

# HORSE

## BIOCHEMICAL REFERENCES

Parameters	Value	Unit
<b>Liver function</b>		
Bilirubin (total)	0.2-6	mg/dl
Bilirubin (direct)	0-0.5	mg/dl
Bilirubin (indirect)	0.2-2	mg/dl
Bile acids (BA)	0-20	---
Icterus index	7.5-25	U
BSP (sulfobromophthalein)	2-4.1	---
<b>Metabolites</b>		
Cholesterol	46-180	mg/dl
Cholesterol (Ester)	81.1	mg/dl
Cholesterol (Free)	15.7	mg/dl
Glucose	60-134	mg/dl
Ammonia	13-110	---
Carotene	20-175	---
Carotenol	9-16	---
<b>Renal function</b>		
Creatinine	0.4-2.2	mg/dl
Blood Urea	20-40	mg/dl
Amino acid nitrogen	5-7	mg/dl
BUN (blood urea nitrogen)	10-27	mg/dl
NPN (non- protein nitrogen)	20-100	mg/dl
<b>Ketones</b>		
Triglycerides	4-44	mg/dl
Lactic acid	10-16	mg/dl
Uric acid	0.9-1.1	mg/dl
Acetone	0-10	mg/dl
Acetoacetate	0-1.1	mg/dl
Beta hydroxybutyrate	0.8-9	mg/dl
Pyruvate	0.4-1	mg/dl
<b>Acid : base status</b>		
Bicarbonate	20-34	mmol/l
CO <sub>2</sub>	22-35	mEq/l
PCO <sub>2</sub>	38-53	mmHg
PO <sub>2</sub>	95-100	mmhg
pH	7.2-7.55	---

<b>Proteins</b>		
Total protein	5.6-8.5	g/dl
Albumin	2.3-4.1	g/dl
Globulin	2.4-4.6	g/dl
$\alpha$ 1 Globulin	0.06-1.3	g/dl
$\alpha$ 2 Globulin	0.3-1.31	g/dl
$\beta$ 1 Globulin	0.4-1.6	g/dl
$\beta$ 2 Globulin	0.29-0.9	g/dl
$\gamma$ Globulin	0.55-1.9	g/dl
$\gamma$ 1 Globulin	0.9-1.5	g/dl
Albumin / Globulin ratio	0.5-1.5	---
Protein – bound Iodine	1.5-3.5	$\mu$ g/dl
<b>Electrolytes</b>		
Chloride	95-115	meq/l
Iodine	5-12	
Osmolality	270-302	mosm/kg
Anion gap	6-25	meq/l
Potassium	2.4-5	meq/l
Sodium	128-150	meq/l
<b>Enzymes</b>		
ALT $\cdot$ SGPT	6.27-23	U/L
Alkaline phosphatase	70-4003	U/L
Amylase	46.7-188	U/L
AST $\cdot$ SGOT	115.7-600	U/L
CPK $\cdot$ CK	34-380	U/L
GGT	2.7-44	U/L
Lipase	2.2-2.8	U/L
SDH	0-8.5	U/L
LDH	102.6-460	U/L
LDH-1	6.3-18.5	%
LDH-2	8.4-20.5	%
LDH-3	41-65.9	%
LDH-4	9.5-20.9	%
LDH-5	1.7-16.5	%
RBC acetylcholinesterase	450-790	U/L
Arginase	0-4	U/ml
OCT (Ornithine carbamoyl transferase)	---	---
Butyrylcholinesterase	2000-3100	U/L
(GD) Glutamate dehydrogenase	0-11.8	U/L
Glutathione reductase	33.3	U/100gHb

Isocitrate dehydrogenase	4.8-18	U/L
<b>Hormones</b>		
Cortisol (0 hour)	1-4.4	µg/dl
Cortisol (2 hour)	5.1-14.6	µg/dl
Peripheral plasma concentration of Corticoids	5.5-26.7	ng/ml
Peripheral plasma concentration of Corticoids Progesterone (estrus)	0.09	ng/ml
Peripheral plasma concentration of Corticoids Progesterone (diestrus)	5.49	ng/ml
Peripheral plasma concentration of Estradiol (estrus)	141	pg/ml
Peripheral plasma concentration of Estradiol (diestrus)	20	pg/ml
Plasma Testosterone (non-Pregnant mares)	<50	pg/ml
Total Serum Thyroxine	0.9-2.8	µg/dl
T3 (1.5-4 months)	135-270	ng/ml
T3 (2-5 years)	72-180	ng/ml
T3 (6-10 years)	48-118	ng/ml
T3 (11-25 years)	47-145	ng/ml
T4 (1.5-4 months)	3-5.25	mg/dl
T4 (2-5 years)	1.2-2.9	mg/dl
T4 (6-10 years)	1.3-2.2	mg/dl
T4 (11-25 years)	0.9-2.2	mg/dl
ACTH	6.5-30.8	pg/ml
PTH	<1.3	ng/ml
<b>Minerals</b>		
Calcium (total)	10.2-13.8	mg/dl
Calcium (ionized)	4.5-7.5	mEq/l
Iron	70-199	µg/dl
Iron-binding capacity	200-390	µg/dl
Magnesium	1.3-4.2	mg/dl
Phosphorus	1.5-5.6	mg/dl
Copper	0.7-1.2	mg/ml
Lead	5-25	---
Manganese	0.1-11	mg/l
Molybdenum	16-31	---
Selenium	0.09-0.3	mg/l
Zinc	0.5-2	mg/l

## HAEMATOLOGICAL REFERENCES

Parameters	Value	Unit
<b>Red Blood Cells</b>		
RBC count	6-18	10 / $\mu$ l
Haemoglobin	8-19	g/dl
PCV	30-53	%
MCV	34-59	fl
MCH	12-20	pg
MCHC	30-39.3	g/dl
Reticulocytes	0	% of RBC
Erythrocyte resistance to hypotonic saline (Erythrocyte fragility) <minimum>	0.56-0.59	%
Erythrocyte resistance to hypotonic saline (Erythrocyte fragility) <maximum>	0.34-0.39	%
Erythrocyte surface area	67	Sq m/kg bwt
RBC diameter	3.5-6	$\mu$
RBC life span	140-150	days
ESR (wintrobe)	2-12	mm/10min
ESR (wintrobe)	15-38	mm/20min
ESR (wintrobe)	24-60	mm/30min
ESR (wintrobe)	51-63	mm/hour
ESR (wester green)	7-23	mm/10min
Mean volume of a red cell	37-58.5	fl
Mean Hb of a red cell	12.3-19.7	Pg
Hb concentration in a red cell	31-38.6	g/dl
<b>White Blood Cells</b>		
WBC count	5-14.3	10 <sup>3</sup> / $\mu$ l
Neutrophils (mature)	2.26-8.6	10 <sup>3</sup> / $\mu$ l
Neutrophils (mature)	30-75	%
Neutrophils (bands)	0-0.1	10 <sup>3</sup> / $\mu$ l
Neutrophils (bands)	0-2	%
Lymphocytes	1.16-7.7	10 <sup>3</sup> / $\mu$ l
Lymphocytes	15-70	%
Monocytes	0-1	10 <sup>3</sup> / $\mu$ l
Monocytes	1-10	%
Eosinophils	0-1	10 <sup>3</sup> / $\mu$ l
Eosinophils	1-12	%
Basophils	0-0.3	10 <sup>3</sup> / $\mu$ l
Basophils	0-4	%
Leukocytes	5-15	10 <sup>3</sup> / $\mu$ l

Neutrophil/Lymphocyte ratio	0.8-2.8	
<b>Coagulation</b>		
Platelets	1-6	× 10 <sup>3</sup> /μl
Fibrinogen	100-400	mg/dl
Myeloid/Eythroid ratio	0.9-3.7	---
Plasma Protein/Plasma Fibrinogen ratio	18-34	---
Thrombocytes	100-350	10 <sup>3</sup> /μl
Thrombin time	9-16	seconds
Prothrombin time	7-15	seconds
Partial thromboplastin time	30-65	seconds
Bleedind time	1-5	minutes
Clotting time (Lee White)	4-17.5	minutes
Clotting time (Cap .tube)	2-11	minutes
Fibrin degradation products (FDP)	0-16	mg/ml
<b>Total data</b>		
Blood volume	61.4-109.6	ml/kg bwt
Blood volume	40000	ml, 8%bwt
Plasma volume	43-63.3	ml/kg bwt
Specific Gravity of Blood	1.046-1.060	---
Blood Pressure	80-130/ 50-95	mmHg

## URINE ANALYSIS

Parameters	Value	Unit
Specific Gravity	1.008-1.060	---
Color	Dark Yellow	
Clarity	Clear to Cloudy	
pH	7-9	---
WBC	0	---
RBC	<5	---
Casts <sup>2</sup>	Rare	
Crystals <sup>3</sup>	Usually Calcium Carbonate	
Protein	0-trace	
Glucose	Not Present usually	
Bilirubin	Not Present usually	
Ketones	Not Present usually	
Bacteria	Not Present usually	
Urea nitrogen	100-600	mg/kg/day
Uric acid	1-2	mg/kg/day
Allantoin	5-15	mg/kg/day
<b>Fractional urinary excretion of Electrolytes &amp; Enzymes</b>		
FE Sodium	<1	%
FE Potassium	15-65	%
FE Phosphorus	0.1-1.6	%
FE GGT	<25	%