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SCHALM'S Veterinary Hematology

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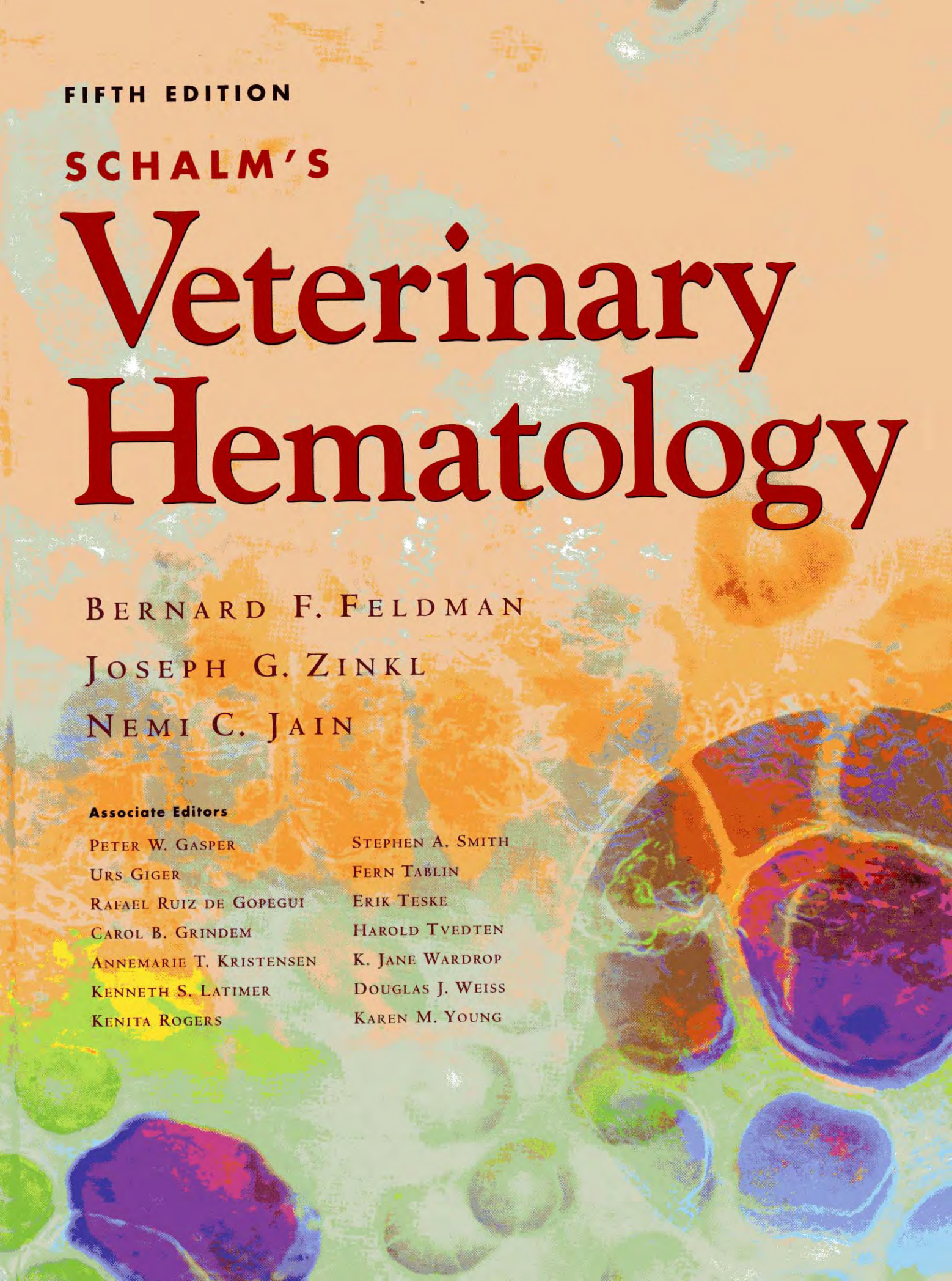

TABLE 163.1 Hematologic Reference Ranges for Normal Dogs

Erythrocytes ($\times 10^6$)	5.5–8.5
Hemoglobin (g/dL)	12.0–18.0
PCV (%)	37–55
MCV (fL)	60–77
MCHC (%)	32–36
Reticulocytes (%)	0.0–1.5
Leukocytes/μL	6000–17,000
Neutrophils	3000–11,500
Bands	0–300
Lymphocytes	1000–4800
Monocytes	150–1350
Eosinophil	100–1250
Basophils	Rare
Platelets/μL	200,000–500,000
Mean platelet volume (fL)	6.7–11.1[a]
	3.9–6.1[b]

Data from Jain NC. Schalm's veterinary hematology. 4th ed. Philadelphia: Lea & Febiger, 1986;103–125.

[a] Data from Meyer DJ, Harvey JW. Veterinary laboratory medicine. 2nd ed. Philadelphia: WB Saunders, 1998;345.

[b] Data from Willard MD, Tvedten H, Turnwald GH. Small animal clinical diagnosis by laboratory methods. 2nd ed. Philadelphia: WB Saunders, 1994;359.

TABLE 163.2 Blood Values in Normal Beagles to 2 Months of Age[a]

	Age				
	0–3 Days	14–17 Days	28–31 Days	40–45 Days	56–59 Days
Number of dogs	46	46	48	44	42
RBC ($\times 10^6$)	4.8 ± 0.8	3.5 ± 0.3	3.9 ± 0.4	4.1 ± 0.4	4.7 ± 0.4
Hemoglobin (g/dL)	15.8 ± 2.9	9.9 ± 1.1	9.6 ± 0.9	9.2 ± 0.7	10.3 ± 0.9
PCV (%)	46.3 ± 8.5	28.7 ± 2.9	28.4 ± 2.5	28.3 ± 2.3	31.4 ± 2.4
MCV (fL)	94.2 ± 5.9	81.5 ± 3.3	71.7 ± 3.5	68.2 ± 2.6	65.8 ± 2.3
MCH (pg)	32.7 ± 1.8	28.0 ± 2.0	24.3 ± 1.6	22.4 ± 1.0	21.8 ± 1.2
MCHC (%)	34.6 ± 1.4	34.3 ± 1.6	33.5 ± 1.4	32.4 ± 1.7	32.6 ± 1.8
nRBC/100 WBC	7.2 ± 6.7	2.4 ± 3.8	1.1 ± 1.5	0.6 ± 0.9	0.1 ± 0.4
Reticulocytes (%)	6.5	6.7	5.8	4.5	3.6
WBC/μL	16,800 ± 5,700	13,600 ± 4,400	13,900 ± 3,300	15,300 ± 3,700	15,700 ± 4,400
Absolute number of WBC/μL					
Band neutrophils	600 ± 500	200 ± 200	100 ± 200	200 ± 200	300 ± 300
Segmented neutrophils	9,200 ± 6,600	6,900 ± 3,100	6,800 ± 2,000	7,400 ± 2,400	8,500 ± 2,900
Lymphocytes	3,700 ± 2,300	4,900 ± 1,700	5,400 ± 1,600	6,100 ± 1,900	5,000 ± 1,500
Monocytes	1,400 ± 1,300	1,100 ± 600	1,100 ± 600	1,300 ± 600	1,400 ± 700
Eosinophils	400 ± 400	500 ± 500	400 ± 400	300 ± 300	400 ± 400
Platelets/μL[b]	302,000	290,000	287,000	321,000	411,000
M:E ratio[b]	1.6:1	1.7:1	1.7:1	1.8:1	1.4:1

[a] Data from Shifrine M, et al. Hematologic changes to 60 days of age in clinically normal Beagles. Lab Anim Sci 1973;23:894–898.
[b] Data from Earl FL, et al. The hemogram and bone marrow profile of normal neonatal, and weanling Beagle dogs. Lab Anim Sci 1973;23:690–695. Values were approximated for various age groups shown here; 5 males and 5 females were studied in each group.

TABLE 164.1 Hematologic Reference Range for Cats[a]

Data	Range	UC Davis Values[b]
Erythrogram		
Erythrocytes ($\times 10^6/\mu L$)	5.0–10.0	6.0–10.2
Hemoglobin (g/dL)	8.0–15.0	9.0–15.1
PCV (%)	24.0–45.0	29.0–48.0
MCV (fL)	39.0–55.0	41.5–52.5
MCHC (%)	31.0–35.0	30.0–33.5
Reticulocytes[c] (%)		
Aggregate	0–0.4	
Punctate	1.4–10.8	
RBC diameter (μm)	5.5–6.3	
Erythrocytes lifespan (days)	66–78	
Other data		
Platelet count ($\times 10^5/\mu L$)	3–8	200,000–600,000
MPV (fL)	12–17[d]	
Plasma proteins (g/dL)	6.0–8.0	6.8–8.3
Fibrinogen (g/dL)	0.05–0.30	
Leukogram		
Leukocytes (μL)	5500–19,500	5000–15,000
Band neutrophils	0–300	Rare
Segmented neutrophils	2500–12,500	2500–11,300
Lymphocytes	1500–7000	1400–8100
Monocytes	0–850	0–800
Eosinophils	0–1500	0–1500
Basophils	Rare	Rare

[a] Data adapted from Jain NC. The cat: normal hematology with comments on response to disease. In: Schalm's veterinary hematology. 4th ed. Philadelphia: Lea & Febiger, 1986;126–139.

[b] Recently determined values from the University of California, Davis, Veterinary Medical Teaching Hospital.

[c] Cramer DV, Lewis RM. Reticulocyte response in the cat. J Am Vet Med Assoc 1972;160:61–67.

[d] For nonaggregated platelets. Zelmanovic D, Hetherington EJ. Automated analysis of feline platelets in whole blood, including platelet count, mean platelet volume, and activation state. Vet Clin Pathol 1998;27:2–9.

TABLE 176.1 Referenced Erythrocyte Values for Several Species of New World Nonhuman Primates

Reference	Species	RBC ($\times 10^6$/mm^3) Mean or [Range]	PCV (%) Mean or [Range]	Hb (g/dl) Mean or [Range]	MCV (μ^3) Mean	MCH ($\mu\mu$g) Mean or [Range]	MCHC (%) Mean or [Range]
	Howler monkey						
37	*Alouatta villosa* (female)	3.9 ± 0.7	36.8 ± 6.7	11.7 ± 1.8	97.7 ± 12.7	29.7 ± 1.4	31.4 ± 5.5
	A villosa (male)	3.8 ± 0.7	37.0 ± 5.8	11.2 ± 1.7	97.6 ± 5.3	29.8 ± 0.9	30.5 ± 1.7
1	*A. villosa*	[2.89–4.65]	[29–44]	[8.6–13.8]	[76.9–117.0]	[22.7–36.9]	[23.7–37.8]
	Owl monkey						
12	*Aotus trivirgatus*	5.17 ± 0.84	42.0 ± 5.4	14.3 ± 1.1	82.4 ± 11.9	26.9 ± 3.1	34.1 ± 3.1
1	*A. trivirgatus*	[3.50–7.74]	[32.5–51.6]	[11.9–16.0]	[57.8–91.8]	[21.7–29.5]	[28.6–39.4]
38	*A. vociferans*	6.4 ± 0.5	52.2 ± 3.7	17.1 ± 1.3	81.3 ± 4.1	26.6 ± 1.6	32.8 ± 0.6
		[5.6–7.4]	[44.0–57.8]	[14.0–18.9]	[72–90]	[22.7–30.3]	[31.0–33.8]
	Spider monkey						
1	*Ateles fusiceps*	[1.97–4.22]	[17–48]	[5.0–12.5]	[54.8–154.0]	[16.1–40.3]	[15.4–38.5]
	Ateles geoffroyi	3.68–4.98	[44–50]	[13.0–15.1]	[98–117]	[28.8–34.9]	[27.0–39.8]
37	*Ateles geoffroyi*	4.2 ± 0.6	40.5 ± 4.9	12.4 ± 1.7	97.0 ± 2.4	30.0 ± 0.4	31.0 ± 0.8
	Marmoset/tamarin						
39	*Callithrix jacchus*	6.7 ± 0.68	48.0 ± 3.5	15.5 ± 1.3	—	—	—
16	*Callithrix jacchus*	6.9	48	15.5	69	22	32
40	*Callithrix jacchus*	6.86	45	15.1	67	22	34
41	*Leontopithecus rosalia*	5.7	—	—	—	—	—
	L. rosalia (males)	—	—	15.4 ± 1.6	—	—	—
	L. rosalia (females)	—	—	14.8 ± 1.3	—	—	—
1	*Sanguinus geoffroyi*	[5.47–8.68]	[34–62]	[10.6–18.7]	[48.0–87.6]	[15.0–26.5]	[22.3–40.9]
42	*Sanguinus labiatus*	6.95	52	17	74	25	33
1	*Sanguinus mystax*	[4.7–7.7]	[35.3–60.7]	[8.7–19.6]	—	[18.3–29.9]	[26.1–35.1]
40	*Sanguinus oedipus*	6.59	45	15.5	69	23	34
	Capuchin monkey						
37	*Cebus capuchinus* (male)	4.92 ± 0.72	47.0 ± 6.7	14.4 ± 1.8	96.7 ± 1.8	29.7 ± 1.7	30.9 ± 2.2
1	*Cebus capuchinus*	[4.15–6.68]	[40–63]	[12.4–19.8]	[70–117]	[21.6–37.3]	[24.2–39.1]
11	*Cebus* sp. (female adult)	6.0 ± 0.6	49 ± 4	17 ± 1	79 ± 4	27 ± 2	34 ± 2
	Cebus sp. (at birth)	5.0 ± 0.5	55 ± 4	19 ± 1	105 ± 4	37 ± 3	36 ± 3
	Cebus sp. (1 month)	4.0 ± 0.5	39 ± 6	13 ± 1	97 ± 11	31 ± 3	32 ± 4
	Cebus sp. (2 months)	5.0 ± 0.4	43 ± 3	14 ± 1	89 ± 7	29 ± 2	32 ± 2
	Cebus sp. (4 months)	6.0 ± 0.4	46 ± 3	15 ± 1	83 ± 5	27 ± 2	32 ± 2
	Cebus sp. (12 months)	6.0 ± 0.4	47 ± 3	16 ± 1	79 ± 5	26 ± 2	33 ± 2
	Squirrel monkey						
43	*Saimiri sciureus* (at birth)	6.0 ± 0.7	55 ± 6	18 ± 2	89 ± 6	29 ± 3	33 ± 2
	S. sciureus (1 month)	5.0 ± 0.5	34 ± 3	11 ± 1	72 ± 4	23 ± 1	32 ± 2
	S. sciureus (2 months)	6.0 ± 0.5	38 ± 3	12 ± 1	66 ± 5	21 ± 2	32 ± 2
	S. sciureus (4 months)	7.0 ± 0.6	42 ± 3	13 ± 1	63 ± 5	20 ± 2	33 ± 2
	S. sciureus (12 months)	7.0 ± 0.6	43 ± 3	14 ± 1	62 ± 3	20 ± 1	33 ± 2
	S. sciureus (24 months)	7.0 ± 0.5	44 ± 3	14 ± 1	60 ± 3	20 ± 1	33 ± 2
1	*Saimiri sciureus*	[5.9–9.4]	[30.5–43.6]	[9.3–16.1]	[39–60]	[12.2–21.0]	[24.8–44.2]
44	*Saimiri sciureus*	7.26	—	14.25 ± 0.11	—	—	—

TABLE 176.2 Referenced Leukocyte Values for Several Species of New World Nonhuman Primates

Reference	Species	WBC ($\times 10^3/mm^3$) Mean or [Range]	Neutrophils (%) Mean or [Range]	Lymphocytes (%) Mean or [Range]	Eosinophils (%) Mean or [Range]	Basophils (%) Mean or [Range]	Monocytes (%) Mean or [Range]
	Howler monkey						
37	*Alouatta villosa* (female)	11.9 ± 5.5	63.0 ± 18.9	34.5 ± 19.3	0.1 ± 0.4	0.4 ± 0.5	1.8 ± 1.3
	Alouatta villosa (male)	13.2 ± 5.0	60.3 ± 6.4	37.3 ± 6.1	0.3 ± 0.5	0	2.3 ± 1.0
1	*Alouatta villosa*	[7.2–22.9]	[51–64]	[32–49]	[0–2]	[0–1]	[0–3]
	Owl monkey						
12	*Aotus trivirgatus*	12.7 ± 4.7	55.4 ± 7.6	35.5 ± 18.3	9.5 ± 9.2	<0.1	—
1	*Aotus trivirgatus*	[3.2–28.5]	[13–91]	[5–80]	[0–37]	[0–1]	—
38	*A. vociferans*	8.8 ± 3.8	29	63	18	1	3
	Spider monkey						
1	*Ateles fusiceps*	[4.3–18.5]	[46–82]	[13–54]	[0–4]	[0–2]	0–3
	Ateles geoffroyi	[7.3–13.5]	—	[50.0–76.1]	[0–3]	[0–1]	0–6
37	*Ateles geoffroyi*	13.0 ± 4.5	39.0 ± 8.0	59 ± 8	1 ± 1	0	1 ± 1
	Marmoset/tamarin						
39	*Callithrix jacchus*	10.0 ± 2.7	37.4 ± 14.7	59.9 ± 14.7	0.9 ± 0.9	0.2 ± 0.3	1.6 ± 1.1
16	*Callithrix jacchus*	7.3	55	43	0.5	1.3	0.4
40	*Callithrix jacchus*	12.8	28	67	0.6	0.3	2.1
41	*Leontopithecus rosalia*	7.13 ± 2.8	62 ± 35.2	30.4 ± 16.0	4.2 ± 5.6	1.1 ± 2.0	2.2 ± 2.5
1	*Sanguinus geoffroyi*	[7.3–24.6]	[30–90]	[9–66]	[0–2]	[0–6]	[0–2]
42	*Sanguinus labiatus*	11.9	42	54	0.9	0.7	2.8
1	*Sanguinus mystax*	[7.7–20.8]	—	—	—	—	—
1	*Sanguinus nigricollis*	[6.8–20.8]	[4.0–72.5]	[20.5–91.0]	[0.0–11.5]	[0.0–7.5]	[0–11]
40	*Sanguinus oedipus*	12.6	43	49	1.2	0.1	5
1	*Sanguinus oedipus*	[7.3–24.6]	[30–90]	[9–66]	[0–2]	[0.0–7.5]	[0–11]
	Capuchin monkey						
37	*Cebus capuchinus*	16.0 ± 8.4	55.6 ± 6.6	40.9 ± 6.7	1.6 ± 2.2	0	1.8 ± 1.1
1	*Cebus capuchinus*	[6.3–34.3]	[40–70]	[25–55]	[0–5]	[0–1]	[0–4]
11	*Cebus* sp. (female adult)	8 ± 3	—	—	—	—	—
	Cebus sp. (at birth)	8 ± 2	62	33	<1	<1	4
	Cebus sp. (1 month)	7 ± 3	30	60	4	<1	6
	Cebus sp. (2 months)	8 ± 3	26	70	3	<1	3
	Cebus sp. (4 months)	10 ± 4	18	76	4	<1	4
	Cebus sp. (12 months)	8 ± 3	30	62	4	0	4
	Squirrel monkey						
43	*Saimiri sciureus* (at birth)	13	77	13	3	1	6
	S. sciureus (1 month)	6	40	53	4	<1	3
	S. sciureus (2 months)	8	40	54	2	<1	4
	S. sciureus (4 months)	8	31	62	4	<1	2
	S. sciureus (12 months)	8	30	63	2	<1	4
1	*Saimiri sciureus*	[4.6–11.7]	[22.5–80.0]	[20–68]	0–10	0–1	1–6
44	*Saimiri sciureus* (males)	8.0 ± 0.4	34.8 ± 2.1	58.0 ± 2.1	—	—	3.5 ± 0.5

TABLE 190.3 Referenced Erythrocyte Values in the Mouse (*Mus musculus*)—by Strain/Stock and Age

Reference	Strain/ Stock	Gender/ Age	RBC ($\times 10^6$/mm^3) Mean	RBC ($\times 10^6$/mm^3) Range	PCV (%) Mean	PCV (%) Range	Hb (g/dL) Mean	Hb (g/dL) Range	MCV (μ^3) Mean	MCV (μ^3) Range	MCH ($\mu\mu$g) Mean	MCH ($\mu\mu$g) Range	MCHC (%) Mean	MCHC (%) Range
16	ICR	M	9.3 ± 1.2	6.9–11.7	41.5 ± 4.2	33.1–49.9	11.3 ± 0.1	11.1–11.5	49.0 ± 0.75	47.5–50.5	12.2 ± 0.25	11.7–12.7	27.2 ± 2.0	23.2–31.2
	ICR	F	9.1 ± 1.12	6.86–11.3	42.1 ± 1.2	39.7–44.5	10.9 ± 0.1	10.7–11.1	49.5 ± 1.25	47–52	11.98 ± 0.42	11.1–12.7	25.9 ± 1.8	22.3–29.5
18	ICR	M < 1 yr	9.11 ± 0.697	—	42.6 ± 3.22	—	15.4 ± 1.05	—	46.8 ± 1.82	—	17.0 ± 0.79	—	36.3 ± 1.26	—
	ICR	F < 1 yr	8.74 ± 0.689	—	41.0 ± 3.23	—	15.0 ± 0.9	—	46.9 ± 1.86	—	17.3 ± 0.9	—	36.7 ± 1.59	—
	ICR	M > 1 yr	8.27 ± 0.884	—	37.5 ± 4.14	—	13.5 ± 1.42	—	45.3 ± 2.72	—	16.5 ± 1.0	—	36.2 ± 0.71	—
	ICR	F > 1 yr	7.46 ± 0.927	—	34.5 ± 3.87	—	12.4 ± 1.36	—	46.3 ± 2.76	—	16.7 ± 1.11	—	36.0 ± 1.01	—
24	ICR	M/F	—	6.86–11.7	—	33.1–49.9	—	10.7–11.5	—	47–52	—	11.1–12.7	—	22.3–31.2
15	B6D2F1	NS	6.74 ± 0.47	—	42 ± 3	—	14.5 ± 0.8	—	—	—	—	—	—	—
29	CD-1®(ICR)	M (6–8 wk)	7.6	7.2–8.0	42	36–48	14.4	12.6–16.2	—	—	—	—	35	33–37
	CD-1®(ICR)	F (6–8 wk)	5.61	4.7–6.5	43	38–48	14.8	13.0–16.6	—	—	—	—	35	31–39
	CD-1®(ICR)	M (19–21 wk)	7.0	6.4–7.6	40	36–44	11.2	8.2–14.2	—	—	—	—	35	31–39
	CD-1®(ICR)	F (19–21 wk)	5.41	4.3–6.4	40	35–46	13.5	11.9–15.1	—	—	—	—	34	31–37
	CD-1®(ICR)	M (32–34 wk)	7.2	6.9–7.5	44	40–48	12.6	9.9–15.3	—	—	—	—	34	32–36
	CD-1®(ICR)	F (32–34 wk)	5.41	4.5–6.3	39	33–45	13.4	11.4–15.4	—	—	—	—	34	31–37
30	BALB/c	M (1–3 mo)	9.5 ± 0.8	—	45.2 ± 2.7	—	15.7 ± 1.2	—	48.1 ± 1.8	—	16.7 ± 1.2	—	35.0 ± 2.3	—
	BALB/c	F (1–3 mo)	9.5 ± 0.5	—	45.3 ± 2.1	—	15.9 ± 1.0	—	48.5 ± 1.0	—	17.2 ± 0.9	—	35.8 ± 1.6	—
	BALB/c	M (6–12 mo)	9.8 ± 0.9	—	44.0 ± 2.9	—	16.0 ± 1.1	—	44.4 ± 1.5	—	16.5 ± 1.0	—	36.7 ± 1.6	—
	BALB/c	F (6–12 mo)	9.7 ± 0.7	—	41.2 ± 2.9	—	15.3 ± 0.7	—	42.4 ± 1.0	—	16.1 ± 0.5	—	38.4 ± 2.2	—
	BALB/c	M (12–18 mo)	10.0 ± 0.8	—	44.2 ± 5.6	—	14.9 ± 1.0	—	44.4 ± 1.4	—	15.0 ± 1.1	—	35.3 ± 1.7	—
	BALB/c	F (12–18 mo)	9.3 ± 0.7	—	40.7 ± 7.0	—	14.3 ± 1.1	—	42.3 ± 1.9	—	15.1 ± 2.1	—	35.3 ± 4.2	—
	BALB/c	M (>18 mo)	9.1 ± 1.0	—	38.9 ± 3.9	—	14.7 ± 1.7	—	43.0 ± 2.1	—	16.5 ± 1.3	—	38.1 ± 2.7	—
	BALB/c	F (>18 mo)	9.3 ± 0.7	—	38.9 ± 6.4	—	14.9 ± 1.1	—	41.3 ± 1.4	—	16.2 ± 1.5	—	38.9 ± 3.2	—
31	BALB/c	F	7.11 ± 0.41	—	41.4 ± 1.77	—	14.8 ± 0.66	—	—	—	—	—	—	—
30	C57BL/6	M (1–3 mo)	9.1 ± 1.1	—	42.7 ± 2.6	—	14.7 ± 1.2	—	47.7 ± 1.1	—	16.5 ± 0.7	—	34.7 ± 1.6	—
	C57BL/6	F (1–3 mo)	9.1 ± 0.9	—	43.1 ± 3.5	—	14.7 ± 1.4	—	48.1 ± 1.2	—	16.5 ± 0.6	—	34.6 ± 1.3	—
	C57BL/6	M (6–12 mo)	9.6 ± 0.5	—	42.0 ± 2.3	—	14.8 ± 0.6	—	48.3 ± 1.3	—	15.7 ± 0.4	—	35.6 ± 0.7	—
	C57BL/6	F (6–12 mo)	9.2 ± 0.5	—	40.4 ± 2.2	—	14.5 ± 0.5	—	44.1 ± 1.0	—	16.1 ± 0.5	—	36.0 ± 1.1	—
	C57BL/6	M (12–18 mo)	8.9 ± 0.7	—	38.6 ± 4.1	—	13.7 ± 1.2	—	43.7 ± 1.4	—	15.7 ± 0.7	—	35.3 ± 1.5	—
	C57BL/6	F (12–18 mo)	8.8 ± 1.0	—	38.8 ± 3.7	—	13.8 ± 1.0	—	44.0 ± 1.5	—	15.8 ± 0.9	—	35.4 ± 2.0	—
	C57BL/6	M (>18 mo)	8.1 ± 0.6	—	34.1 ± 3.1	—	13.1 ± 1.1	—	42.6 ± 2.2	—	16.6 ± 0.8	—	38.7 ± 1.3	—
	C57BL/6	F(>18 mo)	8.5 ± 0.6	—	35.9 ± 6.0	—	13.2 ± 1.1	—	42.1 ± 1.5	—	15.9 ± 1.0	—	37.1 ± 2.7	—
32	C57BL/6J	M (8–10 mo)	—	—	51.7 ± 2.8	46–58	—	—	—	—	—	—	—	—
		M (25–28 mo)	—	—	45.3 ± 4.6	28–52	—	—	—	—	—	—	—	—
31	Swiss Webster	M	6.5 ± 0.7	—	38.05 ± 3.94	—	12.25 ± 1.14	—	58.5 ± 2.06	—	18.78 ± 0.28	—	32.17 ± 0.9	—
	Swiss Webster	F	6.29 ± 0.62	—	37.31 ± 2.84	—	12.44 ± 0.64	—	59.3 ± 1.98	—	20.16 ± 1.59	—	34.2 ± 2.27	—

NS, not specified.

TABLE 190.1 Referenced Erythrocyte Values in the Mouse (*Mus musculus*)—Gender and Strain/Stock Not Specified

Reference	RBC ($\times 10^6$/mm^3) Mean	RBC ($\times 10^6$/mm^3) Range	PCV (%) Mean	PCV (%) Range	Hb (g/dL) Mean	Hb (g/dL) Range	MCV (μ^3) Mean	MCV (μ^3) Range	MCH ($\mu\mu$g) Mean	MCH ($\mu\mu$g) Range	MCHC (%) Mean	MCHC (%) Range
3	9	6–12	—	—	—	—	—	—	—	—	—	—
27	8.6	—	45	—	14.2	—	51	—	17	—	33	—
28	7.85 ± 2.12	—	41.0 ± 2.13	—	11.9 ± 0.94	—	—	—	—	—	—	—
25	—	7–11	—	35.45–40.0	—	10–20	—	—	—	—	—	—
26	—	8.7–10.5	44	42–44	13.4	12.2–16.2	—	—	—	—	—	—
10	—	7.0–12.5	—	39–49	—	10.2–16.6	—	—	—	—	—	—
19	—	7.0–12.5	—	36–49	—	10.2–18	—	—	—	—	—	—
6	—	7.9–10.1	—	37–46	—	11.0–14.5	—	—	—	—	—	—

TABLE 190.2 Referenced Leukocyte Values in the Mouse (*Mus musculus*)—Gender and Strain/Stock Not Specified

Reference	WBC ($\times 10^3$/mm^3) Mean	WBC ($\times 10^3$/mm^3) Range	Neutrophils (%) Mean	Neutrophils (%) Range	Lymphocytes (%) Mean	Lymphocytes (%) Range	Eosinophils (%) Mean	Eosinophils (%) Range	Basophils (%) Mean	Basophils (%) Range	Monocytes (%) Mean	Monocytes (%) Range
3	10	7–15	—	10–60	—	35–90	—	0–7	—	0–1	—	0–3
27	9.2	—	20	—	80	—	0.9	—	0	—	0.2	—
25	—	4–12	—	5–40	—	30–90	—	0–5	—	0–1	—	0–10
26	8.4	5.1–11.6	17.9	6.7–37.2	69	63–75	2.1	0.9–3.8	0.5	0.0–1.5	1.2	0.7–2.6
10	—	6–15	—	10–40	—	55–95	—	0–4	—	0–0.3	—	0.1–3.5
19	—	6–15	—	10–40	—	55–95	—	0–4	—	0–0.3	—	0.1–3.5

TABLE 173.1 Referenced Erythrocyte Parameters of the Syrian (Golden) Hamster (*Mesocricetus auratus*)

Reference	Gender	RBC ($\times 10^6$/mm^3) Mean	RBC ($\times 10^6$/mm^3) Range	PCV (%) Mean	PCV (%) Range	Hb (g/dL) Mean	Hb (g/dL) Range	MCV (μ^3) Mean	MCV (μ^3) Range	MCH ($\mu\mu$g) Mean	MCH ($\mu\mu$g) Range	MCHC (%) Mean	MCHC (%) Range
9	NS	7	6–9	—	—	14.88	—	—	—	—	—	—	—
7	NS	7.5 ± 2.4	—	52.5 ± 2.3	—	16.8 ± 1.2	—	71.2 ± 3.2	—	—	—	—	—
3	NS (n = 23)	6.8 ± 0.3	—	—	—	16.0 ± 0.3	—	73.9 ± 3.0	—	—	—	31.6 ± 2.1	—
4	NS	7.2	—	46	—	14.8	—	64	—	21	—	32	—
5	NS	7.5 ± 2.4	—	52.5 ± 2.3	—	16.8 ± 1.2	—	71.2 ± 3.19	—	22.3 ± 1.27	—	32.0 ± 2.23	—
18	M/F	—	3.96–10.3	—	32.9–58.8	—	13.1–19.2	—	64.0–77.6	—	19.9–25.8	—	27.8–37.4
10	M (n = 84)	7.5 ± 1.40	4.7–10.3	52.5 ± 2.3	47.9–57.1	16.8 ± 1.2	14.4–19.2	70.0 ± 3.19	64.8–77.6	22.4 ± 1.27	19.9–24.9	32.0 ± 2.23	27.5–36.5
	F (n = 80)	6.96 ± 1.50	3.96–9.96	49.0 ± 4.9	39.2–58.8	16.0 ± 1.45	13.1–18.9	70.0 ± 3.0	64.0–76.0	23.0 ± 1.4	20.2–25.8	32.6 ± 2.4	27.8–37.4
6	NS	—	7–8	—	45–49.8	—	16.6–18.6	—	—	—	—	—	—
14	NS	8	4–10	—	36–59	—	9.7–19	—	—	—	—	—	—
2	NS	—	6–10	—	36–55	—	10–16	—	—	—	—	—	—
15	NS	—	5–10	—	36–55	—	10–16	—	—	—	—	—	—
16	NS (n = 6)	7.1 ± 0.2	—	42 ± 1.9	—	15.2 ± 0.6	—	59 ± 1.0	—	21 ± 0.8	—	36 ± 0.8	—

NS, not specified.

TABLE 173.2 Referenced Leukocyte Parameters of the Syrian (Golden) Hamster (*Mesocricetus auratus*)

Reference	Gender	WBC ($\times 10^3$/mm^3) Mean	WBC ($\times 10^3$/mm^3) Range	Neutrophils (%) Mean	Neutrophils (%) Range	Lymphocytes (%) Mean	Lymphocytes (%) Range	Eosinophils (%) Mean	Eosinophils (%) Range	Basophils (%) Mean	Basophils (%) Range	Monocytes (%) Mean	Monocytes (%) Range
9	NS	6.2	3.4–7.6	—	3–43	—	50–96	—	0–2	—	0	—	0–1
7	NS	7.62 ± 1.3	—	29.9 ± 8.0	—	73.5 ± 9.4	—	1.1 ± 0.0	—	0	—	2.5 ± 0.8	—
4	NS	6.3	—	27	—	68	—	1.1	—	0	—	2.9	—
5	NS	7.62 ± 1.3	—	21.9 ± 5.5	—	73.5 ± 9.4	—	1.1 ± 0.02	—	—	—	2.5 ± 0.8	—
18	M/F	—	5.02–10.6	—	17.1–35.2	—	50.9–92.3	—	0.22–1.54	—	0–5	—	0.4–4.4
10	M (n = 84)	7.62 ± 1.3	5.02–10.2	22.1 ± 2.5	17.1–27.1	73.5 ± 9.4	54.7–92.3	0.9 ± 0.32	0.26–1.54	1.0 ± 2.0	0–5	2.5 ± 0.8	0.9–4.1
	F (n = 80)	8.56 ± 1.54	6.48–10.6	29.0 ± 3.12	22.8–35.2	67.9 ± 8.52	50.9–84.9	0.7 ± 0.24	0.22–1.18	0.5 ± 0.7	0–2.1	2.4 ± 1.0	0.4–4.4
6	NS	—	5–23	—	10–50	—	50–70	—	0–5	—	0–1	—	0–10
14	NS	—	3–15	—	10–43	—	50–95	—	0–4.5	—	0–1	—	0–3
2	NS	—	3–11	—	10–42	—	50–95	—	0–4.5	—	0–1	—	0–3
15	NS	—	6.3–8.9	—	10–42	—	50–95	—	0–4.5	—	0–1	—	0–3
16	NS	4.7 ± 0.8	—	24 ± 9	—	74 ± 9	—	0	—	0	—	2 ± 1	—

NS, not specified.

TABLE 170.1 Referenced Erythrocyte Parameters of the New Zealand White (NZW) Rabbit (*Oryctolagus cuniculus*)

Reference	Gender	RBC ($\times 10^6$/mm^3) Mean	RBC ($\times 10^6$/mm^3) Range	PCV (%) Mean	PCV (%) Range	Hb (g/dl) Mean	Hb (g/dl) Range	MCV (μ^3) Mean	MCV (μ^3) Range	MCH ($\mu\mu$g) Mean	MCH ($\mu\mu$g) Range	MCHC (%) Mean	MCHC (%) Range
9	NS	5.25	4–6.4	—	—	12.4	8.4–15.5	—	—	—	—	—	—
36	NS	6.2	—	39	—	13.4	—	60	—	23	—	35	—
37	M/F (adult)	—	5.11–7.94	—	37–50	—	9.8–17.4	—	57.8–65.4	—	17.1–23.5	—	28.7–37
13	NS (1 yr)	7.73 ± 0.78	—	49.08 ± 3.98	—	15.97 ± 1.3	—	63.62 ± 2.47	—	20.7 ± 1.07	—	32.52 ± 1.04	—
	NS (adult)	7.79 ± 0.51	—	47.58 ± 2.89	—	15.95 ± 1.18	—	61.08 ± 2.45	—	20.48 ± 1.1	—	33.54 ± 1.2	—
6	M	6.7 ± 0.62	5.46–7.94	41.5 ± 4.25	33–50	13.9 ± 1.75	10.4–17.4	62.5 ± 2.0	58.5–66.5	20.7 ± 1.0	18.7–22.7	33.5 ± 1.85	33–50
	F	6.31 ± 0.6	5.11–6.51	32.2 ± 4.4	31.0–48.6	12.8 ± 1.5	9.8–15.8	63.1 ± 1.92	57.8–65.4	20.3 ± 1.6	17.1–23.5	32.2 ± 1.74	28.7–35.7
14	M (3 mo)	5.3 ± 0.4	—	34 ± 2	—	11.2 ± 0.7	—	65 ± 3	—	21 ± 1	—	33 ± 1	—
	F (3 mo)	5.4 ± 0.6	—	36 ± 3	—	11.7 ± 1	—	67 ± 4	—	22 ± 1	—	33 ± 1	—
26	NS	—	4–7	—	30–50	—	8–15	—	—	—	—	—	—
5	M (1–2 mo)	5.64 ± 0.49	—	40.5 ± 2.4	—	11.8 ± 0.8	—	72.2 ± 5.1	—	21 ± 1.3	—	28.4 ± 4.2	—
	F (1–2 mo)	5.5 ± 0.62	—	40.3 ± 2.2	—	11.5 ± 0.8	—	73.9 ± 6.4	—	21.1 ± 1.6	—	28.5 ± 0.9	—
	M (3 mo)	6.24 ± 0.24	—	42.5 ± 1.6	—	13.4 ± 0.5	—	68.1 ± 1.9	—	21.5 ± 0.6	—	31.4 ± 0.9	—
	F (3 mo)	6.02 ± 0.23	—	41.4 ± 2.5	—	12.6 ± 0.7	—	68.7 ± 2.5	—	20.9 ± 0.8	—	30.4 ± 1	—
	M (4–6 mo)	6.34 ± 0.39	—	43.3 ± 2.6	—	13.9 ± 1.1	—	68.2 ± 4.1	—	21.9 ± 1.5	—	32 ± 1.2	—
	F (4–6 mo)	6.32 ± 0.43	—	43.0 ± 2.3	—	13.5 ± 0.9	—	68.2 ± 3.0	—	21.4 ± 1.2	—	31.4 ± 1.1	—
	M (7–12 mo)	6.03 ± 0.3	—	42.4 ± 1.6	—	13.7 ± 0.6	—	70.9 ± 2.3	—	22.7 ± 0.8	—	32 ± 8	—
	F (7–12 mo)	5.95 ± 0.43	—	41.7 ± 3.2	—	13.1 ± 1.0	—	70.2 ± 3.1	—	22.1 ± 1.1	—	31.4 ± 1.2	—
	M (1–2 yr)	6.34 ± 0.7	—	42.7 ± 1.8	—	13.2 ± 1.0	—	67.9 ± 5.6	—	21 ± 1.1	—	31 ± 1.8	—
	F (1–2 yr)	5.96 ± 0.54	—	40.8 ± 3.5	—	12.7 ± 1.3	—	68.5 ± 2.7	—	21.4 ± 1	—	31.3 ± 1.4	—
15	M (n = 98)	6.75 ± 0.53 3	—	40.4 ± 3.05	—	13.7 ± 1.0	—	59.9 ± 2.78	—	20.4 ± 0.97	—	34.0 ± 0.52	—
	F (n = 98)	6.22 ± 0.48 4	—	37.8 ± 2.31	—	12.8 ± 0.78	—	60.9 ± 2.4	—	20.8 ± 0.93	—	34.1 ± 0.61	—
12	F (2.9–4.4 kg)	5.7 ± 0.4	—	36 ± 3	—	12.1 ± 1.0	—	62 ± 1	—	21	—	34	—
16	NS (4–7 mo)	6.0 ± 0.6	3.7–7.5	38 ± 3.1	26.7–47.2	12.8 ± 1.0	8.9–15.5	63.7 ± 3.1	58–79.6	21.4 ± 1.3	19.2–29.5	33.6 ± 0.6	31.1–37
17	M	6.4 ± 0.4	—	43 ± 2	—	14 ± 0.6	—	65 ± 4	—	21 ± 1	—	32.5 ± 0.4	—
	F	6.0 ± 0.6	—	39 ± 2	—	12.7 ± 0.6	—	66 ± 2	—	22 ± 1	—	32.8 ± 0.3	—
18	NS	—	4–7.2	—	36–48	—	10.0–15.5	—	—	—	—	—	—
19	NS	—	4–7	—	36–48	—	10.0–15.5	—	—	—	—	—	—
20	NS	—	5.1–7.9	—	33–50	—	10.0–17.4	—	57.8–66.5	—	17.1–23.5	—	29–37

NS, not specified.

TABLE 170.2 Referenced Leukocyte Parameters in the New Zealand White (NZW) Rabbit (*Oryctolagus cuniculus*)

Reference	Gender	WBC ($\times 10^3/mm^3$) Mean	WBC ($\times 10^3/mm^3$) Range	Neutrophils (%) Mean	Neutrophils (%) Range	Lymphocytes (%) Mean	Lymphocytes (%) Range	Eosinophils (%) Mean	Eosinophils (%) Range	Basophils (%) Mean	Basophils (%) Range	Monocytes (%) Mean	Monocytes (%) Range
9	NS	8	5.2–12	—	8–50	—	20–90	—	1–3	—	0.5–30	—	1–4
36	NS	8.1	—	32	—	63	—	1.3	—	2.4	—	4.1	—
37	NS	—	5.2–12.5	—	36.4–54	—	28–52.1	—	0.5–3.5	—	2.4–7.5	—	4.0–13.4
13	NS (1 yr)	4.91 ± 2.19	—	—	—	54.2 ± 11.6	—	4.5 ± 3.6	—	—	—	6.3 ± 3.5	—
	NS (adult)	7.46 ± 3.15	—	—	—	42.7 ± 19.8	—	2.2 ± 2.0	—	—	—	4.3 ± 3.0	—
6	M	9.0 ± 1.75	5.5–12.5	46 ± 4	38–54	39 ± 5.5	28–50	2 ± 0.75	0.5–3.5	5 ± 1.25	2.5–7.5	8 ± 2	4–12
	F	7.9 ± 1.35	5.2–10.6	43.4 ± 3.5	36.4–50.4	41.8 ± 5.15	31.5–52.1	2 ± 0.6	0.8–3.2	4.3 ± 0.95	2.4–6.2	9 ± 2.2	6.6–13.4
14	M (3 mo)	9.7 ± 3.3	—	30	—	60	—	1	—	3.1	—	3.1	—
	F (3 mo)	7.7 ± 2.2	—	25	—	64	—	0	—	3.9	—	5.5	—
26	NS	—	6–12	—	20–60	—	20–50	—	0–5	—	0–1	—	1–10
5	M (1–2 mo)	5.99 ± 1.98	—	34.7 ± 11.7	—	57.7 ± 13.1	—	0.8 ± 0.6	—	2.0 ± 1.7	—	5.5 ± 7.0	—
	F (1–2 mo)	5.38 ± 1.85	—	31.9 ± 12.2	—	61.1 ± 12.5	—	0.9 ± 0.9	—	2.3 ± 2.2	—	3.7 ± 2.6	—
	M (3 mo)	8.45 ± 1.34	—	28.9 ± 8.4	—	65.7 ± 9.2	—	1.6 ± 0.8	—	0.8 ± 0.6	—	5.6 ± 7.5	—
	F (3 mo)	9.1 ± 3.54	—	28.8 ± 10	—	67.5 ± 10.3	—	0.9 ± 0.8	—	1.5 ± 0.8	—	1.4 ± 0.9	—
	M (4–6 mo)	7.71 ± 1.08	—	27.6 ± 10.4	—	68.5 ± 11.1	—	0.8 ± 0.8	—	1.4 ± 1.3	—	1.7 ± 1.4	—
	F (4–6 mo)	7.69 ± 1.6	—	28.9 ± 10.4	—	63.9 ± 10.4	—	1.5 ± 0.9	—	2.5 ± 1.8	—	2.7 ± 2.3	—
	M (7–12 mo)	8.99 ± 1.75	—	27.9 ± 8	—	62 ± 16.9	—	0.8 ± 0.7	—	3.0 ± 2.6	—	2.5 ± 2.4	—
	F (7–12 mo)	7.69 ± 1.8	—	30 ± 9.7	—	62.8 ± 11.8	—	1.2 ± 1.1	—	2.4 ± 2.0	—	3.6 ± 2.6	—
	M (1–2 yr)	10.0 ± 2.85	—	47 ± 5.9	—	44.5 ± 7	—	1.5 ± 1	—	2.3 ± 2.3	—	4.9 ± 4.5	—
	F (1–2 yr)	9.72 ± 3.3	—	44.7 ± 14.6	—	45.6 ± 14.4	—	2.0 ± 1.6	—	3.3 ± 2.2	—	4.8 ± 2.5	—
15	M (2–7 mo)	9.5 ± 2.07	—	32 ± 10.95	—	62 ± 13.2	—	1 ± 0.8	—	2 ± 1.7	—	1 ± 1.4	—
	F (2–7 mo)	8.4 ± 2.24	—	34 ± 10.7	—	61 ± 11.3	—	1 ± 1.3	—	3 ± 1.8	—	1 ± 1.1	—
12	F (2.9–4.4 kg)	8.1 ± 2.7	—	32 ± 15	—	68 ± 15	—	—	—	—	—	—	—
16	NS	9.2 ± 2.2	5.2–16.5	—	—	—	—	—	—	—	—	—	—
17	M (1–2 yr)	6.8 ± 1.2	—	26 ± 7	—	58 ± 8	—	0.5 ± 0.4	—	3.2 ± 0.8	—	6.0 ± 2.4	—
	F (1–2 yr)	5.6 ± 0.9	—	35 ± 3	—	47 ± 7	—	1.2 ± 0.8	—	5.0 ± 2.5	—	6.6 ± 2.4	—
18	NS	—	7.5–13.5	—	20–35	—	55–80	—	0–4	—	2–10	—	1–4
19	NS	—	9–11	—	20–75	—	30–85	—	0–4	—	2–7	—	1–4
20	NS	—	5.2–12.5	—	20–75	—	30–85	—	1–4	—	1–7	—	1–4

NS, not specified.

TABLE 171.1 Referenced Erythrocyte Parameters for the Guinea Pig (*Cavia porcellus*)

Reference	Gender	RBC ($\times 10^6$/mm^3) Mean	RBC ($\times 10^6$/mm^3) Range	PCV (%) Mean	PCV (%) Range	Hb (g/dL) Mean	Hb (g/dL) Range	MCV (μ^3) Mean	MCV (μ^3) Range	MCH ($\mu\mu$g) Mean	MCH ($\mu\mu$g) Range	MCHC (%) Mean	MCHC (%) Range
5	NS	5.37	4.62–6.48	—	—	15.3	11.2–16.1	—	—	—	—	—	—
20	NS	5.4	—	43	—	13.4	—	81	—	25	—	30	—
9	M/F	—	5.49–8.69	—	37.5–44.2	—	11.4–13.5	—	54.6–62	—	16.5–18.8	—	26.1–34.
21	F	5.4	—	43	—	13.4	—	81	—	25	—	30	—
10	NS	4.92 ± 0.54	—	41.2 ± 3.6	—	12.4 ± 1.3	—	84.1 ± 4.5	—	—	—	30.1 ± 1.2	—
22	NS	—	5–8	—	32–50	—	10–16	—	50–68	—	16–22	—	30–34
16	NS	—	5–8	—	32–50	—	10–16	—	50–67	—	—	—	30–34
23	M (n = 110)	5.6 ± 0.62	4.36–6.84	42 ± 2.5	37–47	14.4 ± 1.38	11.6–17.2	77 ± 3	71–83	25.7 ± 0.75	24.2–27.2	34.3 ± 2.28	29.7–38.
	F (n = 95)	4.75 ± 1.2	3.35–6.15	45.4 ± 2.25	40.9–49.9	14.2 ± 1.42	11.4–17	91 ± 2.45	86.1–95.9	25.7 ± 0.8	23.1–26.3	31.3 ± 1.55	28.2–34.
17	NS	—	4–7	—	35–45	—	11–17	—	—	—	—	—	—
6	M (2–30 d)	4.67 ± 0.65	—	38.3 ± 4.5	—	11.63 ± 1.5	—	82.4 ± 4.0	—	—	—	29.7 ± 1.4	—
	F (2–30 d)	4.58 ± 0.52	—	42.9 ± 2.9	—	11.07 ± 1.2	—	82.1 ± 4.6	—	—	—	29.5 ± 1.1	—
	M (31–60 d)	5.18 ± 0.47	—	42.9 ± 2.9	—	13.06 ± 1.0	—	82.9 ± 3.9	—	—	—	30.3 ± 0.9	—
	F (31–60 d)	5.19 ± 0.4	—	43.5 ± 3.1	—	13.3 ± 0.8	—	84.0 ± 4.7	—	—	—	30.7 ± 1.0	—
	M (63–90 d)	5.64 ± 0.38	—	46.3 ± 2.3	—	14.04 ± 0.9	—	82.2 ± 2.7	—	—	—	30.3 ± 1.2	—
	F (63–90 d)	5.52 ± 0.35	—	46.2 ± 2.8	—	14.2 ± 0.9	—	83.7 ± 1.9	—	—	—	30.8 ± 1.6	—
	M (4–6 mo)	5.81 ± 0.62	—	45.1 ± 4.5	—	14.07 ± 1.0	—	77.7 ± 3.8	—	—	—	31.2 ± 1.2	—
	F (4–6 mo)	5.27 ± 0.49	—	44.1 ± 3.8	—	13.55 ± 1.4	—	83.7 ± 3.1	—	—	—	30.7 ± 1.0	—
	M (7–12 mo)	5.55 ± 0.51	—	44.0 ± 3.7	—	13.9 ± 1.4	—	79.4 ± 3.7	—	—	—	31.6 ± 1.1	—
	F (7–12 mo)	4.87 ± 0.24	—	41.2 ± 2.4	—	12.4 ± 0.7	—	84.6 ± 3.0	—	—	—	30.1 ± 0.9	—
	M (13–28 mo)	5.37 ± 0.46	—	43.9 ± 3.7	—	13.56 ± 1.1	—	81.8 ± 3.5	—	—	—	30.9 ± 1.4	—
	F (13–28 mo)	4.67 ± 0.39	—	39.8 ± 2.6	—	11.76 ± 0.8	—	85.4 ± 4.5	—	—	—	29.6 ± 0.8	—
3	NS	—	4.5–7.0	—	37–48	—	11–15	—	—	—	—	—	—
11	NS	—	4.5–7.0	—	37–48	—	11–15	—	—	—	—	—	—
4	NS	—	3.2–8.0	—	32–50	—	10–17.2	—	71–96	—	23–27	—	26–39

NS, not specified.

TABLE 171.2 Referenced Leukocyte Parameters for the Guinea Pig (*Cavia porcellus*)

Reference	Gender	WBC ($\times 10^3/mm^3$) Mean	WBC ($\times 10^3/mm^3$) Range	Neutrophils (%) Mean	Neutrophils (%) Range	Lymphocytes (%) Mean	Lymphocytes (%) Range	Eosinophils (%) Mean	Eosinophils (%) Range	Basophils (%) Mean	Basophils (%) Range	Monocytes (%) Mean	Monocytes (%) Range
5	NS	9	3.2–15	—	18–35	—	55–75	—	1–5	—	0–3	—	3–12
20	NS	9.9	—	38	—	55	—	3.5	—	0.3	—	2.7	—
9	M/F	—	7.8–20.7	—	21.7–47.7	—	41.3–68.5	—	2.1–7.8	—	0.6–2.7	—	2.46–5.8
21	F	9.9	—	—	28–34	—	39–72	—	1–5	—	0–3	—	3–12
10	NS	11.2 ± 2.85	—	—	—	—	—	—	—	—	—	—	—
22	NS	—	11–22	—	28–47	—	39–52	—	0–11	—	0–2	—	2–10
16	NS	—	10–14	—	28–47	—	39–60	—	1–11	—	0–2	—	2–10
23	M (n = 84)	11.5 ± 3	5.5–17.5	42 ± 7	28–56	49 ± 6.75	40–62.5	4.0 ± 1.5	1–7	0.7 ± 0.5	0–1.7	4.3 ± 0.5	3.3–5.3
	F (n = 80)	10.8 ± 2.8	5.2–16.4	31.1 ± 5.4	20.3–41.9	63.4 ± 8.5	46.4–80.4	3.5 ± 1.75	0–7	0.2 ± 0.3	0–0.8	1.8 ± 0.4	1.0–2.6
17	NS	—	7–14	—	20–60	—	30–80	—	0–5	—	0–1	—	2–20
6	M (2–30 d)	3.73 ± 0.94	—	27.9 ± 10.8	—	70.7 ± 11.7	—	2.2 ± 2.1	—	0.22 ± 0.48	—	21. ± 1.9	—
	F (2–30 d)	4.09 ± 1.0	—	21.2 ± 6.4	—	74.9 ± 7.7	—	1.9 ± 1.7	—	0.13 ± 0.4	—	1.4 ± 1.4	—
	M (31–60 d)	5.52 ± 1.8	—	29.0 ± 10.7	—	66.2 ± 13.6	—	1.0 ± 0.8	—	0.13 ± 0.28	—	2.1 ± 1.5	—
	F (31–60 d)	7.04 ± 2.01	—	25.8 ± 11.7	—	71.5 ± 12.5	—	1.0 ± 0.8	—	0.08 ± 0.21	—	1.6 ± 1.5	—
	M (63–90 d)	5.94 ± 1.2	—	31.9 ± 10.7	—	65.9 ± 10.6	—	0.6 ± 0.6	—	0.19 ± 0.39	—	1.3 ± 1.1	—
	F (63–90 d)	7.98 ± 2.3	—	26.3 ± 7.1	—	70.5 ± 7.1	—	1.4 ± 1.2	—	0.1 ± 0.2	—	1.7 ± 2.0	—
	M (4–6 mo)	9.58 ± 3.17	—	20.8 ± 6.1	—	75.3 ± 6.7	—	1.2 ± 1.0	—	0.19 ± 0.24	—	1.9 ± 1.4	—
	F (4–6 mo)	10.24 ± 1.87	—	24.3 ± 11.3	—	71.3 ± 11.9	—	2.0 ± 1.8	—	0.31 ± 0.47	—	2.2 ± 1.6	—
	M (7–12 mo)	11.5 ± 2.0	—	23.2 ± 5.1	—	71.4 ± 4.0	—	2.6 ± 4.5	—	0	—	2.8 ± 1.4	—
	F (7–12 mo)	10.93 ± 3.2	—	23.5 ± 11.0	—	71.4 ± 11.3	—	2.3 ± 2.5	—	0.08 ± 0.18	—	2.7 ± 2.2	—
	M (13–28 mo)	13.53 ± 2.5	—	30.3 ± 15.7	—	64.8 ± 16.1	—	2.1 ± 2.4	—	0.18 ± 0.24	—	2.7 ± 1.6	—
	F (13–28 mo)	9.88 ± 2.1	—	24.7 ± 10.6	—	69.4 ± 13.2	—	2.3 ± 2.1	—	0.22 ± 0.29	—	3.4 ± 3.6	—
3	NS	—	7–18	—	28–44	—	39–72	—	1–5	—	0–3	—	3–12
11	NS	—	7–18	—	28–44	—	39–72	—	1–5	—	0–3	—	3–12
4	NS	—	5.5–17.5	—	22–48	—	39–72	—	0–7	—	0–2.7	—	1–10

NS, not specified.

TABLE 169.1 Referenced Erythrocyte Parameters in the Ferret (*Mustela putorius furo*)

Reference	Breed/Type	Gender	RBC ($\times 10^6$/mm^3) Mean	RBC ($\times 10^6$/mm^3) Range	PCV (%) Mean	PCV (%) Range	Hb (g/dl) Mean	Hb (g/dl) Range	MCV (μ^3) Mean	MCV (μ^3) Range	MCH ($\mu\mu$g) Mean	MCH ($\mu\mu$g) Range	MCHC (%) Mean	MCHC (%) Range
16	NS	NS	9.98	—	—	35–51	12.8	—	—	—	—	—	—	—
9	Albino	M	10.23	7.3–12.18	55.4	44–61	17.8	16.3–18.2	—	—	—	—	—	—
	Albino	F	8.11	6.77–9.76	49.2	42–55	16.2	14.8–17.4	—	—	—	—	—	—
17	Fitch	M	—	—	43.4	36–50	14.3	12–16.3	—	—	—	—	—	—
	Fitch	F	—	—	48.4	47–51	15.9	15.2–17.4	—	—	—	—	—	—
14	Fitch	F (in estrus)	5.99 ± 2.02	1.81–9.06	36 ± 12	13–53	12.1 ± 3.9	4.4–17.7	61.0 ± 6.14	48.4–71.8	20.5 ± 1.39	18.8–24.3	33.8 ± 3.24	29.2–42.3
	Fitch	F (ovariectomized)	8.52 ± 0.44	8.07–8.77	45 ± 3	42–47	15.8 ± 1.0	14.6–16.4	53.4 ± 3.8	51.4–54.9	18.7 ± 1.1	18.2–19.3	35.2 ± 0.9	34.9–35.7
13	NS	NS (adult)	—	6.77–12.18	—	36–61	—	12.0–18.2	—	—	—	—	—	—
	Fitch	NS (adult)	—	6.5–8.7	—	43.4–48.4	—	14.3–15.9	—	—	—	—	—	—
	Albino	NS (adult)	—	8.11–10.23	—	49.2–55.4	—	16.2–17.8	—	—	—	—	—	—
18[a]	NS	M	—	9.64–9.69	—	49.4–49.8	—	16.7–16.8	51.4	—	17.3	—	—	33.7–33.8
	NS	F	—	9.3–9.34	—	48.4–48.8	—	16.2–16.3	—	52.1–52.2	17.5	—	—	33.4–33.5
18[b]	NS	NS	—	3.6–10.0	—	30–55	—	—	—	—	—	—	—	—
8	Fitch	M	11.3	10.1–13.2	53.1	48–59	16.9	15.4–18.5	47.1	42.6–51.0	15	13.7–16.0	32	30.3–34.9
8[a]	NS	M (10 wk)	6.4 ± 0.6	5.5–7.4	32.9 ± 1.9	29.3–36.8	11.8 ± 0.8	10.4–13.6	51.3 ± 1.8	47.8–54.8	18.3 ± 0.6	17.5–19.1	35.7 ± 0.6	34.7–37.0
		F (10 wk)	6.1 ± 0.7	5–7	32.1 ± 2.7	27.0–34.8	11.5 ± 1.0	9.6–12.5	52.0 ± 1.9	49.6–54.5	18.9 ± 0.7	17.8–19.6	35.7 ± 0.7	34.8–36.9
		M (12 wk)	6.4 ± 0.8	4.8–7.8	33.4 ± 2.3	30.9–38.1	12.0 ± 0.8	11.0–13.7	51.4 ± 1.6	49.0–53.6	18.9 ± 1.7	17.4–22.8	35.9 ± 0.5	34.7–36.7
		F (12 wk)	6.4 ± 0.7	5.7–7.8	34.1 ± 2.5	31.3–38.5	12.2 ± 0.9	11.2–13.8	52.5 ± 3.4	48.8–57.6	19.1 ± 1.0	17.7–20.4	35.8 ± 0.5	35.3–37.0
		M (14–16 wk)	8.2 ± 0.9	6.2–9.2	39.1 ± 4.0	29.8–43.2	14.3 ± 1.0	12.7–15.9	47.8 ± 2.4	44.9–53.6	17.6 ± 1.3	16.4–20.6	36.9 ± 2.2	35.1–42.6
		M (adult)	9.1 ± 0.9	7.1–10.2	42.3 ± 3.7	33.6–47.2	15.5 ± 1.3	12.0–16.9	46.6 ± 1.9	44.1–52.5	17.1 ± 0.8	16.5–19.7	—	—
		F (nonestrus)	8.2 ± 0.6	7.5–9.3	39.1 ± 2.6	35.6–44.7	14.5 ± 1.0	12.9–15.9	48.4 ± 3.0	44.4–53.7	17.6 ± 1.0	16.4–19.4	37.0 ± 2.0	35.1–42.2
		F (in estrus)	8.3 ± 0.5	7.5–9.3	38.8 ± 2.5	34.6–43.3	13.4 ± 0.9	11.9–15.0	46.8 ± 1.3	45.2–48.7	16.2 ± 0.3	15.8–16.8	34.5 ± 0.6	33.2–35.3

[a]Data supplied by Marshall Farms.
[b]Reference data supplied by the University of Miami Avian Diagnostic Lab.
NS, not specified.

TABLE 169.2 Referenced Leukocyte Parameters in the Ferret (*Mustela putorius furo*)

Reference	Breed/Type	Gender	WBC ($\times 10^3/mm^3$) Mean	WBC ($\times 10^3/mm^3$) Range	Neutrophils (%) Mean	Neutrophils (%) Range	Lymphocytes (%) Mean	Lymphocytes (%) Range	Eosinophils (%) Mean	Eosinophils (%) Range	Basophils (%) Mean	Basophils (%) Range	Monocytes (%) Mean	Monocytes (%) Range
16	NS	NS	—	9–13	65	—	35	—	0	—	0	—	0	—
9	Albino	M	9.7	4.4–19.1	57	11–82	35.6	12–54	2.4	0–7	0.1	0–2	4.4	0–9
	Albino	F	10.5	4.0–18.2	59.5	43–84	33.4	12–50	2.6	0–5	0.2	0–1	4.4	2–8
17	Fitch	M	11.3	7.7–15.4	40.1	24–78	49.7	28–69	2.3	0–7	0.7	0–2.7	6.6	3.4–8.2
	Fitch	F	5.9	2.5–8.6	31.1	12–41	58	25–95	3.6	1–9	0.8	0–2.9	4.5	1.7–6.3
14	Fitch	F (in estrus)	3.84 ± 1.72	1.82–5.83	—	18.8–53.5	—	60.7–83.9	—	0–2.5	—	0–0.74	—	0–2.52
	Fitch	F (ovariectomized)	7.07 ± 1.42	5.98–8.1	—	21.6–44.5	—	53.7–57.5	—	2.3–4.0	—	0.2–1.1	—	0.5–1.3
13	NS	NS (adult)	—	2.5–19.1	—	11–84	—	12–95	—	1–9	—	0–3	—	0–9.1
	Fitch	NS (adult)	—	5.9–11.3	—	31.1–40.1	—	49.7–58.0	—	2.3–3.6	—	0.7–0.8	—	4.5–6.6
	Albino	NS (adult)	—	9.7–10.5	—	57.0–59.5	—	33.4–35.6	—	2.4–2.6	—	0.1–0.2	—	4.4–4.6
12	NS	NS	—	2.8–8.0	—	—	35	—	—	—	—	—	—	—
18[a]	NS	M	—	8.9–9.2	—	47–48	—	46–48	—	3.0–3.5	—	0–0.49	—	1.0–1.19
		F	—	7.0–7.6	—	49–50	45	—	—	3.0–3.3	—	0–0.34	—	1.0–1.12
18[b]	NS	NS	—	3.3–15.9	—	9.0–54	—	34–85	—	0–10	—	0–3	—	0–8
8	Fitch	M	6.2	1.7–11.9	—	24–72	—	26–73	—	0–3	—	—	—	1–4
8[a]	NS	M (10 wk)	8.0 ± 2.1	5.3–12.0	32.7 ± 5.3	24.3–45.1	54.8 ± 5.9	42.2–64.3	4.4 ± 1.1	2.7–6.1	0.1 ± 0.1	0–0.2	2.8 ± 0.8	1.7–4.3
		F (10 wk)	9.2 ± 2.0	6.7–12.6	28.6 ± 4.9	20.6–76.6	60.0 ± 6.4	52.4–68.2	4.2 ± 1.8	2.1–6.9	0.1 ± 0.0	0–0.1	2.5 ± 1.0	1.4–4.1
		M (12 wk)	8.4 ± 2.0	5.3–11.7	43.3 ± 14.2	24.3–68.3	46.1 ± 14.1	22.1–62.8	4.4 ± 0.9	3.3–5.8	0.1 ± 0.3	0–1.3	2.1 ± 1.1	0.7–4.7
		F (12 wk)	6.7 ± 1.2	5.8–9.8	27.9 ± 3.7	21.7–32.4	61.8 ± 3.5	57.8–67.0	3.7 ± 1.0	2.2–5.7	0.1 ± 0.1	0–0.3	2.0 ± 0.3	1.5–2.4
		M (14–16 wk)	9.5 ± 3.7	—	37.5 ± 8.9	27.9–58.2	50.9 ± 9.0	30.1–60.6	5.4 ± 1.3	3.6–8.2	0.1 ± 0.1	0–0.2	1.7 ± 0.5	1.1–2.9
		M (adult)	8.4 ± 2.5	4.9–13.8	41.5 ± 15.4	24.0–76.6	47.4 ± 15.3	14.7–66.6	5.6 ± 1.5	1.9–8.5	0.1 ± 0.1	0–0.3	1.7 ± 1.0	0.7–5.0
		F (nonestrus)	7.2 ± 2.3	5.1–12.6	57.7 ± 6.8	48.8–71.0	33.3 ± 6.1	22.7–43.3	4.3 ± 2.1	2.3–8.5	0	0–0.1	1.8 ± 0.7	1.0–3.0
		F (in estrus)	5.7 ± 1.5	5.2–8.2	43.2 ± 9.4	33.1–60.9	48.2 ± 9.6	32.9–59.1	3.1 ± 1.2	1.6–5.6	0	0–0.1	1.6 ± 0.5	1.1–2.7

[a]Data supplied by Marshall Farms.
[b]Reference data supplied by the University of Miami Avian Diagnostic Lab.
NS, not specified.

TABLE 165.2 Normal Blood Values of Thoroughbred and Quarter Horse Foals of Both Sexes (mean ± 1 SD)[a]

	1st Day	2–7 Days (Average 5)	8–14 Days (Average 9)	21–30 Days (Average 28)	1–3 Months (Average 51 days)
Number of foals	34	16	15	8	14
RBC ($\times 10^6/\mu L$)	10.5 ± 1.4	9.5 ± 0.8	9.0 ± 0.8	11.2 ± 1.3	11.9 ± 1.3
Hb (g/dL)	14.2 ± 1.3	12.7 ± 0.9	11.8 ± 1.2	13.1 ± 1.1	13.4 ± 1.6
PCV (%)	41.7 ± 3.6	37.1 ± 2.8	34.9 ± 3.7	37.8 ± 3.3	38.3 ± 4.1
MCV (fL)	40.1 ± 3.8	39.2 ± 2.8	39.1 ± 2.2	34.2 ± 0.4	32.4 ± 1.9
MCH (pg)	13.6 ± 1.2	13.4 ± 1.0	13.1 ± 0.8	11.8 ± 0.8	11.2 ± 0.6
MCHC (%)	33.9 ± 1.6	43.2 ± 1.2	33.6 ± 0.9	34.5 ± 1.0	34.9 ± 1.2
Plasma proteins (g/dL)	6.2 ± 0.9 (32)	6.3 ± 0.5	6.1 ± 0.6	6.2 ± 0.4	6.4 ± 0.4
Fibrinogen (mg/dL)	270 ± 60 (15)	330 ± 130 (6)	300 ± 50 (9)	400 (5)	460 ± 70 (10)
Total leukocytes/μL	9602 ± 3372	9300 ± 2346	9483 ± 2196	9688 ± 1940	10,893 ± 2977
Band neutrophil	138 ± 198	29 ± 37	48 ± 125	19 ± 33	10 ± 28
Neutrophil (seg)	6824 ± 2757	6448 ± 2128	6338 ± 1849	5501 ± 1346	5315 ± 2437
Lymphocyte	2192 ± 891	2420 ± 739	2633 ± 933	3823 ± 863	5086 ± 1419
Monocyte	414 ± 373	308 ± 172	302 ± 124	266 ± 192	348 ± 175
Eosinophil	0	30 ± 34	21 ± 38	48 ± 53	115 ± 88
Basophil	14 ± 78	41 ± 44	29 ± 50	11 ± 29	12 ± 26
Leukocytes (%)					
Band neutrophil	1.5 ± 1.8	0.3 ± 0.4	0.5 ± 1.1	0.2 ± 0.3	0.1 ± 0.3
Segmented neutrophil	68.9 ± 10.7	68.2 ± 9.4	66.2 ± 9.0	56.8 ± 7.4	46.9 ± 12.1
Lymphocyte	25.1 ± 10.3	27.0 ± 9.8	28.5 ± 9.4	39.6 ± 6.5	48.5 ± 11.5
Monocyte	3.9 ± 2.9	3.4 ± 1.9	3.3 ± 1.5	2.6 ± 2.0	3.3 ± 1.8
Eosinophil	0	0.3 ± 0.4	0.2 ± 0.4	0.4 ± 0.5	1.0 ± 0.8
Basophil	0.02 ± 0.08	0.4 ± 0.4	0.3 ± 0.5	0.1 ± 0.3	0.1 ± 0.3
N:L	2.8:1	2.5:1	2.3:1	1.4:1.0	1.1:1

Adapted from Jain NC. Schalm's veterinary hematology. 4th ed. Philadelphia: Lea & Febiger, 1986.

[a] Numbers in parentheses indicate number of foals when less than total for series.

TABLE 165.1 Normal Blood Ranges for the Horse

	Hot-Blooded Breeds (Based on 147 Clinically Normal Horses)	Cold-Blooded Breeds (Collected from the Literature)
Erythrocytic series		
Erythrocytes ($\times 10^6/\mu L$)	6.8–12.9	5.5–9.5
Hemoglobin (g/dL)	11.0–19	8.0–14.0
PCV (%)	32–53	24.00–44.0
MCV (fL)	37.0–58.5 (37.0–58.0)[a]	–
MCH (pg)	12.3–19.9 (10.0–20.0)[a]	–
MCHC (%)	31.0–38.6 (31.0–36.0)[a]	–
RBC diameter (μm)	5.0–6.0	–
RDW (%)	24–27	–
Leukocytic series		
Total leukocytes/μL	5400–14,300	6000–12,000
Neutrophil (band)	0–100 (0–100)	–
Neutrophil (seg)	2260–8580	–
Lymphocyte	1500–7700	–
Monocyte	0–1000	–
Eosinophil	0–1000	–
Basophil	0–290	–
Percentage distribution		
Neutrophil (band)	0–8	0–2
Neutrophil (seg)	22–72	35–75
Lymphocyte	17–68	2–10
Monocyte	0–14	2–12
Eosinophil	0–10	0–3
Basophil	0–4	–
Other data		
Plasma proteins (g/dL)	5.8–8.7	–
Fibrinogen (g/dL)	0.1–0.4	–
Thrombocytes ($\times 10^3$)	1.0–3.5	–
Erythrocyte life span (days)	140–150	–
Myeloid:erythroid ratio	0.5–1.5:1.0	–

Adapted from Jain NC. Schalm's veterinary hematology. 4th ed. Philadelphia: Lea & Febiger, 1986;141.

[a] Parentheses contain recently determined values from the University of California, Davis, Veterinary Medical Teaching Hospital.

TABLE 166.1 Normal Blood Values for Cattle

	Range	Mean
Erythrocytic series		
Erythrocytes ($\times 10^6/\mu L$)	5.0–10.0	7.0
Hemoglobin (g/dL)	8.0–15.0	11.0
PCV (%)	24–46	35
MCV (fL)	40–60	52
MCH (pg)	11.0–17.0	14.0
MCHC (%)	30–36	32.7
RBC diameter (μm)	4.0–8.0	5.8
Miscellaneous data		
Plasma proteins (g/dL)	7.0–8.5	
Fibrinogen (mg/dL)	300–700	
Thrombocytes ($\times 10^3$)	1100–800	500
RBC life span (days)	160	
Myeloid:erythroid ratio	0.3–1.9	0.7–1.0
Leukocytic series		
Total leukocytes/μL	4000–12,000	8000
Neutrophil (band)	0–120	20
Neutrophil (seg)	600–4000	2000
Lymphocyte	2500–7500	4500
Monocyte	25–840	400
Eosinophil	0–2400	700
Basophil	0–200	50
Percentage distribution		
Neutrophil (band)	0–2	0.5
Neutrophil (seg)	15–45	28
Lymphocyte	45–75	58
Monocyte	2–7	4.0
Eosinophil	0–20	9.0
Basophil	0–2	0.5

Summarized literature data from Jain NC. Schlam's veterinary hematology. 4th ed. Philadelphia: Lea & Febiger, 1986.

TABLE 166.3 Normal Blood Values for Goats

	Range	Mean
Erythrocytic series		
Erythrocytes ($\times 10^6/\mu L$)	8.0–18.0	13.0
Hemoglobin (g/dL)	8.0–12.0	10.0
PCV (%)	22–38	28
MCV (fL)	16–25	19.5
MCH (pg)	5.2–8.0	6.5
MCHC (%)	30–36	33
RBC diameter (μm)	2.5–3.9	3.2
Miscellaneous data		
Plasma proteins (g/dL)	6.0–7.5	
Fibrinogen (mg/dL)	100–400	
Thrombocytes ($\times 10^3$)	300–600	450
RBC life span (days)	125	
Myeloid:erythroid ratio	0.7	
Leukocytic series		
Total leukocytes/μL	4000–13,000	9000
Neutrophil (band)	Rare	
Neutrophil (seg)	1200–7200	3250
Lymphocyte	2000–9000	5000
Monocyte	0–550	250
Eosinophil	50–650	450
Basophil	0–120	50
Percentage distribution		
Neutrophil (band)	Rare	
Neutrophil (seg)	30–48	36.0
Lymphocyte	50–70	56.0
Monocyte	0–4	2.5
Eosinophil	1–8	5.0
Basophil	0–1	0.5

Summarized literature data from Jain NC. Schlam's veterinary hematology. 4th ed. Philadelphia: Lea & Febiger, 1986.

TABLE 166.2 Normal Blood Values for Sheep

	Range	Mean
Erythrocytic series		
Erythrocytes ($\times 10^6/\mu L$)	9–15	12.0
Hemoglobin (g/dL)	9–15	11.5
PCV (%)	27–45	35
MCV (fL)	28–40	34
MCH (pg)	8–12	10.0
MCHC (%)	31–34	32.5
RBC diameter (μm)	3.2–6.0	4.5
Miscellaneous data		
Plasma proteins (g/dL)	6.0–7.5	
Fibrinogen (mg/dL)	100–500	
Thrombocytes ($\times 10^3$)	1100–800	500
RBC life span (days)	140–150	
Myeloid:erythroid ratio	0.77–1.7	1.1
Leukocytic series		
Total leukocytes/μL	4000–12,000	8000
Neutrophil (band)	Rare	—
Neutrophil (seg)	700–6000	2400
Lymphocyte	2000–9000	5000
Monocyte	0–750	200
Eosinophil	0–1000	400
Basophil	0–300	50
Percentage distribution		
Neutrophil (band)	Rare	—
Neutrophil (seg)	10–50	30.0
Lymphocyte	40–75	62
Monocyte	0–6	2.5
Eosinophil	0–10	5.0
Basophil	0–3	0.5

Summarized literature data from Jain NC. Schlam's veterinary hematology. 4th ed. Philadelphia: Lea & Febiger, 1986.