

## Serum Biochemical Reference Ranges <sup>a</sup>

Measure	Units	Dog	Cat	Cow	Horse	Pig	Sheep	Goat	Rabbit	Llama	Vietnamese Potbellied Pig	Ostrich
<i>In Conventional (USA) Units</i>												
ALT	u/L	10–109	25–97	6.9–35	2.7–21	22–47	15–44	15–52	48–80		23–83	20
Amylase	u/L	226–1,063	550–1,458	41–98	47–188	44–88	140–270		167–315			
Alk phos <sup>b</sup>	u/L	1–114	0–45	18–153	70–227	41–176	27–156	61–283	4–16	30–780	35–563	32–98
AST	u/L	13–15	7–38	60–125	160–412	15–55	49–123	66–230	14–113	110–250	<109	131–486
Creatine kinase	u/L	52–368	69–214	0–350	60–330	66–489	7.7–101	16–48	218–2,705	30–400		294
GGT <sup>b</sup>	u/L	1.0–9.7	1.8–12	6–17.4	6–32	31–52	20–44	20–50	0–14	5–29	21–57	2.1
LDH <sup>b</sup>	u/L	0–236	58–120	309–938	112–456	160–425	83–476	79–265	34–129			
SDH <sup>b</sup>	u/L	3.1–7.6	2.4–6.1	4.3–15.3	1–8	0.5–4.9	3.5–21	9.3–21		85–740		
Bicarbonate	mEq/L	17–24	17–24	20–30	24–30	18–27	20–27		16–38			
Bilirubin	mg/dL	0–0.3	0–0.1	0–1.6	0–3.2	0–0.5	0–0.5	0.1–0.2	0–0.7	0–0.1	<0.3	

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Calcium	mg/dL	9.1– 11.7	8.7– 11.7	8.0– 11.4	10.2– 13.4	9.3– 11.5	9.3– 11.7	9.0– 11.6	5.6– 12.5	7.7– 9.4	10.2–12.2	10.7– 14
Chloride	mEq/L	110– 124	115– 130	99– 107	98– 109	97– 106	101– 113	100– 112	92– 112	106– 118	91–103	100
Cholesterol	mg/dL	135– 278	71– 156	62– 193	71– 142	81– 134	44– 90	65– 136	10–80			
Creatinine	mg/dL	0.5– 1.7	0.9– 2.2	0.5– 2.2	0.4– 2.2	0.8– 2.3	0.9– 2.0	0.7– 1.5	0.5– 2.5	1.5– 2.9	0.4–1.1	0.1– 0.4
Glucose	mg/dL	76– 119	60– 120	40– 100	62– 134	66– 116	44– 81	48– 76	75– 155	90– 140	68–155	245
Magnesium	mg/dL	1.6– 2.4	1.7– 2.6	1.5– 2.9	1.4– 2.3	2.3– 3.5	2.0– 2.7	2.1– 2.9	1.5–3.8			
Phosphorus	mg/dL	2.9– 5.3	3.0– 6.1	5.6– 8.0	1.5– 4.7	5.5– 9.3	4.0– 7.3	3.7– 9.7	4.0– 6.9	4.6– 9.8	5.0–10.7	4.0– 9.9
Potassium	mEq/L	3.9– 5.1	3.7– 6.1	3.6– 4.9	2.9– 4.6	4.4– 6.5	4.3– 6.3	3.8– 5.7	3.6– 6.9	4.3– 5.6	3.9–5.9	3.0
Protein	g/dL	5.4– 7.5	6.0– 7.9	6.7– 7.5	5.6– 7.6	5.8– 8.3	5.9– 7.8	6.1– 7.5	5.4– 8.3	5.5– 7.0	4.6–7.8	3.8
Albumin	g/dL	2.3– 3.1	2.8– 3.9	2.5– 3.8	2.6– 4.1	2.3– 4.0	2.7– 3.7	2.3– 3.6	2.4– 4.6	3.5– 4.4	3.1–4.3	1.8
Globulin	g/dL	2.4– 4.4	2.6– 5.1	3.0– 3.5	2.6– 4.0	3.9– 6.0	3.2– 5.0	2.7– 4.4	1.5– 2.8	1.7– 3.5	1.5–3.5	2.0
Sodium	mEq/L	142– 152	146– 156	136– 144	128– 142	139– 153	142– 160	137– 152	131– 155	147– 158	134–150	147
Urea nitrogen	mg/dL	8–28	19–34	10– 25	11–27	8.2– 25	10– 26	13.26	13–29	13– 32	10.8–47	1.1

<i>In SI Units</i>												
Bicarbonate	mmol/L	17–24	17–24	20– 30	24–30	18– 27	20– 27			16–38		
Bilirubin	mmol/L	0–5.1	0–1.7	0–27	0–55	0.3– 8.2	0.7– 8.6	1.7– 4.3	0–12	1.7	5.0	
Calcium	mmol/L	2.3– 2.9	2.2– 2.9	2.0– 2.8	2.5– 3.3	2.3– 2.9	2.3– 2.9	2.3– 2.9	1.4– 3.1	2–2.4	2.5–3.1	2.7– 3.5
Chloride	mmol/L	110– 124	115– 130	99– 107	98– 109	97– 106	101– 113	100– 112	92– 112	106– 118	91–103	100
Cholesterol	mmol/L	3.5– 7.2	1.8– 4.0	1.6– 5.0	1.8– 3.7	2.1– 3.5	1.1– 2.3	1.7– 3.5	0.3– 2.1			
Creatinine	mmol/L	44– 150	80– 194	44– 194	35– 194	70– 208	76– 174	60– 135	44– 221	133– 256	35–97	8.8– 35
Glucose	mmol/L	4.2– 6.6	3.3– 6.7	2.2– 5.6	3.4– 7.4	3.7– 6.4	2.4– 4.5	2.7– 4.2	4.1– 8.5	5.0– 7.7	3.8–8.5	14
Magnesium	mmol/L	0.7– 1.0	0.7– 1.1	0.6– 0.9	0.7– 1.1	0.9– 1.4	0.8– 1.1	0.9– 1.2			0.7–1.9	
Phosphorus	mmol/L	0.9– 1.7	1.0– 2.0	1.8– 2.6	0.5– 1.5	1.8– 3.0	1.3– 2.4	1.2– 3.1	1.3– 2.2	1.5– 3.2	1.6–3.4	1.3– 3.2
Potassium	mmol/L	3.9– 5.1	3.7– 6.1	3.6– 4.9	2.9– 4.6	4.4– 6.5	4.3– 6.3	3.8– 5.7	3.6– 6.9	4.3– 5.6	3.9–5.9	3.0
Protein	g/L	54–75	60–79	67– 75	56–76	58– 83	59– 78	61– 75	54–83	55– 70	46–78	38
Albumin	g/L	23–31	28–39	25– 38	26–41	23– 40	27– 37	23– 36	24–46	35– 44	31–43	18
Globulin	g/L	24–44	26–51	30–	26–40	39–	32–	27–	15–28	17–	15–35	20

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		35	60	50	44	35						
Sodium	mmol/L	142– 152	146– 156	136– 144	128– 142	139– 153	142– 160	137– 152	131– 155	147– 158	134–150	147
Urea nitrogen	mmol/L	2.9– 10.0	6.8– 12.1	3.6– 8.9	3.9– 9.6	2.9– 8.8	3.7– 9.3	4.5– 9.2	4.6– 10.4	4.6– 11.4	3.9–17	0.4

<sup>a</sup> Adapted, with permission, in part from Latimer K.S., Mahaffey E.A., and Prasse K.W., Duncan and Prasse's Veterinary Laboratory Medicine: Clinical Pathology, 4th ed., Wiley-Blackwell, 2003. Reference ranges vary between laboratories. Using values supplied by the laboratory that is routinely used is recommended.

<sup>b</sup> Alk phos = alkaline phosphatase; GGT = gamma glutamyltransferase; LDH = lactate dehydrogenase; SDH = sorbitol dehydrogenase

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