

### Avian Reference Ranges: Chemistry

Determination	Af Grey	Amazon	Caique	Cockatiel	Cockatoo	Conure	Eclectus
Alk Phos (U/L)	20-160	15-150	--	20-250	15-255	80-250	150-350
ALT (U/L)	5-12	5-11	--	5-11	6-12	5-13	5-11
AST (U/L)	109-305	141-347	193-399	160-383	117-314	178-307	148-378
Amylase (U/L)	210-530	205-510	--	205-490	200-510	100-450	200-645
BUN (mg/dL)	3-5.4	3.1-5.3	--	2.9-5	3-5.1	2.8-5.4	3-5.5
Ca (mg/dL)	7.7-11.3	8.2-10.9	7.1-11.5	7.3-10.7	8.3-10.8	7.9-10.8	7.9-11.4
Chol (mg/dL)	160-425	180-305	--	140-360	145-355	120-400	130-350
Creat (mg/dL)	0.1-0.4	0.1-0.4	--	0.1-0.4	0.1-0.4	0.1-0.4	0.1-0.4
CO2 (mmol/L)	13-25	13-26	--	13-25	14-25	14-25	14-24
CPK (U/L)	228-322	125-345	134-427	58-245	106-305	154-355	118-345
GGT (U/L)	1-10	1-12	--	1-30	1-45	1-15	1-20
Glu (mg/dL)	206-275	221-302	167-366	249-363	214-302	217-323	220-294
LDH (U/L)	145-465	155-425	--	120-455	220-550	120-390	200-425
Lipase (U/L)	35-350	35-225	--	30-280	25-275	30-290	35-275
Phos (mg/dL)	3.2-5.4	3.1-5.5	--	3.2-4.8	2.5-5.5	2-10	2.9-6.5
Potassium (mmol/L)	2.9-4.6	3-4.5	--	2.4-4.6	2.5-4.5	3-4.5	3.5-4.3
Sodium (mmol/L)	157-165	125-155	--	130-153	130-155	135-149	130-145
Total Bili (mg/dL)	0-0.1	0-0.1	--	0-0.1	0-0.1	0-0.1	0-0.1
Total Protein (g/dL)	3.2-5.2	3.0-5.2	2.4-4.6	2.4-4.8	3.0-5.0	2.8-4.6	3.0-5.0
Trig (mg/dL)	45-145	49-190	--	45-200	45-205	50-300	70-410
Uric acid (mg/dL)	2.7-8.8	2.1-8.7	3.4-12.4	2.7-11.1	2.9-11.0	3.0-11.4	2.5-8.7

### Avian Reference Ranges: Chemistry

Determination	Af Grey	Amazon	Caique	Cockatiel	Cockatoo	Conure	Eclectus
Bile Acids (umol/L)	13.7-73.6	10.3-79.3	11.8-56.7	11.7-80.7	10.3-79.1	8.3-85.2	9.7-87.5
T4 (ug/dL)	0.2-1.7	0.1-1.8	0.3-1.3	0.2-1.4	0.2-1.8	0.2-1.7	0.2-1.6
Pre-albumin (g/dL)	0.30-0.92	0.60-1.23	0.33-0.89	0.59-1.24	0.29-0.83	0.39-1.12	0.31-1.18
% Pre-albumin	8.9-22.7	12.7-24.1	13.1-25.2	20.6-37.7	7.5-20.8	13.2-28.0	5.4-25.9
Albumin (g/dL)	1.22-2.51	1.79-2.81	0.96-2.04	0.78-1.75	1.11-2.28	1.01-1.94	1.23-2.26
% Albumin	40.5-56.2	38.6-54.4	33.1-51.6	27.6-41.5	34.4-55.2	30.7-50.4	31.8-47.5
Alpha-1 (g/dL)	0.06-0.20	0.09-0.23	0.05-0.17	0.05-0.32	0.07-0.16	0.07-0.17	0.08-0.19
% Alpha-1	1.7-4.6	2.0-4.0	1.8-4.5	2.0-4.7	2.0-3.8	2.3-4.5	2.0-4.1
Alpha-2 (g/dL)	0.10-0.28	0.20-0.42	0.13-0.38	0.07-0.39	0.09-0.26	0.18-0.43	0.10-0.30
% Alpha-2	2.9-6.1	5.0-11.3	4.2-10.1	2.8-9.1	2.6-6.4	5.7-12.0	2.5-6.1
Beta (g/dL)	0.49-0.88	0.33-0.89	0.34-0.99	0.34-0.81	0.39-0.89	0.30-0.81	0.46-0.89
% Beta	14.4-21.9	7.5-17.2	8.9-23.9	13.5-24.5	12.9-23.2	10.7-22.1	13.6-23.2
Gamma (g/dL)	0.21-0.81	0.21-0.72	0.13-0.50	0.15-0.60	0.18-0.61	0.12-0.55	0.17-0.63
% Gamma	3.0-11.8	5.6-13.8	4.5-13.7	5.2-13.3	5.3-14.7	4.1-12.0	4.4-13.1
A/G ratio	1.02-2.59	1.21-2.69	1.09-2.76	1.01-2.19	1.06-2.54	1.08-2.73	1.09-2.50

All reference ranges obtained from 24 hour old heparinized plasma samples.

Regular chemistry performed on Ortho 250XR

TP by non-temperature compensated refractometer

Bile acids and T4 by RIA

EPH by Helena split beta gels, represent adult ranges

### Avian Reference Ranges: Chemistry

Determination	Jardine's	Lorikeet	Lory	Lovebird	Macaw	Meyer	Pionus	Quaker	Senegal
Alk Phos (U/L)	80-156	--	75-155	10-90	20-230	--	80-290	70-300	70-300
ALT (U/L)	5-12	--	5-13	5-13	5-12	--	5-12	5-11	5-11
AST (U/L)	150-278	57-368	71-372	125-377	105-324	137-354	140-359	225-375	183-352
Amylase (U/L)	100-425	--	90-422	90-400	150-550	--	200-500	100-400	190-550
BUN (mg/dL)	2.8-5.6	--	2.7-5.7	2.8-5.5	3-5.6	--	3-5.4	2.9-5.4	2.9-5.4
Ca (mg/dL)	7.0-12.8	5.5-11.6	5.6-10.3	7.2-10.6	8.2-10.9	6.0-9.8	7.8-10.8	7.5-10.0	7.6-10.7
Chol (mg/dL)	100-300	--	95-295	95-335	100-390	--	130-295	100-295	130-340
Creat (mg/dL)	0.1-0.4	--	0.1-0.4	0.1-0.4	0.1-0.5	--	0.1-0.4	0.1-0.4	0.1-0.4
CO2 (mmol/L)	14-25	--	14-26	14-25	14-25	--	14-24	14-26	14-25
CPK (U/L)	110-310	144-426	65-414	58-337	101-300	114-369	169-354	110-311	100-340
GGT (U/L)	1-15	--	1-16	2.5-18	1-30	--	1-18	1-15	1-15
Glu (mg/dL)	199-348	121-384	180-397	246-381	228-325	117-342	228-312	229-318	220-284
LDH (U/L)	119-335	--	115-330	105-355	70-350	--	125-380	120-300	150-350
Lipase (U/L)	30-255	--	25-250	30-320	30-250	--	30-250	25-225	35-250
Phos (mg/dL)	2-6.8	--	2-6.5	2.8-4.9	2-12	--	2.9-6.6	2.9-6.5	2.5-9.5
Potassium (mmol/L)	3-4.5	--	3-4.4	2.1-4.8	2-5	--	3.5-4.6	2.8-4.6	3-5
Sodium (mmol/L)	133-153	--	130-155	125-155	140-165	--	145-155	140-155	130-155
Total Bili (mg/dL)	0-0.1	--	0-0.1	0-0.1	0-0.1	--	0-0.1	0-0.1	0-0.1
Total Protein (g/dL)	2.8-4	2.4-4.6	2.4-5.1	2.4-3.6	2.6-5.0	2.4-4.6	3.6-5.2	3.0-4.8	2.8-4.2
Trig (mg/dL)	60-130	--	65-140	45-200	60-135	--	60-225	50-200	45-145
Uric acid (mg/dL)	2.5-12	2.3-11.9	2.9-11.6	5.8-11.5	2.9-10.6	3.5-9.5	2.0-7.9	3.5-8.7	2.5-7.8

### Avian Reference Ranges: Chemistry

Determination	Jardine's	Lorikeet	Lory	Lovebird	Macaw	Meyer	Pionus	Quaker	Senegal
Bile Acids (umol/L)	10.2-61.7	9.5-71.2	9.3-80.2	8.5-77.1	7.6-60.0	11.5-76.9	6.1-62.7	9.6-83.2	13.8-87.4
T4 (ug/dL)	--	--	--	0.2-1.7	0.2-1.9	0.2-1.5	0.2—1.5	0.2-1.9	0.2-1.2
Pre-albumin (g/dL)	0.13-0.42	0.32-1.36	0.30-1.33	0.37-0.68	0.24-0.80	0.28-1.07	0.62-1.15	0.91-2.46	0.55-0.99
% Prealbumin	3.8-12.7	16.2-33.4	11.9-34.7	13.3-21.5	6.9-19.9	12.9-29.0	15.1-25.3	28.1-36.3	17.5-26.3
Albumin (g/dL)	1.17-1.92	0.91-2.12	0.93-2.29	0.98-1.68	1.12-2.43	1.02-2.22	1.52-2.37	0.92-2.48	1.19-1.81
% albumin	44.3-60.9	33.8-53.9	39.0-51.2	36.3-48.5	35.9-55.4	37.3-57.6	38.1-50.2	25.4-39.4	38.8-48.2
Alpha-1 (g/dL)	0.07-0.16	0.02-0.18	0.03-0.18	0.08-0.17	0.07-0.18	0.03-0.18	0.08-0.23	0.08-0.21	0.08-0.15
% alpha 1	2.3-4.8	1.5-3.9	1.5-4.6	2.7-4.9	2.1-4.6	1.5-5.0	2.0-3.8	2.5-4.1	2.3-4.0
Alpha-2 (g/dL)	0.08-0.22	0.04-0.16	0.03-0.25	0.12-0.37	0.15-0.45	0.06-0.26	0.11-0.36	0.22-0.45	0.11-0.25
% alpha 2	3.2-6.2	1.6-5.4	1.5-7.9	4.3-12.1	4.6-10.3	2.5-7.1	2.8-7.5	5.9-10.8	3.3-6.4
Beta (g/dL)	0.38-0.84	0.28-0.96	0.38-0.98	0.33-0.78	0.34-0.85	0.26-0.84	0.40-0.95	0.37-0.79	0.32-0.87
% beta	13.1-22.7	11.5-24.5	10.9-21.6	12.4-24.2	11.4-21.3	10.9-21.7	12.8-23.1	11.0-18.9	12.5-23.2
Gamma (g/dL)	0.12-0.47	0.12-0.58	0.20-0.48	0.12-0.38	0.15-0.58	0.16-0.48	0.23-0.69	0.19-0.77	0.15-0.45
% gamma	4.2-12.8	3.8-12.8	4.9-11.3	4.5-9.1	4.9-13.5	3.9-10.6	5.6-13.6	5.9-13.7	4.6-10.7
A/G ratio	1.32-2.56	1.07-3.38	1.08-3.01	1.06-2.09	1.08-2.55	1.34-2.73	1.11-2.65	1.07-2.38	1.41-2.66

All reference ranges obtained from heparinized plasma samples.

Regular chemistry performed on Ortho 250XR

TP by non-temperature compensated refractometer

Bile acids and T4 by RIA

EPH by Helena split beta gels, represent adult ranges

### Avian Reference Ranges: Hematology

Determination	Af Grey	Amazon	Caique	Cockatiel	Cockatoo	Conure	Eclectus
WBC x 10 <sup>3</sup> /ul	5.0-13.6	4.3-12.5	4.2-15.5	3.8-10.7	5.7-13.9	4.0-14.0	5.3-13.1
RBC x 10 <sup>6</sup> /ul	3.00-4.20	2.78-3.96	3.14-4.45	3.30-4.93	2.58-3.88	3.33-4.62	2.84-4.00
HCT (%)	40-52	40-52	40-50	40-49	40-50	41-53	40-53
Hets (%)	55-75	55-80	54-81	55-80	55-80	55-75	55-70
Eos (%)	0-2	0-1	0-1	0-2	0-2	0-2	0-1
Baso (%)	0-1	0-1	0-1	0-2	0-1	0-1	0-2
Monos (%)	0-3	0-3	0-2	0-2	0-1	0-2	0-2
Lymphs (%)	25-45	20-45	18-40	20-45	20-45	25-45	30-45

Determination	Jardine's	Lorikeet	Lory	Lovebird	Macaw	Meyer	Pionus	Quaker	Senegal
WBC x 10 <sup>3</sup> /ul	4.1-12.6	3.8-14.4	3.8-14.3	4.0-13.0	6.0-16.4	3.8-13.6	3.8-12.3	4.7-13.1	5.0-12.7
RBC x 10 <sup>6</sup> /ul	3.03-4.47	2.98-4.87	3.10-4.59	3.15-4.38	2.88-4.15	2.81-4.84	3.00-4.38	3.15-4.48	3.22-4.35
HCT (%)	41-53	41-52	41-53	41-51	40-51	40-52	41-53	41-52	40-53
Hets (%)	55-75	54-73	54-76	55-80	58-78	53-74	50-75	55-80	55-75
Eos (%)	0-1	0-1	0-2	0-1	0-1	0-1	0-2	0-1	0-1
Baso (%)	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-2	0-1
Monos (%)	0-2	0-2	0-2	0-3	0-3	0-2	0-2	0-3	0-2
Lymphs (%)	25-45	24-47	24-47	20-45	20-45	19-44	25-45	20-45	25-45

RBC and WBC count by Unopette method from 24 hour old blood collected in EDTA

Spun HCT

Diff based on 100 cell count using smear made at the time of sample acquisition