

# DOG

## BIOCHEMICAL REFERENCES

Parameters	Value	Unit
<b>Liver function</b>		
Bilirubin (total)	0.07-0.61	mg/dl
Bilirubin (direct)	0-0.12	mg/dl
Bilirubin (indirect)	0.01-0.5	mg/dl
Bile acids (BA)	2-15.5	---
Icterus index	2-6	U
BSP (sulfobromophthalein)	5-10	%
<b>Metabolites</b>		
Cholesterol	109-345	mg/dl
Cholesterol (Ester)	40-78	mg/dl
Cholesterol (Free)	31-71	mg/dl
Glucose	55-127	mg/dl
Ammonia	19-150	---
Carotene	35-90	---
Carotenol	0-5	---
<b>Renal function</b>		
Creatinine	0.3-1.7	mg/dl
Blood Urea	17-38	mg/dl
Amino acid nitrogen	7-8	mg/dl
BUN (blood urea nitrogen)	7-31	mg/dl
NPN (non- protein nitrogen)	70-100	mg/dl
<b>Ketones</b>		
Triglycerides	10-42	mg/dl
Lactic acid	8-20	mg/dl
Uric acid	0-2	mg/dl
Acetoacetate	0.18	mg/dl
Beta hydroxybutyrate	0.3	mg/dl
Pyruvate	0.1-0.2	---
<b>Acid : base status</b>		
Bicarbonate	16-28	mmol/l
CO <sub>2</sub>	15-25	meq/l
PCO <sub>2</sub>	28-49	mmHg
PO <sub>2</sub>	85-100	mmHg
pH	7.27-7.45	---

<b>Proteins</b>		
Total protein	5.4-8	g/dl
Albumin	2.1-4.3	g/dl
Globulin	2.1-4.7	g/dl
α 1 Globulin	0.2-0.8	g/dl
α 2 Globulin	0.3-1.3	g/dl
β Globulin	0.7-1.8	g/dl
β 1 Globulin	0.7-1.3	g/dl
β 2 Globulin	0.6-1.4	g/dl
γ Globulin	0.4-1.8	g/dl
γ 1 Globulin	0.5-1.3	g/dl
γ 2 Globulin	0.4-0.9	g/dl
Albumin / Globulin ratio	0.6-1.9	---
<b>Electrolytes</b>		
Chloride	95-125	meq/l
Osmolality	280-320	mOsm/kg
Anion gap	8-25	meq/l
Potassium	3.5-5.7	meq/l
Sodium	135-161	meq/l
<b>Enzymes</b>		
ALT • SGPT	7-70	U/L
Alkaline phosphatase	5-110	U/L
Amylase	185-1700	U/L
AST • SGOT	6.2-87	U/L
CPK • CK	10-329	U/L
GGT	0-11	U/L
Lipase	1.8-2.4	U/L
SDH	3.1-7.6	U/L
LDH	10-219	U/L
LDH-1	1.7-30.2	%
LDH-2	1.2-11.7	%
LDH-3	10.9-25	%
LDH-4	11.9-15.4	%
LDH-5	30-72.8	%
RBC acetylcholinesterase	270	U/L
Arginase	0-0.28	U/ml
OCT (Ornithine carbamoyl transferase)	0.5	U/L
Butyrylcholinesterase	1210-3020	U/L

(GD) Glutamate dehydrogenase	3	U/L
Isocitrate dehydrogenase	0.4-7.3	U/L
(LAP) Leucine aminopeptdase	13	U/L
(MD) Malate dehydrogenase	199	U/L
Acid phosphatase	5-25	U/L
<b>Hormones</b>		
Cortisol (0 hour)	1-4.8	µg/dl
Cortisol (2 hour)	5-26	µg/dl
Peripheral plasma concentration of Corticoids	28	ng/ml
Peripheral plasma concentration of Corticoids Progesterone (estrus)	2.6	ng/ml
Peripheral plasma concentration of Corticoids Progesterone (diestrus)	20.3	ng/ml
Peripheral plasma concentration of Estradiol (estrus)	3-8	pg/ml
Total Serum Thyroxine	1.1	µg/dl
T3 (RIA)	50-200	ng/ml
T4 (RIA)	0.6-4	---
Insulin	86.1-35.9	pmol/l
ACTH	20-100	pg/ml
Growth hormone	0-10	ng/ml
Gastrin	45-125	pg/ml
Parathormone (PTH)	16-136	pg/ml
Calcitonin	?25	pg/ml
<b>Minerals</b>		
Calcium (total)	7.9-12.8	mg/dl
Calcium (ionized)	4.2-5.7	meq/l
Iron	94-122	µg/dl
Iron-binding capacity	165-418	µg/dl
Magnesium	1.43-4	mg/dl
Phosphorus	2.4-7.6	mg/dl
Copper	100-200	mg/ml
Lead	0-50	---

## HAEMATOLOGICAL REFERENCES

Parameters	Value	Unit
<b>Red Blood Cells</b>		
RBC count	5.5-9.5	10 / $\mu$ l
Haemoglobin	12-18	g/dl
PCV	35-55	%
MCV	60-77	fl
MCH	13-25	pg
MCHC (microhematocrit)	31-36	g/dl
MCHC (wintrobe)	31-34	g/dl
Reticulocytes	0-1.5	% of RBC
Erythrocyte resistance to hypotonic saline (Erythrocyte fragility) <minimum>	0.4-0.5	%
Erythrocyte resistance to hypotonic saline (Erythrocyte fragility) <maximum>	0.32-0.42	%
Erythrocyte surface area	68	Sq m/kg bwt
RBC diameter	6.7-7.3	$\mu$
RBC life span	107-120	days
ESR (wintrobe)	1-6	mm/30 min
ESR (wintrobe)	5-25	mm/hour
ESR (westerngreen)	0-5	mm/hour
Mean volume of a red cell	59-69	---
Mean Hb of a red cell	20-24	pg
Hb concentration in a red cell	30-35	g/dl
<b>White Blood Cells</b>		
WBC count	6-19	10 <sup>3</sup> / $\mu$ l
Neutrophils (mature)	3-12	10 <sup>3</sup> / $\mu$ l
Neutrophils (mature)	60-77	%
Neutrophils (bands)	0-0.3	10 <sup>3</sup> / $\mu$ l
Neutrophils (bands)	0-4	%
Lymphocytes	1-5.2	10 <sup>3</sup> / $\mu$ l
Lymphocytes	12-30	%
Monocytes	0.15-1.4	10 <sup>3</sup> / $\mu$ l
Monocytes	3-10	%
Eosinophils	0.1-1.3	10 <sup>3</sup> / $\mu$ l
Eosinophils	2-10	%
Basophils	Rare	
Basophils	0-0.5	%
Leukocytes	6-18	10 <sup>3</sup> / $\mu$ l
Neutrophil/Lymphocyte ratio	2.4-3.5	---
<b>Coagulation</b>		
Platelets	2-9	$\times$ 10/ $\mu$ l
Fibrinogen	100-500	mg/dl
Myeloid/Eythroid ratio	0.75-2.53	---

Plasma Protein/Plasms Fibrinogen ratio	17-74	---
Thrombocytes	200-500	$\times 10^3/\mu\text{l}$
Thrombin time	4-10	seconds
Prothrombin time	6-14	seconds
Partial thromboplastin time	14-30	seconds
Bleeding time (Buccal)	1-5	minutes
Clotting time (Lee White)	2-13	minutes
Clotting time (Cap .tube)	1-5	minutes
Fibrin degradation products (FDP)	0-32	---
<b>Total data</b>		
Blood volume	80-101	ml/kgbwt
Blood volume	1600	ml $\cdot$ 8%bwt
Plasma volume	42-58	ml/kgbwt
Specific Gravity of Blood	1.045-1.059	---
<b>Blood Pressure</b>		
Direct : Femoral $\cdot$ Pressure transducer	132-164/79-95	mmHg
Indirect : Tibial $\cdot$ ultrasonic Doppler	123-170/55-96	mmHg

## URINE ANALYSIS

Parameters	Value	Unit
Specific Gravity	1.015-1.070	---
Color	Straw Yellow	
Clarity	Clear	
Osmolality	500-1200	meq/l
pH	4.5-8.5	---
Calcium	2.1	meq/l
Phosphorus	20-30	mg/kg/day
Magnesium	1.7-3	mg/kg/day
Sodium	0.04-13	mmol/kg/day
Potassium	0.1-2.4	mmol/kg/day
Sulfate	30-50	mg/kg/day
Glucose	Negative	
Bicarbonate	0.05-3.2	mmol/kg/day
Bilirubin	0-trace	
Creatinine	30-80	mg/kg/day
Cortisol/Creatinine ratio	35	nmol/l : mmol/l
Urea nitrogen	250-800	mg/kg/day
Ammonia nitrogen	30-60	mg/kg/day
Allantoin	35-45	mg/kg/day
Ketones	Negative	
RBC	0-5	---
WBC	0-5	---

Occult blood	Negative	
Protein	Trace	
Casts	Occasional Hyaline	
Epithelial cells	Occasional	
Fat droplets	Uncommon	
Bacteria	Negative	
Crystals	variable	
<b>Fractional clearance of Electrolytes</b>		
Sodium	0-0.7	%
Potassium	0-20	%
Chloride	0-0.8	%
Calcium	0-0.4	%
Phosphorus	3-39	%
<b>Glomerular function tests</b>		
Endogenous Creatinine Clearance	2.97-3.7 0.96	ml/min/kg
Exogenous Creatinine Clearance	4.08-0.5	ml/min/kg
Inulin Clearance	3.55-4.72 1.82	ml/min/kg
PAH Clearance	10.55-12.23 1.65	ml/min/kg
Iothalamate Clearance	5.6-0.77	ml/min/kg
Iodohippurate Clearance	16.17-2.99	ml/min/kg
Filtration fraction	0.35-0.02	---
<b>Tubular function tests</b>		
Random USG	1.001-1.070	---
USG after 5% dehydration	1.050-1.076	---
Uosm after 5% dehydration	1.787-2.791	mosm/kg
Uosm/Posm after 5% dehydration	5.7-8.9	---
PSP	21-27	minutes

## IMMUNOLOGY REFERENCES

Parameters	Value	Unit
<b>Serum Ig levels</b>		
IgG	1000-2000	mg/dl
IgG 1	8.17	mg/ml
IgG 2	8.15	mg/ml
IgM	70-270	mg/dl
IgA	20-160	mg/dl
IgE	0.2-4.2	mg/dl
<b>Ig Isotypes &amp; Sub-Isotypes</b>		
IgG	G1-G2(G2a-G2b-G2c)	
IgA	A	
IgM	M	
IgE	E	
Peripheral blood Lymphocytes (T-cells)	70	%
Peripheral blood Lymphocytes (B-cells)	23-30	%
IgA secretion in Colostrum	1500	mg/dl
IgA secretion in Milk	400	mg/dl
Tissue layers intervening between maternal and fetal circulation	4	n
Placental transfer of Ig	+	
Colostrum transfer of Ig	+++	
Colostrum IgA level	500-2200	mg/dl
Colostrum IgM level	14-60	mg/dl
Colostrum IgG level	100-300	mg/dl
Milk IgA level	110-620	mg/dl
Milk IgM level	10-54	mg/dl
Milk IgG level	1-3	mg/dl