LABOKLIN
LABORATORY FOR CLINICAL DIAGNOSTICS

Reference Values

Cattle, Sheep, Goat, Pig



Haematology

Blood count	Unit	Cattle	Sheep	Goat	Pig
Erythrocytes	T/l	5.0 – 10.0	7.3 – 11.3	8 – 18	5.8 – 8.1
Haematocrit	l/l	0.28 – 0.38	0.29 – 0.38	0.24 – 0.48	0.33 – 0.45
Haemoglobin	g/l	90 – 140	80 – 120	80 – 120	108 – 148
Leukocytes	G/l	4 – 10	4 – 10	4 – 13	10 – 22
Neutrophils	%	25 – 45	10 – 50	30 – 48	10 – 39
Lymphocytes	%	45 – 65	40 – 80	50 – 70	49 – 85
Monocytes	%	2 – 6	0 – 15	0 – 4	2 – 4
Eosinophils	%	1 – 10	0 – 8	1 – 8	0 – 6
Basophils	%	0 – 2	0 – 4	0 – 1	0 – 5
Bands	%	0 – 3	0 – 4	0	0 – 7
Hypochromasia		neg.	neg.	neg.	neg.
Anisocytosis		neg.	neg.	neg.	neg.
Platelets	G/L	300 – 800	200 – 800	200 – 800	175 – 580

Differential blood count	Unit	Cattle	Sheep	Goat	Pig
Neutrophils	G/l	1.0 – 3.5	0.7 – 4.0	1.2 – 6.2	1.0 – 8.2
Lymphocytes	G/l	2.5 – 5.5	2.0 – 4.0	2.0 – 8.0	6.0 – 16.0
Monocytes	G/l	0 – 0.33	0 – 0.7	0 – 0.4	0 – 1.0
Eosinophils	G/l	0.3 – 1.5	0.1 – 1.0	0.05 – 0.6	0 – 1.3
Basophils	G/l	0 – 0.1	0 – 0.3	0 – 0.12	0 – 0.05
Bands	G/l	0 – 0.2	0 – 0.2	0 – 0.2	0 – 1.5

Hormones

	Unit	Cattle	Sheep	Goat	Pig
T4	µg/dl	3.4 – 8.2	3.9 – 8.0	3.9 – 8.0	
T3	ng/dl	78 – 150	> 110.7	> 110.7	84 – 156
PAG (cow/sheep/goat from day 28)	P – N	> 0.300**	> 0.300**	> 0.300**	
Progesterone (day 18/19)	ng/ml	proliferative phase: < 1 Corpus luteum***: 1 – 10			
Testosterone	ng/ml	intact bulls: > 1			1.1 – 3.1
Cortisol	ng/ml	2 – 50	2 – 50	2 – 50	
Insulin	µU/ml	< 5			

Vitamins

	Unit	Cattle	Sheep	Goat	Pig
ß-Carotin	µg/l	> 2500			
Vit. A	µg/l	130 – 380		600 – 1500	
Vit. B 12	pg/ml	> 100	> 100	100 – 1500	300 – 800
Vit. D (25 OH)	nmol/l	75 – 125			
Vit. E	mg/l	> 3	> 3	> 3	1.6 – 4.6

* age-dependent

** PAG values > 0.3 indicate pregnancy. After an embryonic premature death, PAGs can continue to circulate for some time. Therefore it is recommended to re-test the animal if values are between 0.3 and < 1.0

Clinical Chemistry

Enzymes 37 °C	Unit	Cattle	Sheep	Goat	Pig
α-Amylase	U/l	< 161	< 120	< 120	< 3500
ALT (GPT)	U/l	< 93	< 33	< 32	< 126
AP	U/l	< 484	< 359	< 1942	< 274
AST (GOT)	U/l	< 182	< 126	< 135	< 80
Cholinesterase	U/l	78 – 156	78 – 156	78 – 156	317 – 788
CK	U/l	< 595	< 208	< 268	< 4769
γ-GT	U/l	< 88	< 63	< 63	< 79
GLDH	U/l	< 48	< 76	< 20	< 6
LDH	U/l	< 1364	< 1325	< 972	< 545
Lipase	U/l	2 – 8		2 – 8	

Substrates	Unit	Cattle	Sheep	Goat	Pig
Albumin	g/l	30 – 40	24 – 30	30 – 40	18 – 31*
ß-HBS	mmol/l	< 1.0	< 0.6	< 0.6	< 0.6
Bile Acids	µmol/l	15 – 80	< 10		
Bilirubin	µmol/l	< 5.0	< 8.5	< 8.5	< 4.3
Cholesterol	mmol/l	< 2	< 1	< 2	2.0 – 3.3
Creatinine	µmol/l	88 – 177	50 – 120	50 – 120	40 – 130
Globulins	g/l	< 48	< 48	< 48	< 64
Glucose	mmol/l	1.9 – 3.1	2.2 – 5.2	2.2 – 5.2	3.9 – 6.4
Haptoglobin	g/l	< 0.35	< 0.35	< 0.27	< 0.68
Lactate	mmol/l	0.5 – 3.0	1.0 – 1.4	1.0 – 1.4	
NEFA	mmol/l	< 0.8	< 0.5	< 0.5	< 0.5
Total Protein	g/l	60 – 80	50 – 70	60 – 80	55 – 86
Triglycerides	mmol/l	< 0.5	< 0.4	< 0.5	< 0.5
Urea	mmol/l	2 – 8	4.5 – 10.7	4.5 – 10.7	3.3 – 8.3

Electrolytes & Minerals	Unit	Cattle	Sheep	Goat	Pig
Calcium	mmol/l	2.3 – 2.8	2.1 – 2.7	2.2 – 2.8	2.4 – 3.5
Chloride	mmol/l	90 – 110	75 – 114	97 – 110	102 – 106
Cobalt	µg/l	1.0 – 3.5	1.0 – 3.5	1.0 – 3.5	
Copper	µmol/l	8 – 24	7 – 24	16 – 32	16 – 39
Iron	µmol/l	20 – 40	20 – 30	16 – 35	16.7 – 35.3
Magnesium	mmol/l	0.8 – 1.3	0.8 – 1.0	0.8 – 1.0	1.1 – 1.5
Manganese	µg/l	3.5 – 20	< 20	< 20	
Molybdenum	µg/l	1 – 35			
Phosphate	mmol/l	1.1 – 2.4	1.2 – 2.5	1.61 – 2.26	2.1 – 3.3
Potassium (K)	mmol/l	3.5 – 4.5	3.5 – 4.5	4.5 – 6.5	4.0 – 5.0
Selenium	µg/l	40 – 85	55 – 170	62 – 158	100 – 200
Sodium (Na)	mmol/l	135 – 145	145 – 155	135 – 157	140 – 160
Zinc	µmol/l	8 – 24	11 – 21	10 – 20	10 – 20

Further Parameters

	Unit	Cattle	Sheep	Goat	Pig
Haptoglobin	g/l	< 0.35	< 0.35	< 0.27	< 0.68
IgG (juveniles)	mg/dl	> 800	> 800		
SAA	µg/ml	< 6.5			

*** Pregnancy corpus luteum concentrations are generally higher than those of cyclic corpora lutea, but can fluctuate individually. A differentiation of pregnant and non-pregnant animals by means of progesteron determination is not possible. Progesteron concentrations of > 1 ng/ml on days 17 – 19 are indicative for early pregnancy due to missing luteolysis. For pregnancy diagnosis we advise the determination of PAG (pregnancy associated glycoprotein)

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