

Hematological and Biochemical values of Snow leopard (*Uncia uncia*), (Schreber, 1775) at Padmaja Naidu Himalayan Zoological Park, Darjeeling

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Abstract

Hematological and biochemical analyses of blood can be of great importance for studying the biology of species and determining the health status of animals in both the wild and captivity. In order to determine baseline ranges hematological and biochemical variables were measured from 10 healthy individuals (5:5) in captivity. The paper presents the normal hematological and serum chemistry values of captive snow leopards and comparison of the values with the other feline species.

Introduction

Taxonomically the Snow leopard (*Uncia uncia*) is considered a member of Felidae subfamily *Pantherinae* (Wilson and Reeder 2005). The Snow leopard have been prioritized as one of the Conservation Breeding species amongst the total 26 species that requires urgent conservation in India. In whole of South East Asia Padmaja Naidu Himalayan Zoological (PNHZ) Park is the only institution with the highest population of snow leopards in captivity. The park is working for the conservation of this endangered species with proper husbandry, breeding stock, well documented and recorded, breeding facilities/techniques and continuous record keeping. The veterinary aspects are also well taken into consideration and the study undertaken concerning study on hematological and biochemical values is the first of its kind for the captive snow leopards. Values obtained in the following study have been standardized for *Uncia uncia* as there are no available or published values in case of snow leopards.

Methods and Materials

10 ml of blood was collected from 10 (5:5) individuals using 5 ml BD vacutainer. The blood was collected during the morning hours from 9:00 a.m. to 10:30 a.m. through chemical restraint. Haemoglobin (Hb) concentration of the blood was determined by acid haematin method using Sahli's haemoglobinometer. Red Blood Cells (R.B.C), White Blood Cells (W.B.C) using Neubauer counting chamber (Haematocytometer), Differential Leucocyte Count (DLC) using Leishman's stain, Packed cell Volume (PCV) or hematocrit value was obtained using Wintrobe's tube. The biochemical test results were obtained using semi Auto Analyser (BTS 320) and BA- 88A Mindray (semi auto chemistry analyzer) from blood serum by centrifuging whole blood at 2000-3000 r.p.m. Erythrocyte Sedimentation Rate (E.S.R) was obtained by Westergren's Method. The samples were obtained from the healthy captive animals.

Table 1. Schedule of Blood collection (Biochemical values)

Sample No.	Sex	Age	Date of collection
A	M	4 years	03.07.2006
B	M	4.1 years	18.07.2006
A1	M	5.2 years	23.03.2007
C	M	6.6 years	20.05.2007
A2	M	10 years	05.12.2012
B1	M	10.5 years	02.12.2012
D	M	17.2 years	02.12.2012
E	M	17.4 years	01.12.2012
F	F	2.2 years	01.12.2012
G	F	5.1 years	21.10.2005
H	F	7.5 years	21.10.2005
I	F	12.5 years	20.04.2007

Table 2. Schedule of Blood collection (For Hematological values)

Sample No.	Sex	Age	Date of collection
A	M	4 years	03.07.2006
B	M	4.1 years	18.07.2006
A1	M	5.2 years	23.08.2007
C	M	6.6 years	20.05.2007
A2	M	10 years	05.12.2012
B1	M	10.5 years	02.12.2012
D	M	17.2 years	01.12.2012
E	M	17.4 years	01.12.2012
F	F	1.5 years	21.10.2012
G	F	5.1 years	20.04.2007
H	F	7.5 years	03.12.2012

Discussion

Hematological and biochemical analyses of blood and the establishment of baseline ranges can be of great importance for understanding general aspects of the species and determining the health status of animals in both the wild and captivity. There have been no published hematological profiles, in order to obtain precise ranges samples were obtained from individuals with age ranging from 1.5 to 17.4 years including age, size, sex and environmental and physiological conditions taken into consideration. Further comparative studies have also been carried out with the other feline species and the values obtained for different parameters when compared were almost the same except for few values.

Conclusion

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Table 3. Biochemical values

Parameters	A (M) 4 yrs	B (M) 4.1 yrs	A1 (M) 5.2 yrs	C (M) 6.6 yrs	A2 (M) 10 yrs	B1 (M) 10.5 yrs	D (M) 17.2 yrs	E (M) 17.4 yrs	F (F) 2.2 yrs	G (F) 5.1 yrs	H (F) 7.5 yrs	I (F) 12.5 yrs	Standard deviation (S.D.)
Glucose (Random)(mg/dl)	148	164	62	76	78	92	156	70	105	75	92	149	37.83326659
Urea (mg/dl)	54.1	43.5	74.8	54	18	55	19	37	38	48	18	54.1	17.66966884
Creatinine (mg/dl)	4	1	1	2	0.8	0.9	0.9	1	0.8	0.67	0.7	1.3	0.934368609
SGPT (U/L)	23	27	25	38	33.7	41	32.1	65	53.1	57	40.9	57	13.98657365
SGOT (U/L)	21	14	24	27	72	29	29	108	35	55	28	58	27.0297255
Total Protein (gm/dl)	9.1	10	8	10	7.8	8	3	7.9	7.6	8	8.1	7.9	1.768666678
Cholesterol (mg/dl)	154	133	162	95	138	102	104	174	102	119	80	140	29.4313531
Calcium (mg/dl)	10	10	8.9	10	10	9	4	68	10	8.8	7	10	17.15864258
Phosphorus (mg/dl)	4.5	3.5	5.75	4	4.16	5.4	8.18	7	4	6	5	3.6	1.442897705
Magnesium (mg/dl)	4	2	2	1.5	4.42	2.9	5.14	2.3	4.7	1	2.9	4	1.354600467
Albumin (mg/dl)	3	3	6	2	3.9	3.5	3	4	3.8	2	3.2	2.4	1.082785409
Sodium (mEq/L)	150	100	125	150	170	132	145	135	132.9	110	116	145	19.52273539
Potassium (mEq/L)	3.9	3.9	3.11	3.33	4.9	3.2	1.9	3.6	4.8	4.6	1.6	3.8	1.030748478
Alk-Phosphate (U/L)	89	95	110	108	105	97	7.8	108	101	87	98	110	27.9480633

Table 4. Hematological values

Parameters	A (M) 4 yrs	B (M) 4.1 yrs	A1 (M) 5.2 yrs	C (M) 6.6yrs	A2 (M) 10 yrs	B1 (M) 10.5 yrs	D (M) 17.2 yrs	E (M) 17.4 yrs	F (F) 1.5 yrs	G (F) 5.1 yrs	H (F) 7.5 yrs	Standard deviation (S.D.)
Hb (gm/dl)	13.3	12.9	13	12.1	10.5	12.2	12	11.5	12	12.3	12.1	0.7630084
RBC Million/cumm)	7.5	7.8	7.9	7.43	9.8	8.1	7.2	6.7	6.4	8.4	8.6	0.941106699
PCV (%)	42	41	40	40	41	40	40	40	42	41	41	0.786245393
WBC (Thousand/cumm)	10500	9500	10550	-	10750	-	13100	12350	13350	12150	16550	2120.550898
DLC (%)												
1. Neutrophil	74	74	82	64	68	78	70	82	72	76	76	5.546497666
2. Lymphocyte	24	24	18	27	26	22	30	16	26	24	24	3.951984542
3. Monocyte	1	1	0	0	0	0	0	0	0	0	0	0.404519917
4. Eosinophil	1	1	0	4	6	0	0	2	2	0	0	1.967924611

Table: 4 Comparison of biochemical & hematological values of snow leopard, leopard and tiger

Parameters	Snow Leopard (<i>Uncia uncia</i>)	Common Leopard (<i>Panthera pardus</i>)	Tiger (<i>Panthera tigris</i>)
Glucose(Random) (mg/dl)	140-62	72-120	96-236
Urea (mg/dl)	Upto 54	Upto 58	4.99-107.3
Creatinine (mg/dl)	0.9-2	0.9-2.4	1.6-4.6
SGPT (U/L)	Upto 93	Upto 98	33-92
SGOT (U/L)	Upto 55	Upto 52	37-105
Total Protein (gm/dl)	7.6-8.2	6.4-8.4	3.7-8.7
Cholesterol (mg/dl)	Upto 174	87-171	58-233
Calcium (mg/dl)	9-10	9.1-10.8	0.7-10.1
Phosphorus (mg/dl)	3.5-4.5	4.2-5.2	Upto 5.8
Magnesium (mg/dl)	1-2	1.2-2.28	-
Albumin (mg/dl)	3-4	3.3-4.1	2.1-4.6
Sodium (mEq/L)	145-150	149-157	149-157
Potassium (mEq/L)	1.6-4.6	0.5-4.4	0.15-4.42
Alk-Phosphate (U/L)	87-110	10-50	6-98
Triglyceride mg/dl	1.5-133	4.0-131	10.14-50.1
Hb (gm/dl)	10.5-13.3	10.4-14.5	8-15
RBC(million/cumm)	6.5-9.8	6.3-9	5-10
PCV (%)	40-45	24-45	24-45
WBC (Thousand/cumm)	8500-1600	8100-15700	100-15700
DLC (%)	64-82	48-82	57-75
1. Neutrophil			
2. Lymphocyte	7-33	11-48	18-35
3. Monocyte	Upto 1	0.1-0.8	2-6
4. Eosinophil	1-6	1.0-6.0	2-6
5. Basophil	Rare	0.0-2	0-4
ESR Westergren's Method mm in 1st hour	Upto 40	Upto 42.22	Upto 30

Hematological and biochemical studies are important tool for health evaluation and their interpretations to know the status of physiological functions of various organs. We suggest that these results can be used as a baseline data for determining biochemical and hematological values as well as in further studies including monitoring and determining the health status of the species.

Reference

Wilson, D.E. and D.M. Reeder (2005). Mammal species of the world: a taxonomic and geographic reference. 3rd ed. Vol. 1. Hopkins University Press. p. 2142.