus</i>	60.35	33.55	1.3	3.05	5.75	Pospisil et al., 1984b
Lechwe	<i>Kobus leche</i>	38.2	56.3	3.7	1.5	0.7	Pospisil et al., 1984b
Mrs Gray's Waterbuck	<i>Kobus megaceros</i>	53	43.4	1.4	1.6	0	Pospisil et al., 1984b
Springbok	<i>Antidorcas marsupialis</i>	66	27.8	0.9	1.2	0	Pospisil et al., 1984b
Roan antelope	<i>Hippotragus equinus</i>	61.7	29.6	4.6	3.3	0	Pospisil et al., 1984a
Sable antelope	<i>Hippotragus niger</i>	60.3	32.8	3.6	3.2	0.1	Pospisil et al., 1984a
Adax antelope	<i>Addax nasomaclatus</i>	52.7	43.2	2.5	10.2	0.2	Pospisil et al., 1984a
Gemsbok Oryx	<i>Oryx gazella</i>	73.7	19.4	3.1	2	0	Pospisil et al., 1984a
Scimitar-horned Oryx	<i>Oryx dammah</i>	64.5	27.2	4	3.5	0.5	Pospisil et al., 1984a
Nyala	<i>Tragelaphus angasii</i>	57.7	38.1	1.7	1.2	0.9	Pospisil et al., 1984a
Greater Kudu	<i>Tragelaphus strepsiceros</i>	66.6	29.1	3.7	1.5	0	Pospisil et al., 1984a
Common Eland	<i>Taurotragus oryx</i>	54	37.4	4.6	3.4	0.6	Pospisil et al., 1984a
Bongo	<i>Tragelaphus eurycerus</i>	64.5	31.5	2	1	0.1	Pospisil et al., 1984a
African Buffalo	<i>Syncerus caffer</i>	42.6	53.1	2.1	1.5	0.7	Beechler et al., 2009
American bison	<i>Bison bison</i>	46	44	10	1	0	Marler, 1975
Spanish Ibex	<i>Capra pyrenaica</i>	33.9	61.6	2.1	2.4	0	Casas-Díaz et al., 2008
Order <i>Chiroptera</i>							
Sub-order <i>Microchiroptera</i>							
Proboscis Bat	<i>Rhynchonycteris naso</i>	38.4	57.7	0.7	2.8	0.4	Schinnerl et al., 2011
Greater sac-winged Bat	<i>Saccopteryx bilineata</i>	33.9	62.7	0.3	3.1	0	Schinnerl et al., 2011
Bonda mastiff bat	<i>Molossus bondae</i>	52.9	42.5	0.8	2.2	1.7	Schinnerl et al., 2011
Sinaloan Mastiff Bat	<i>Molossus sinaloae</i>	49.6	49.6	0	0.6	0.6	Schinnerl et al., 2011
Chestnut Short-tailed Bat	<i>Carollia castanea</i>	25.2	69.7	0.5	4.3	0.1	Schinnerl et al., 2011
Seba's Short-tailed Bat	<i>Carollia perspicillata</i>	21.2	73.4	1	3.8	0.5	Schinnerl et al., 2011
Sowell's Short-tailed Bat	<i>Carollia sowelli</i>	25.5	63.2	1.4	7.7	3.6	Schinnerl et al., 2011
Commissaris's Long-tongued Bat	<i>Glossophaga commissarisi</i>	16.9	77.1	1.1	2.8	2.1	Schinnerl et al., 2011
Chestnut Sac-winged Bat	<i>Cormura brevirostris</i>	23.7	61	0	3.5	0	Schinnerl et al., 2011
Big Naked-backed Bat	<i>Pteronotus gymnotus</i>	24	71	1	3	1	Schinnerl et al., 2011
Common Vampire Bat	<i>Desmodus rotundus</i>	44.5	53.5	0	0	2	Schinnerl et al., 2011

Underwood's Long-tongued Bat	<i>Hylonycteris underwoodi</i>	10	88	1	1	0	Schinnerl et al., 2011
Hairy Big-eared Bat	<i>Micronycteris hirsuta</i>	39.7	56.8	0.3	3.7	0	Schinnerl et al., 2011
Great Fruit-eating Bat	<i>Artibeus lituratus</i>	31.7	56.5	1	8.2	2.7	Schinnerl et al., 2011
Striped Yellow-eared Bat	<i>Vampyressa nymphaea</i>	28.3	68	0	3.3	0.3	Schinnerl et al., 2011
Stripe-headed Round-eared Bat	<i>Tonatia saurophila</i>	32.5	63	0.5	3.5	0.5	Schinnerl et al., 2011
Heller's Broad-nosed Bat	<i>Platyrrhinus helleri</i>	16	80.3	0.3	4.3	0	Schinnerl et al., 2011
Greater Spear-nosed Bat	<i>Phyllostomus hastatus</i>	16.5	73	1	7.5	2	Schinnerl et al., 2011
Striped Hairy-nosed Bat	<i>Mimon crenulatum</i>	25.7	66.1	0.8	5.9	1.6	Schinnerl et al., 2011
Pale Spear-nosed Bat	<i>Phyllostomus discolor</i>	20.6	69.7	0.9	7.2	1.8	Schinnerl et al., 2011
Fringe-lipped Bat	<i>Trachops cirrhosus</i>	21.5	72.7	0.8	4.1	1	Schinnerl et al., 2011
Jamaican Fruit Bat	<i>Artibeus jamaicensis</i>	34.1	58.9	2.8	3.1	1.6	Schinnerl et al., 2011
Thomas's Fruit-eating Bat	<i>Artibeus watsoni</i>	37	57.2	1.1	2	2.8	Schinnerl et al., 2011
Honduran White Bat	<i>Ectophylla alba</i>	58.1	39.6	0.2	1.1	1	Schinnerl et al., 2011
Elegant Myotis	<i>Myotis elegans</i>	22.3	70.6	1.1	4.3	1.8	Schinnerl et al., 2011
Sub-order <i>Megachiroptera</i>							
Family <i>Pteropodidae</i>							
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	39	53.5	6.5	4.5	1.5	Calculated from Clark, 2004
Indian Flying fox	<i>Pteropus giganteus</i>	89.5	6.6	3.8	0.1	0	McLaughlin et al., 2007
Island Flying-fox	<i>Pteropus hypomelanus</i>	28.1	68	1.8	2.2	0	Mean of Heard and Whittier, 1997 and 3 studies from Clark, 2004
Little Red Flying fox	<i>Pteropus scapulatus</i>	53	31	7.5	7.5	0.5	Calculated from Clark, 2004
Malaysian Flying-fox	<i>Pteropus vampyrus</i>	34.8	64	0.7	0.5	0	Heard and Whittier, 1997
Rodriguez Island Flying-fox	<i>Pteropus rodricensis</i>	79.6	19.1	0.8	0.2	0	Heard and Whittier, 1997
Mean Order		34.0 + (29) 3.35	60.5 + (29) 3.14	0.89 + (29) 0.15	3.26 + (29) 0.43	1 + (31) 0.19	
Order Eulipotyphla							
European Hedgehog	<i>Erinaceus europaeus</i>	40.1	50.7	2.2	5.9	1.1	Lewis et al., 2002
Long-eared Hedgehog	<i>Hemiechinus auritus</i>	23.9	64.3	1.8	9	1	Özparlak et al., 2011
Southern White-breasted Hedgehog	<i>Erinaceus concolor</i>	23.3	65.5	2.3	7.6	1.3	Özparlak et al., 2011
Mean Order		29.1 + (3) 5.5	60.2 + (3) 4.8	2.1 + (3) 0.15	7.5 + (3) 0.9	1.1 + (3) 0.09	
Order <i>Perissodactyla</i>							
Ongar	<i>Equus hemionus</i>	56	39.2	0.9	3.7	0	Jani et al., 2004
Grevy's Zebra	<i>Equus grevyi</i>	55	37.7	2.7	1.8	2.8	Pospíšil et al., 1985
Mountain Zebra	<i>Equus zebra</i>	54.8	37.6	3.7	1.3	2.6	Pospíšil et al., 1985
Plains Zebra	<i>Equus quagga</i>	60	32	3.5	2.2	2.3	Pospíšil et al., 1985
Baird's tapir	<i>Tapirus bairdii</i>	54	32.1	2.1	8.4		Calculated from Hernandez-Divers et al., 2005
Black rhinoceros	<i>Diceros bicornis</i>	52.9	34.5	6	5.6	0.9	Kock et al., 1990
Red ruffed lemurs	<i>Varecia rubra</i>	62.8	30.5	2.68			Dutton et al., 2008
Ring-tailed lemur	<i>Lemur catta</i>	36.75	52.5	6.2	1.5	0.35	Moresco et al., 2012
White-Footed Tamarins	<i>Saguinus leucopus</i>	46.6	51.1	0	0	0	Fox et al., 2008
African elephant	<i>Loxodonta africana</i>	20.17 (1.17)	69.1	8.17	1.33	0.11	Debbie and Clausen, 1975

References for supplementary materials

References

- [1]. Ahlers AA, Mitchell MA, Schooley RL, Heske EJ, Levengood JM. (2011) Hematologic and bloodchemistryreferencevalues for free-ranging muskrats (*Ondatra zibethicus*). *J Wildl Dis.* 47: 685-689. <http://www.ncbi.nlm.nih.gov/pubmed/21719833>
- [2]. Alagaili AN, Omer SA, Bray TC, Mohammed Osama B. (2013). Reference data of haematology and serum biochemistry in adult wild-caught Libyan jird (*Meriones libycus*) from central Saudi Arabia. *J. King Saud Univ. Sci.* 25: 307-31. <http://www.sciencedirect.com/science/article/pii/S1018364713000074>
- [3]. Aljumaah RS, Hussein MF. (2011) Haematological, hemastatic and blood chemical values of captive Erlanger's gazelles (*Gazalla erlangeri*). *J. Anim. Vet. Adv.* 10: 1699-1705. <http://www.medwelljournals.com/fulltext/?doi=javaa.2011.1699.1705>
- [4]. Andriansyah, Candra D, Riyanto MA, Barry J, Radcliffe RW. (2013) Hematology and serum biochemistry of Sumatran rhinoceroses (*Dicerorhinus sumatrensis*) in a rainforest sanctuary in Way Kambas National Park, Indonesia. *J Zoo Wildl Med.* 44: 280-284. <http://www.ncbi.nlm.nih.gov/pubmed/23805545>
- [5]. Aroch I, Shpigel NY, Avidar Y, Yakobson B, King R, Shamir M. (2005) Haematological and biochemical measurements in healthy, adult, free-ranging golden jackals (*Canis aureus*) held in captivity. *Vet Rec.* 157: 317-321. <http://www.ncbi.nlm.nih.gov/pubmed/16155240>
- [6]. Barnes TS, Goldizen AW, Coleman GT. (2008) Hematology and serum biochemistry of the brush-tailed rock-wallaby (*Petrogale penicillata*). *J Wildl Dis.* 44: 295-303. <http://www.ncbi.nlm.nih.gov/pubmed/18436662>
- [7]. Bechert U, Mortenson J, Dierenfeld ES, Cheeke P, Keller M, et al. (2002) Diet composition and blood values of captive cheetahs (*Acinonyx jubatus*) fed either supplemented meat or commercial food preparations. *J. Zoo. Wildl. Med.* 33: 16-28. <http://www.ncbi.nlm.nih.gov/pubmed/12216789>
- [8]. Beechler BR, Jolles AE, Ezenwa VO. (2009) Evaluation of hematologic values in free-ranging African buffalo (*Syncerus caffer*). *J Wildl Dis.* 45: 57-66. <http://www.ncbi.nlm.nih.gov/pubmed/19204335>
- [9]. Beltrán FSL, Nallar RG, Villalba LMM, Delgado EE, Berna MM. (2009) Inmovilización química, evaluación hematológica y coproparasitología de *Leopardus colocolo* en Khasor, Potosí, Bolivia: Chemical Immobilization and hematologic and Endoparasitologic Evaluation of *Leopardus colocolo* in Khasor, Potosí, Bolivia. *Rev. invest. Vet. Perú* 20. http://www.scielo.org.pe/scielo.php?script=sci_arttext&pid=S1609-91172009000200022 accessed 1.19.14
- [10]. Benn DM, McKeown DB, Lumsden JH. (1986) Hematology and biochemistry reference values for the ranch fox. *Can J Vet Res.* 50: 54-58. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1255159/>
- [11]. Black DM, Gilardi KV, Hamilton LP, Williams E, Williams DF, et al. (2009) Hematologic and biochemistry reference values for the endangered riparian brush rabbit (*Sylvilagus bachmani riparius*). *J Wildl Dis.* 45: 491-496. <http://www.ncbi.nlm.nih.gov/pubmed/19395758>
- [12]. Boily F, Beaudoin S, Measures LN. (2006) Hematology and serum chemistry of harp (*Phoca groenlandica*) and hooded seals (*Cystophora cristata*) during the breeding season, in the Gulf of St. Lawrence, Canada. *J Wildl Dis.* 42: 115-132. <http://www.ncbi.nlm.nih.gov/pubmed/16699154>
- [13]. Burns JM, Rea LD, Mashburn KL. (2005) Postnatal ontogeny of erythropoietin and hematology in free-ranging Steller sea lions (*Eumetopias jubatus*). *Gen. Comp. Endocrinol.* 141: 240-247. <http://www.ncbi.nlm.nih.gov/pubmed/15804511>
- [14]. Bush M, Custer RS, Smith EE (1980) Use of dissociative anesthetics for the immobilization of captive bears: blood gas, hematology and biochemistry values. *J. Wildl. Dis* 16(4): 481-489. <http://www.ncbi.nlm.nih.gov/pubmed/7463600>
- [15]. Campbell KL, Storz JF, Signore AV, Moriyama H, Catania KC, et al. (2010) Molecular basis of a novel adaptation to hypoxic-hypercapnia in a strictly fossorial mole. *BMC Evolutionary Biology* 10:214. <http://www.ncbi.nlm.nih.gov/pubmed/20637064>
- [16]. Casanave EB, Polini NN. (1999) Comparative study of some haematological parameters of two wild *Chaetophractus villosus* (mammalia, dasypodidae) populations. *Comp Haematol Int.* 9: 13-16. <http://link.springer.com/article/10.1007%2FBF02585516>
- [17]. Casas-Díaz E, López-Olvera JR, Marco I, Mentaberre G, Lavín S. (2008) Hematologic and biochemical values for Spanish ibex (*Capra pyrenaica*) captured via drive-net and box-trap. *J. Wildl. Dis.* 44: 965-972. <http://www.bioone.org/doi/abs/10.7589/0090-3558-44.4.965>
- [18]. Castellanos A, Arias L, Jackson D, Castellanos R. (2010) Hematological and serum biochemical values of Andean bears in Ecuador. *Ursus* 2: 115-120. <http://www.bioone.org/doi/abs/10.2192/09GR002.1>
- [19]. Castellini MA, Baskurt O, Castellini JM, Meiselman HJ. (2010) Blood rheology in marine mammals. *Front. Physiol.* 1:146. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3059974/>
- [20]. Catley A, Kock RA, Hart MG, Hawley CM. (1990) Haematology of clinically normal and sick captive rein deer (*Rangifer tarandus*). *Vet. Rec.* 126: 239-241. <http://www.ncbi.nlm.nih.gov/pubmed/2321339>
- [21]. Chang GR, Mao FC, Yang CC, Chan FT. (2006) Hematological Profiles of the Formosan Black Bear (*Ursus thibetanus formosanus*). *Zoological Studies* 45: 93-97 <http://zoostud.sinica.edu.tw/Journals/45.1/93.pdf>
- [22]. Chege S, Toosy A, Howlett J, Saker A, Kagira J. (2013) Haematology and biochemistry values of captive sand cats (*Felis margarita*) in Al Ain Wildlife Park and Resort, United Arab Emirates. *J. Coastal Life Med.* 1: 92-95. <http://www.jclmm.com/qk/20132/12.pdf>
- [23]. Clark P. (2004) Haematology of Australian mammals. CSIRO Publishing, Collingwood, Victoria, Australia. 1-250.
- [24]. Clark P, Holz P, Booth R, Jakob-Hoff R, Cooper DW. (2003) Haematological characteristics of captive Parma wallabies (*Macropus parma*). *Comp Clin Path* 12: 11-16. <http://link.springer.com/article/10.1007%2F500580-003-0474-2>
- [25]. Crooks KR, Garcelon DK, Scott CA, Wilcox JT, Timm SF, et al. (2003) Hematology and serum chemistry of the island spotted skunk on Santa Cruz Island. *J Wildl Dis.* 39: 460-466. <http://www.bioone.org/doi/abs/10.7589/0090-3558-39.2.460>
- [26]. de Almeida Curi NH, Oliveira PA, Souto Lima RB, Gonçalves da Silveira JA, Costa Santos JL, et al. (2012) Haematology and several health aspects of endangered free-ranging thin-spined porcupines, *Chaetomys subspinosus* (Olfers, 1818) (*Erebizontidae*: Chaetomyiinae). *Comp. Clin. Pathol.* 21: 1109-1113. <http://link.springer.com/article/10.1007%2F500580-011-1241-4>
- [27]. Debbie JG, Clausen B. (1975) Some hematological values of free-ranging African elephants. *J. Wildl Dis.* 11: 79-82. <http://www.ncbi.nlm.nih.gov/pubmed/1113444>
- [28]. Deem SL, Noss AJ, Fiorello CV, Manharth AL, Robbins RG, et al. (2009) Health Assessment of Free-Ranging Three-Banded (*Tolypeutes matacus*) and Nine-Banded (*Dasyurus novemcinctus*) Armadillos in the Gran Chaco, Bolivia. *J. Zoo. Wildl. Med.* 40: 245-256. <http://www.ncbi.nlm.nih.gov/pubmed/19569470>
- [29]. DelGiudice GD, Krausman PR, Bellantoni ES, Wallace MC, Etchberger RC, et al. (1990) Blood and urinary profiles of free-ranging desert mule deer in Arizona. *J. Wildl. Dis.* 26: 83-89. <http://www.bioone.org/doi/10.7589/0090-3558-26.1.83>
- [30]. Drevemo S, Grootenhuis JG, Karstad L. (1974) Blood parameters in wild ruminants in Kenya. *J. Wildl. Dis.* 10: 327-334. <http://www.jwildlifedis.org/doi/pdf/10.7589/0090-3558-10.4.327>
- [31]. Dutton CJ, Dipl ACZM, Randall E, Junge, Edward E. Louis. (2008) Biomedical Evaluation of Free-Ranging Red Ruffed Lemurs (*Varecia rubra*) Within the Masoala National Park, Madagascar. *J. Zoo. Wildl. Med.* 39: 76-85. <http://www.ncbi.nlm.nih.gov/pubmed/18432099>
- [32]. English AW, Lephherd EE. (1981) The haematology and serum biochemistry of wild fallow deer (*Dama dama*) in New South Wales. *J. Wildl. Dis.* 17: 289-295. <http://www.ncbi.nlm.nih.gov/pubmed/7241715>
- [33]. Evans KD, Hewett TA, Clayton CJ, Krubitzer LA, Griffey SM. (2010) Normal organ weights, serum chemistry, hematology, and cecal and nasopharyngeal bacterial cultures in the grayshort tailed opossum (*Monodelphis domestica*). *J. Am. Assoc. Lab. Anim. Sci.* 49: 401-406. <http://www.ncbi.nlm.nih.gov/pubmed/20819383>
- [34]. Fayolle C, Leray C, Ohlmann P, Gutbier G, Cazenave JP, et al. (2000) Lipid composition of blood platelets and erythrocytes of southern elephant seal (*Mirounga leonina*) and Antarctic fur seal (*Arctocepalus gazella*). *Comp. Biochem. Physiol. B* 126: 39-47. <http://www.ncbi.nlm.nih.gov/pubmed/10825663>
- [35]. Fox M, Brieva C, Moreno C, MacWilliams P, Thomas C. (2008) Hematologic and serum biochemistry reference values in wild-caught White-footed Tamarins (*Saguinus leucopus*) Housed in Captivity. *J Zoo Wildl Med.* 39: 548-557. <http://www.ncbi.nlm.nih.gov/pubmed/19110695>
- [36]. Franzmann AW. (1971) Physiological values for Stone sheep. *J. Wildl. Dis.* 7: 139-141. <http://www.ncbi.nlm.nih.gov/pubmed/5156478>
- [37]. Fernández-Morán J, Molina L, Flamme G, Saavedra D, Manteca-Vilanova X. (2001) Hematological and biochemical reference intervals for wild caught Eurasian otter from Spain. *J. Wildl Dis* 37: 159-163. <http://www.ncbi.nlm.nih.gov/pubmed/11272491>
- [38]. Gates NL, Goering EK. (1976) Hematologic values of conditioned, captive wild coyotes. *J. Wildl Dis.* 12: 402-404. <http://www.ncbi.nlm.nih.gov/pubmed/16498887>
- [39]. Geraghty DP, Griffiths J, Stewart N, Robertson IK, Gust N. (2011) Hematologic, plasmabiochemical, and other indicators of the health of Tasmanian platypuses (*Ornithorhynchus anatinus*): predictors of mucormycosis. *J Wildl Dis.* 47: 483-493. <http://www.ncbi.nlm.nih.gov/pubmed/21719813>
- [40]. Gono S. (1993) The domestication and nutrition of sambar deer (*Cervus*

- unicolor) : a comparative study with red deer (*Cervus elaphus*). Ph.D. Thesis. Massey University. <http://mro.massey.ac.nz/handle/10179/4016>
- [41]. Greig DJ, Gulland FM, Rios CA, Hall AJ. (2010) Hematology and serum chemistry in stranded and wild-caught harbor seals in central California: reference intervals, predictors of survival, and parameters affecting blood variables. *J. Wildl. Dis.* 46: 1172-1184. <http://www.ncbi.nlm.nih.gov/pubmed/20966268>
- [42]. Harvey JW, Harr KE, Murphy D, Walsh MT, Nolan EC, et al. (2009) Hematology of healthy Florida manatees (*Trichechus manatus*). *Vet. Clin. Pathol.* 38: 183-193. https://www.researchgate.net/publication/26261215_Hematology_of_healthy_Florida_manatees_Trichechus_manatus
- [43]. Harvey SB, Krimer PM, Correa MT, Hanes MA. (2008) Hematology and plasma chemistry reference intervals for mature laboratory pine voles (*Microtus pinetorum*) as determined by using the nonparametric rank percentile method. *J. Am. Assoc. Lab. Anim. Sci.* 47: 35-40. <http://www.ncbi.nlm.nih.gov/pubmed/18702449>
- [44]. Hawkey CM, Hart MG. (1985) Normal haematological values of axis deer (*Axis axis*), père david's deer (*Elaphus davidianus*) and barasingha (*Cervus duvauceli*). *Res. Vet. Sci.* 39: 247-248. <http://www.ncbi.nlm.nih.gov/pubmed/4070791>
- [45]. Heard DJ, DA Whittier. (1997) Hematologic and plasma biochemical reference values for three flying fox species (*Pteropus* spp). *J. Zoo Wildl. Med.* 28:464-470. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4418720/>
- [46]. Hernandez-Divers SM, Aguilar R, Leandro-Loria D, Foerste CR. (2005) Health evaluation of a radiocollared population of free-ranging Baird's tapirs (*Tapirus bairdii*) in Costa Rica. *J. Zoo Wildl. Med* 36:176-187. <http://www.ncbi.nlm.nih.gov/pubmed/17323556>
- [47]. Jacobson HA, Kirkpatrick RL, Burkhardt HE, Davis W. (1978) Hematologic comparisons of shot and live trapped cottontail rabbits. *J. Wildl Dis.* 14: 82-88. <http://www.ncbi.nlm.nih.gov/pubmed/633520>
- [48]. Jani RG, Sabapara RH, Bhuva CN, Katatra RD. (2004) A study of reference intervals for the Asiatic wild ass (*Equus hemionus khur*). *Zoos Print J.* 19: 1332-1333. https://www.researchgate.net/publication/275425337_Study_of_haematological_reference_intervals_for_Asiatic_Wild_Ass_Equus_hemionus_khur
- [49]. Kane JD, Steinbach TJ, Sturdivant RX, Burks RE (2012) Sex-Associated Effects on Hematology and Serum Chemistry Analytes in Sand Rats (*Psamomys obesus*). *J Am Assoc Lab Anim Sci* 51(6): 769-774. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3508180/>
- [50]. Khan SA, Epstein JH, Olival KJ, Hassan MM, Hossain MB, et al. (2011) Hematology and serum chemistry reference values of stray dogs in Bangladesh. *Open Vet J* 1: 13-20. <http://www.openveterinaryjournal.com/khanabstractovj005.htm>
- [51]. Kock MD, du Toit R, Morton D, Kock N, Paul B (1990) Baseline biological data collected from chemically immobilized, free-ranging black rhinoceroses (*Diceros bicornis*) in Zimbabwe. *J Zoo Wildl Med* 21(3): 283-291. http://www.jstor.org/stable/20095065?seq=1#page_scan_tab_contents
- [52]. Kusak J, Rafaj RB, Zvorc Z, Huber D, Forsek J, et al. (2005) Effects of sex, age, body mass, and capturing method on hematologic values of brown bears in Croatia. *J Wildl Dis* 41(4): 843-847. <http://www.ncbi.nlm.nih.gov/pubmed/16456182>
- [53]. Langer S, Juczynski K, Widmer D (2013) Hematologic and biochemical values in subadult and adult captive fossas (*Cryptoprocta ferox*). *J Zoo Wildl Med* 44(3): 581-588. <http://www.bioone.org/doi/abs/10.1638/2012-0049R3.1>
- [54]. Lee EJ, Moore WE, Fryer HC, Minocha HC (1982) Haematological and serum chemistry profiles of ferrets (*Mustela putorius furo*). *Lab Anim* 16(2): 133-137. <http://www.ncbi.nlm.nih.gov/pubmed/7078059>
- [55]. Lewis JC, Norcott MR, Frost LM, Cusdin P (2002) Normal haematological values of European hedgehogs (*Erinaceus europaeus*) from an English rehabilitation centre. *Vet Rec* 151(19): 567-569. <http://www.ncbi.nlm.nih.gov/pubmed/12452356>
- [56]. Maas, M, Keet DF, Nielen M (2013) Hematologic and serum chemistry reference intervals for free-ranging lions (*Panthera leo*). *Res Vet Sci* 95(1): 266-268. <http://www.ncbi.nlm.nih.gov/pubmed/23415881>
- [57]. Mahmood KH, Stanford JL, Machin S, Watts M, Stuart FA, et al. (1988) The haematological values of European badger (*Meles meles*) in health and in the course of tuberculosis infection. *Epidemiol. Infect.* 101(2): 231-237. <http://www.ncbi.nlm.nih.gov/pubmed/3181308>
- [58]. Madjdzadeh SM, Abbasnejad M, Takaloozadeh HM (2011) Haematology and some biochemical parameters of wild rodents in Pirstachio Gardens of Kerman Province, southeast Iran. *Chin. J Appl Environ Biol* 17: 907-909.
- [59]. Mainka SA, He T, Chen M, Dierenfeld ES (1995) Hematologic and Serum Biochemical Values for Healthy Captive Giant Pandas (*Ailuropoda melanoleuca*) at the Wolong Reserve, Sichuan, China. *J Zoo Wildl Med* 26(3): 377-381. http://www.jstor.org/stable/20095493?seq=1#page_scan_tab_contents
- [60]. Marco I, Martinez F, Pastor J, Lavin S (2000) Hematologic and serum chemistry values of the captive European wildcat. *J Wildl Dis* 36(3): 445-449. <http://www.ncbi.nlm.nih.gov/pubmed/10941728>
- [61]. Marco I, Cuenca R, Pastor J, Velarde R, Lavin S (2003) Hematology and serum chemistry values of the European brown hare. *Vet Clin Pathol.* 32(4):195-198. <http://www.ncbi.nlm.nih.gov/pubmed/14655104>
- [62]. Marler RJ (1975) Some hematologic and blood chemistry values in two herds of American bison in Kansas. *J Wildl Dis* 11(1): 97-100. <http://www.ncbi.nlm.nih.gov/pubmed/1113446>
- [63]. Martino PE, Aráuz SM, Anselmino F, Cisterna CC, Silvestrini MP, et al. (2012) Hematology and serum biochemistry of free-ranging nutria (*Myocastor coypus*). *J Zoo Wildl Med* 43(2): 240-247. <http://www.ncbi.nlm.nih.gov/pubmed/22779226>
- [64]. Mattoso CR, Catenacci LS, Beier SL, Lopes RS, Takahira RK (2012) Hematologic, serum biochemistry and urinary values for captive Crab-eating Fox (*Cerdocyon thous*) in São Paulo. *Pesq. Vet. Bras.* 32(6): 559-566. http://www.scielo.br/scielo.php?pid=S0100-736X2012000600015&script=sci_arttext accessed 12.8.13
- [65]. May-Júnior JA, Songsasen N, Azevedo FC, Santos JP, Paula RC, et al. (2009) Hematology and blood chemistry parameters differ in free-ranging maned wolves (*Chrysocyon brachyurus*) living in the Serra da Canastra National Park versus adjacent farmlands. Brazil. *J Wildl Dis* 45(1): 81-90. <http://www.ncbi.nlm.nih.gov/pubmed/19204338>
- [66]. McDonald SE, Pahl SR, Bud TD (1981) Hematology and hematologic values in Nelson desert bighorn sheep. *J Wildl Dis* 17(1): 131-134. <http://www.ncbi.nlm.nih.gov/pubmed/7253095>
- [67]. McLaughlin AB, Epstein JH, Prakash V, Smith CS, Daszak P, et al. (2007) Plasma biochemistry and hematological values for wild-caught flying foxes (*Pteros giganteus*) in India. *J Zoo Wildl Med* 38(3): 446-452. [http://www.bioone.org/doi/abs/10.1638/1042-7260\(2007\)38%5B446%3APBAHV%5D2.0.CO%3B2](http://www.bioone.org/doi/abs/10.1638/1042-7260(2007)38%5B446%3APBAHV%5D2.0.CO%3B2)
- [68]. Melrose WD, Feast MM, Woods R, McMinn A, Jupe DM et al. (1995) Haematology, red cell enzymes, and red cell metabolic intermediates of 20 wild southern elephant seals (*Mirounga leonina*) from Macquarie Island. *Comp Haematol Internat* 5(1): 1-6. <http://link.springer.com/article/10.1007%2FBF00214483#page-1>
- [69]. Miller DL, Leopold BD, Gray MJ, Woody BJ (1999) Blood parameters of clinically normal captive bobcats (*Felis rufus*). *J Zoo Wildl Med* 30(2): 242-247. http://www.jstor.org/stable/20095851?seq=1#page_scan_tab_contents
- [70]. Mira A, da Luz Mathias M (1994) Seasonal effects on the hematology and plasma proteins of two species of mice *Mus musculus domesticus* and *M. spretus* (Rodentia: Muridae) from Portugal. *Hystrix* 5(1-2): 63-72. <http://www.italian-journal-of-mammalogy.it/article/view/4004>
- [71]. Moen R, Rasmussen JM, Burdett CL, Pelican KM (2010) Hematology, serum chemistry, and body mass of free-ranging and captive Canada lynx in Minnesota. *J Wildl Dis* 46(1): 13-22. <http://www.jwildlifedis.org/doi/pdf/10.7589/0090-3558-46.1.13>
- [72]. Mohri M, Aslani MR, Shahbazian N (2000) Haematology of Persian Fallow Deer (*Dama mesopotamica*). *Comp Haematol Int* 10(4): 183-186. <http://link.springer.com/article/10.1007%2F005800170001>
- [73]. Montane J, Marco I, Lopez-Olvera J, Manteca X, Lavin S (2002) Transport stress in roe deer (*Capreolus capreolus*): effect of a short-acting antipsychotic. *Animal Welfare* 11(4): 405-417. <http://www.ingentaconnect.com/content/ufaw/aw/2002/00000011/00000004/art00004>
- [74]. Montes G, Vásquez A, Flores E, Cattaneo G, Acuña M, et al. (2004) Hematology, serum chemistry and physiological characteristics of captive south pudu Pudu pudu. *Avances en Ciencias Veterinarias* 19(1-2): 62-65. <http://goo.gl/JQyczn>
- [75]. Moreau B, Vié JC, Cotellon P, De Thoisy I, Motard A, et al. (2003) Hematological and serum biochemistry values in two free-ranging porcupines (*Coendou prehensilis*, *Coendou melanurus*) in French Guinea. *J Zoo Wildl Med* 34(2): 159-162. <http://www.bioone.org/doi/abs/10.1638/01-023>
- [76]. Moresco A, Larsen RS, Sauter ML, Cuzzo FP, Youssouf Jacky IA (2012) Survival of a wild ring-tailed lemur (*Lemur catta*) with abdominal trauma in an anthropogenically disturbed habitat. *Madagascar Conservation & Development* 7(1): 45-48. Supplementary Material (doi:10.4314/mcd.v7i1.9).
- [77]. Mussart NB, Kozza GA, Solis G, Coppo JA (2009) Approach to some hematological variables of healthy captive "yaguarete" (*Panthera onca*) from Northeast Argentina. *Rev Vet* 20(1): 50-53. <http://goo.gl/SOLZhh>
- [78]. Mustonen AM, Bowman J, Sadowski C, Nituch LA, Bruce L, et al. (2013) Physiological adaptations to prolonged fasting in the overwintering striped skunk (*Mephitis mephitis*). *Comp Biochem Physiol A Mol Integr Physiol* 166(4): 555-563. <http://www.ncbi.nlm.nih.gov/pubmed/23981473>
- [79]. Needham D, Cargill C, Sheriff D (1980) Haematology of the Australian sea lion, *Neophoca cinerea*. *J Wildl Dis* 16(1): 103-107. <http://www.ncbi.nlm.nih.gov/pubmed/7373720>
- [80]. Nimitsutiwong W, Homswat S, Boonprakob U, Kaewmukul S, Schmidt A (2000) Hematological and Plasma Biochemical Values in Captive Eld's-

- Brow Antlered Deer (*Cervus eldi thamin*) in Thailand. *J. Vet. Med. Sci.* 62(1): 93-95. <http://www.ncbi.nlm.nih.gov/pubmed/10676897>
- [81]. Norberg SE, Burkanov VN, Tuomi P, Andrews RD (2011) Hematology of free-ranging, lactating northern fur seals, *Callorhinus ursinus*. *J Wildl Dis* 47(1): 217-221. https://alaskafisheries.noaa.gov/sites/default/files/hematology_norbergetal2011.pdf
- [82]. Norman SA, Goertz CE, Burek KA, Quakenbush LT, Cornick LA, et al. (2012) Seasonal hematology and serum chemistry of wild beluga whales (*Delphinapterus leucas*) in Bristol Bay, Alaska, USA. *J Wildl Dis* 48(1): 21-32. <http://www.ncbi.nlm.nih.gov/pubmed/22247370>
- [83]. Old JM, Connelly L, Francis J, Branch K, Fry G, et al. (2005) Haematology and serum biochemistry of three Australian desert murids: the Plains rat (*Pseudomys australis*), the Spinifex hopping-mouse (*Notomys alexis*) and the Central rock-rat (*Zyzomys pedunculatus*). *Comp Clin Path* 14(3): 130-137. <http://link.springer.com/article/10.1007%2Fs00580-005-0586-y>
- [84]. Old JM, Connelly L, Francis J, Gogler J (2007) Haematology and serum biochemistry of the Carpentarian Rock-rat (*Zyzomys palatalis*). *Comp Clin Path* 16: 249-252. https://www.researchgate.net/publication/245619051_Haematology_and_serum_biochemistry_of_the_Carpentarian_Rock-rat_Zyzomys_palatalis
- [85]. Opara M N, Ike K A, Okoli IC (2006) Haematology and Plasma Biochemistry of the Wild Adult African Grasscutter (*Thryonomis swinderianus*, Temminck). *J. Am. Sci* 2(2): 17-22. <http://ofuturescholar.com/paperpage?docid=973353>
- [86]. Oyewale JO, Ogunsanmi OA, Ozegbe PC (1997) Haematology of the adult African white-bellied Pangolin (*Manis tricuspis*) *Vet. Arch* 67: 261.
- [87]. Oyewale JO, FO Olayemi, OA Oke (1998) Haematology of the wild adult African giant rat (*Cricetomys gambianus*, Waterhouse). *Veterinarski arhiv* 68: 91-99. <http://www.tandfonline.com/doi/full/10.1080/09712119.2016.1141772>
- [88]. Özpirlak H, Çelik I, Sur E, Özyaydin T, Arslan A (2011) A Study of Peripheral Blood in Hedgehogs in Turkey. *J. Zoo Wildl. Med* 42(3): 392-398. <http://www.ncbi.nlm.nih.gov/pubmed/22950310>
- [89]. Palomares F, Delibes M, Recio F (1992) Hematology and serum biochemistry of the Egyptian mongoose, *Herpestes ichneumon*. *J. Wildl. Dis* 28(4): 659-661. <http://www.bioone.org/doi/pdf/10.7589/0090-3558-28.4.659>
- [90]. Pedersen R J, Pedersen AA, (1975) Blood Chemistry and Hematology of Elk. *J. Wildl. Manag* 39(3): 617-620. http://www.jstor.org/stable/3800406?seq=1#page_scan_tab_contents
- [91]. Pospisil J, Kase F, Vahala J, Mouchová I (1984) Basic haematological values in antelopes-II. The Hippotraginae and the Tragelaphinae. *Comp Biochem Physiol A* 78(4):799-807. <http://www.ncbi.nlm.nih.gov/pubmed/6149054>
- [92]. Pospisil J, Kase F, Vahala J, Mouchová I (1984) Basic haematological values in antelopes-III. The Reduncinae and the Antelopinae. *Comp Biochem Physiol A* 78(4): 809-813. <http://www.ncbi.nlm.nih.gov/pubmed/6149055>
- [93]. Pospisil J, Kase F, Vahala J (1987) Basic haematological values in carnivores-I. The Canidae, the Hyaenidae and the *Ursidae*. *Comp Biochem Physiol A* 86(4): 649-652. <http://www.ncbi.nlm.nih.gov/pubmed/2882894>
- [94]. Pospisil J, Kase F, Vahala J (1987) Basic haematological values in carnivores-II. The Felidae. *Comp Biochem Physiol* 87(2): 387-391. <http://www.ncbi.nlm.nih.gov/pubmed/2886279>
- [95]. Prihirunkit K, Salakij C, Apibal S, Narkkon NA (2007) Hematology, cytochemistry and ultrastructure of blood cells in fishing cat (*Felis viverrina*). *J Vet Sci* 8(2): 163-168. <http://www.ncbi.nlm.nih.gov/pubmed/17519570>
- [96]. Priddel D, Wheeler R (1998) Hematology and blood chemistry of a Bryde's whale, *Balaenoptera edeni*, entrapped in the Manning river, New South Wales, Australia. *Mar.Mam. Sci* 14(1): 72-81. <http://onlinelibrary.wiley.com/doi/10.1111/j.1748-7692.1998.tb00691.x/abstract>
- [97]. Reiss A, Portas T, Horsup A (2008) Hematologic and serum biochemical reference values for free-ranging northern hairy-nosed wombats. *J Wildl Dis* 44(1): 65-70. <http://www.ncbi.nlm.nih.gov/pubmed/18263822>
- [98]. Ratnasooriya WD, Udagama-Randeniya PV, Yapa WB, Dharmasira MG (2005) Haematological parameters of three species of wild caught *microchiropteran* bats, *Miniopterus schreibersii*, *Taphozous melanopogon* and *Hipposiderus lankadiva* in Sri Lanka. *J. Sci.Univ.Kelaniya* 2(2005): 27-40. <http://www.kln.ac.lk/uokr/journals/J2/J-2.2.pdf>
- [99]. Rice CG, Hall B (2007) Hematologic and Biochemical Reference Intervals for Mountain Goats (*Oreamnos americanus*): Effects of Capture Conditions. *Northwest Science* 81(3): 206-214. https://www.researchgate.net/publication/250304332_Hematologic_and_Biochemical_Reference_Intervals_for_Mountain_Goats_Oreamnos_americanus_Effects_of_Capture_Conditions
- [100]. Robel GL, Lochmiller RL, McMurphy ST, Qualls CW Jr (1996) Environmental, age, and sex effects on cotton rat (*Sigmodon hispidus*) hematology. *J. Wildl. Dis* 32(2): 390-394. <http://www.ncbi.nlm.nih.gov/pubmed/8722287>
- [101]. Rogival D, Scheirs J, De Coen W, Verhagen R, Blust R, (2006) Metal blood levels and hematology characteristics in woodmice (*Apodemus sylvaticus* L.) along a metal pollution gradient. *Env. Tox. Chem* 25(1): 149-157. <http://www.ncbi.nlm.nih.gov/pubmed/16494236>
- [102]. Rosas FCW, Neto JAA, Mattos G (2008) Anesthesiology, hematology and serum chemistry of the giant otter, *Pteronabrabrasiensis carnivora*, mustelidae. *Arq. Ciênc. Vet. Zool. Unipar, Umuarama* 11: 81-85. http://www.giantotterresearch.com/articles/Anesthesiology_hematology_of_giant_otters.pdf
- [103]. Rostal MK, Evans AL, Solberg EJ, Arnemo JM (2012) Hematology and serum chemistry reference ranges of free-ranging moose (*Alces alces*) in Norway. *J. Wildl. Dis* 48(3): 548-559. <http://www.ncbi.nlm.nih.gov/pubmed/22740520>
- [104]. Rothstein R, Hunsaker D 2nd (1972) Baseline hematology and blood chemistry of the South American woolly opossum, *Caluromys derbianus*. *Lab. Anim. Sci* 22(2): 227-232. <http://www.ncbi.nlm.nih.gov/pubmed/4336994>
- [105]. Sajjad S, Farooq U, Malik H, Anwar M, Ahmad I (2012) Comparative hematology variables of Bengal tigers (*Panthera tigris tigris*) kept in Lahore Zoo and Lahore Wildlife Park, Pakistan. *Turk. J. Vet. Anim. Sci* 36(4): 346-351. https://www.researchgate.net/publication/235639239_Comparative_hematological_variables_of_Bengal_tigers_Panthera_tigris_tigris_kept_in_Lahore_Zoo_and_Lahore_Wildlife_Park_Pakistan
- [106]. Salakij C, Salakij J, Rattanakunuprakarn J, Tengchaisri N, Tunwattana W, Apibal S (2000) Morphology and Cytochemistry of Blood Cells from Asian Wild Dog (*Cuon alpinus*). https://www.researchgate.net/publication/265936571_Morphology_and_Cytochemistry_of_Blood_Cells_from_Asian_Wild_Dog_Cuon_alpinus
- [107]. Salakij C, Salakij J, Narkkong NA, Tongthainun D, Prihirunkit K, Itarat S (2007) Hematology, Cytochemistry and Ultrastructure of Blood Cells in Common Palm Civet (*Paradoxurus hermaphroditus*). *Kasetsart J. (Nat. Sci.)* 41: 705 - 716. https://www.researchgate.net/publication/242411117_Hematology_Cytochemistry_and_Ultrastructure_of_Blood_Cells_in_Sun_Bear_Ursus_malayanus
- [108]. Salakij C, Prihirunkit K, Narkkong NA, Apibal S, Tongthainun D (2008) Hematology, Cytochemistry and Ultrastructure of Blood Cells in Clouded Leopard (*Neofelis nebulosa*). *J. Anim. Vet. Advances* 7(7): 847-853. <http://www.medwelljournals.com/abstract/?doi=javaa.2008.847.853>
- [109]. Salakij C, Salakij J, Narkkong NA, Sirinarumit T, Pattanarangsana R (2008) Hematology, cytochemical, ultrastructural, and molecular findings of Hepatozoon-infected flat-headed cats (*Prionailurus planiceps*). *Vet. Clin. Pathol* 37(1): 31-41. <http://www.ncbi.nlm.nih.gov/pubmed/18366542>
- [110]. Salakij C, Prihirunkit K, Salakij J, Narkkong NA, Thongthainun D (2010) Characterisation of blood cells in jungle cat, *Felis chaus* (Carnivora, Felidae). *Comp Clin Pathol* 20(4): 319-326. <http://link.springer.com/article/10.1007%2Fs00580-010-0996-3>
- [111]. Sanches TC, Miranda FR, Oliveira AS, Matushima ER (2013) Hematology values of captive giant anteaters (*Myrmecophaga tridactyla*) and collared anteaters (*Tamandua tetradactyla*). *Pesquisa Veterinária Brasileira* 33(4): 557-560. http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0100-736X2013000400022
- [112]. Schinnerl M, Aydinonat D, Schwarzenberger F, Voigt CC (2011) Hematological survey of common neotropical bat species from Costa Rica. *J. Zoo Wildl Med* 42(3): 382-391. <http://www.ncbi.nlm.nih.gov/pubmed/22950309>
- [113]. Schoeder MT (1987) Blood chemistry, hematology, and condition evaluation of black bears in Northern California. *Int Conf Bear Res and Manage* 7: 333-349. http://www.bearbiology.com/fileadmin/tpl/Downloads/URSUS/Vol_7/Schroeder_Vol_7.pdf
- [114]. Seal US, Siniff DB, Tester JR, Williams TD (1985) Chemical immobilization and blood analysis of feral horses (*Equus caballus*). *J Wildl Dis* 21(4): 411-416. <http://www.ncbi.nlm.nih.gov/pubmed/4078978>
- [115]. Shanmugam AA, Kumar JK, Selvaraj I, Selvaraj V (2008) Hematology of sloth bears (*Melursus ursinus ursinus*) from two locations in India. *J Wildl Dis* 44(2): 509-518. <http://www.ncbi.nlm.nih.gov/pubmed/18436689>
- [116]. Shirai K, Sakai T (1998) Haematological findings of captive dolphins and whales. *Aust Vet. J* 75(7): 512-514. <http://onlinelibrary.wiley.com/doi/10.1111/j.1751-0813.1997.tb14384.x/abstract>
- [117]. Silva ID, Kuruwita VY (1993) Hematology, Plasma, and Serum Biochemistry Values in Free-Ranging Elephants (*Elephas maximus ceylonicus*) in Sri Lanka. *J. Zoo Wildl. Med* 24(4): 434-439. https://www.jstor.org/stable/20095303?seq=1#page_scan_tab_contents
- [118]. Singh S, Singh C, Kumar A, Sinha KK, Mishra PC (1999) Hematology of tigers (*Panthera tigris tigris*), leopards (*Panthera pardus*) and clouded leopards (*Neofelis nebulosa*) in captivity. *Zoos' Prnt* 14(4): 7-8. <http://www.zoosprint.org/showJournalBackIssue.asp?hidId=192>
- [119]. Superina M, Mera Y, Sierra RL (2008) Hematology and serum chemistry values in captive and wild pichis, *Zaedyus pichiy* (Mammalia, Dasydidae). *J. Wildl. Dis* 44(4): 902-910. <http://www.ncbi.nlm.nih.gov/pubmed/18957646>
- [120]. Szabó MPJ, Matushima ER, de Castro MB, Santana DA, de Paula CD,

- et al. (2005) Hematology of free-living marsh deer (*Blastocerus dichotomus*). *J. Zoo. Wildl. Med.* 36(3): 463-469. <http://www.bioone.org/doi/abs/10.1638/04-404.1>
- [121]. Tociłowski ME, Spelman LH, Sumner PW, Stoskopf MK (2000) Hematology and serum biochemistry parameters of North American river otters (*Lontra Canadensis*). *J. Zoo Wildl Med* 31(4): 484-490. <http://www.ncbi.nlm.nih.gov/pubmed/11428394>
- [122]. Tomkins NW, Jonsson NN (2005) Haematological values of young male rusa deer (*Cervus timorensis*). *Aust. Vet. J* 83(8): 496-498. <http://www.ncbi.nlm.nih.gov/pubmed/16119423>
- [123]. Travis EK, Eby C (2006) Clotting profiles and selected hematology of captive Speke's gazelles (*Gazella spekei*). *J. Zoo Wildl. Med* 37(1): 64-67. <http://www.ncbi.nlm.nih.gov/pubmed/17312817>
- [124]. Vaughan RJ, Warren KS, Mills JS, Palmer C, Fenwick S, et al. (2009) Hematological and serum biochemical reference values and cohort analysis in the Gilbert's potoroo (*Potorous gilbertii*). *J. Zoo Wildl. Med* 40(2): 276-288. <http://www.ncbi.nlm.nih.gov/pubmed/19569474>
- [125]. Vogel I, Vie JC, De Thoisy B, Moreau B (1999) Hematological and serum chemistry profiles of free-ranging southern two-toed sloths in French Guiana. *J. Wildl. Dis* 35(3): 531-535. <http://www.ncbi.nlm.nih.gov/pubmed/10479087>
- [126]. Wallace C, Oppenheim YC (1996) Hematology and Serum Chemistry Profiles of Captive Hoffmann's Two-Toed Sloths (*Choloepus hoffmanni*). *J. Zoo. Wildl. Med* 27(3): 339-345. http://www.jstor.org/stable/20095587?seq=1#page_scan_tab_contents
- [127]. Weber DK, Danielson K, Wright S, Foley J E (2002) Hematology and serum biochemistry values of dusky-footed wood rat (*Neotoma fuscipes*). *J. Wildl Dis* 38(3): 576-582. <http://www.ncbi.nlm.nih.gov/pubmed/12238375>
- [128]. Weiss DJ, Wustenberg W, Bucci TJ, Perman V (1994) Hematologic and serum chemistry reference values for adult brown mink. *J Wildl Dis* 30(4):599-602. <http://www.ncbi.nlm.nih.gov/pubmed/7760500>
- [129]. Wolk E (1985) Hematology of a hibernating rodent – the Northern Birch Mouse. *Acta Theriologica* 30(2): 337-348. <http://rcin.org.pl/dlibra/docmetadata?id=11132>
- [130]. Wiger R (1977) Hematology of the Norwegian Lemming (*Lemmus lemmus*(L.)). *Acta Zool* 58(3): 143-150. <http://onlinelibrary.wiley.com/doi/10.1111/j.1463-6395.1977.tb00249.x/abstract;jsessionid=448E811736283B167A83FA5F17389137.f01t04>
- [131]. Williams TD, Pulley LT (1983) Hematology and blood chemistry in the sea otter (*Enhydra lutris*). *J Wildl Dis* 19(1) :44-47. <http://www.ncbi.nlm.nih.gov/pubmed/6842733>
- [132]. Wilson GR, Hoskins L (1975) Haematology and blood chemistry of the red kangaroo *Megaleia rufa* in captivity. *Aust. Vet. J* 51(3): 146-149. <http://www.ncbi.nlm.nih.gov/pubmed/1164287>
- [133]. Wolff MJ, Bratthauer A, Fischer D, Montali RJ, Banish LD, et al. (1990) Hematologic and serum chemistry values for the Red Panda (*Ailurus fulgens*): Variation with sex, age, health status, and restraint. *J. Zoo Wildl Med* 21(3): 326-333. https://www.jstor.org/stable/20095071?seq=1#page_scan_tab_contents
- [134]. Yamanaka Y (1989) Hematologic study in sika deer (*Cervus nippon yessoensis*). *Jpn J. Vet. Re* 37(2): 140-141. <http://eprints.lib.hokudai.ac.jp/dspace/bitstream/2115/3182/1/KJ00002377285.pdf>
- [135]. Yarıliođlu S, Şahin , Şahin, N, Yüreki (2004) Investigation of Some Hematologic and Biochemical Parameters in the Serum of Gazelles (*Gazella subgutturosa*) in Ceylanpınar, Şanlıurfa, Turkey. *Turk. J. Vet. Anim. Sci.* 28(2): 369-372. <http://connection.ebscohost.com/c/articles/12724148/investigation-some-hematologic-biochemical-parameters-serum-gazelles-gazella-subgutturosa-ceylanpınar-anlıurfa-turkey>
- [136]. Youatt WG, Fay LD, Howe DL, Harte HD (1961) Hematologic data on some small mammals. *Blood* 18: 758-763. <http://www.ncbi.nlm.nih.gov/pubmed/14009319>
- [137]. Yochem PK, Stewart BS, Mazet JA, Boyce WM (2008) Hematologic and serum biochemical profile of the northern elephant seal (*Mirounga angustirostris*): variation with age, sex, and season. *J Wildl Dis.* 44(4): 911-921. <http://www.ncbi.nlm.nih.gov/pubmed/18957647>

***Corresponding Author:**

Colin G. Scanes
Department of Biological Science, University of Wisconsin Milwaukee, 3209 N. Maryland Avenue, Milwaukee, WI 53211, WI53211, USA.
Tele : 1-414-229-3641
E-mail: scanes@uwm.edu

Received: April 05, 2016

Accepted: May 18, 2016

Published: May 23, 2016

Citation: Scanes CG (2016) Allometric and Phylogenic Comparisons of Circulating Leukocyte Concentrations between and within Birds and Mammals. *Int J Vet Health Sci Res.* 4(4), 116-122.

Copyright: Scanes CG[©] 2016. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.