

REFERENCE INTERVALS FOR SERUM BIOCHEMISTRY IN ADULT MIRANDA'S DONKEY

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BACKGROUND: Miranda's donkey is a Portuguese breed originally from the north of Portugal, considered endangered. Despite the increase in the number of animals, the breed still requires efforts in several areas for its preservation. The knowledge of normal serum biochemistry values is important to characterize the breed and assist veterinarians in the diagnosis of diseases.

OBJECTIVES: The aim of this study was to determine reference intervals (RI) for serum biochemistry in a healthy adult population of Miranda's donkey.

METHODS: Blood samples were collected from 55 healthy adult Miranda's Donkey (27 males, 28 females), aged 4-25 years old. Samples were collected as part of a prophylactic program developed for the breed, and no sample was collected on purpose for the study. All owners gave informed consent for the use of data and remaining blood samples from their animals. The study was approved by the ORBEA (Ethics Committee for Animal Welfare) by the Universidade Trás-os-Montes e Alto Douro (UTAD)—i467-e-CECAV-2022 and was carried out in spring. All determinations were performed on the Respos@920 automated biochemistry analyzer and the RI were established with the Reference Value Advisor v2.1, strictly following American Society for Veterinary Clinical Pathology guidelines.

RESULTS AND DISCUSSION: The present study investigates for the first time the biochemistry reference interval of Miranda's donkey in a healthy population. The donkeys had a mean age of 10 years and an age range of 4-25 years. The values found in our study differ from those reported for adult donkeys of other European autochthonous breeds when compared^{1,2}. These differences may possibly result from variations in breed, geographical location, and techniques used³. This emphasizes the importance of determining reference ranges for each breed whenever possible.

CONCLUSION: Several factors can influence biochemical parameters, such as breed, sex, age and geographic location. The values described here can be used by veterinarians to assess and monitor the health status of animals and herds, helping to select suitable and healthy animals for reproduction, contributing to their preservation.

Table 1. Serum biochemistry reference intervals for adults healthy Miranda's donkey (n=55).

Analyte/Units	n	Mean ± SD	Median	Min-Máx	RI	LRL 90% CI	URL 90% CI
AP U/L	54	141.3±38.8	134.1	62.1-242.1	68.6-232.5	62.1-98.1	208.5-242.7
ALB g/dl	54	3.0±0.2	3.0	2.39-3.39	2.5-3.4	2.4-2.7	3.3-3.4
ALT U/L	52	4.5±1.3	4.5	1.4-8.3	1.8-8.2	1.4-2.8	6.4-8.3
AST U/L	55	233±45.5	227.5	150.8-367.3	151.6-366.2	150.8-178.3	305.5-367.3
TB mg/dl	55	0.1±0.0	0.1	0.05-0.17	0.1-0.2	0.1-0.1	0.2-0.2
Ca mg/dl	55	11.2±0.8	11.2	9.03-13.07	9.2-12.9	9.0-10.1	12.3-13.1
CHOL mg/dl	55	73.4±13.6	73.0	52.0-116.0	52.4-114.8	52.0-55.0	97.1-116.0
CK U/L	53	109±30.9	104.2	55.3-193.5	56.2-189.9	55.3-73.5	173.4-193.5
Cl mmol/l	53	105.8±3.0	105.7	96.0-112.8	97.7-112.3	96.0-101.7	110.4-112.8
CREA mg/dl	55	1.2±0.2	1.2	0.77-1.67	0.8-1.7	0.8-0.9	1.6-1.7
GGT U/L	53	26.9±22.5	22.7	10.7-178.2	11.2-133.3	10.7-14.6	40.8-178.2
GLOB g/dl	55	3.9±0.5	3.9	2.53-4.83	2.8-4.8	2.5-3.2	4.7-4.8
GLU mg/dl	55	78.7±14.6	77.0	55.5-130.1	56.7-123.1	55.5-60.7	102.0-130.1
K mmol/l	55	3.8±0.6	3.9	2.13-4.82	2.3-4.8	2.1-2.8	4.5-4.8
P mg/dl	55	3.2±0.6	3.2	1.91-4.72	1.9-4.6	1.9-2.1	4.0-4.7
Mg mg/dl	55	2.3±0.3	2.3	1.62-2.96	1.7-2.9	1.6-1.9	2.8-3.0
Na mmol/l	53	135.2±3.0	135.7	125.3-140.5	125.8-140.3	125.3-130.5	139.2-140.5
TP g/dl	54	7.0±0.5	7.0	5.37-7.87	5.6-7.8	5.4-6.3	7.6-7.9
TRIG mg/dl	53	117.2±37.0	114.0	14.0-205.0	29.1-199.8	14.0-66.6	181.8-205.0
UREA mg/dl	55	27.7±9.5	28.3	11.6-47.1	12.2-46.2	11.6-13.6	43.4-47.1

AP: Alkaline phosphatase; ALB: albumin; ALT: alanine aminotransferase; AST: aspartate aminotransferase; TB: total bilirubin; Ca: calcium; CHOL: cholesterol; CK: creatine phosphokinase; Cl: chlorine; CREA: creatinine; GGT: gamma-glutamyl transferase; GLO: globulin; GLU: glucose; K: potassium; P: phosphorus; Mg: magnesium; Na: sodium; TP: total protein; TRIG: triglycerides; SD: Standard deviation, Min: Minimum, Máx: Maximum, RI: Reference intervals, LRL: lower reference limit, URL: upper reference limit, CI: Confidence interval.

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