

HEMATOLOGICAL VALUES OF CLINICAL HEALTHY NEW ZEALAND  
WHITE RABBITS (ORYCTOLAGUS CUNICULUS)  
RAISED IN BANGLADESH

By

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INTRODUCTION

The increasing attention paid by different investigators using laboratory animals especially rabbits has led to importance of knowing the physiological norms of these animals. As the haematological parameters of a species of animal vary considerably from country to country, it is not exactly correct using the foreign data in academy courses, in diagnostic laboratories and in nutritional and experiment research works. (Duke, 1955)

It has been observed by Hafez and Anwar (1956) that food, breed and climatic conditions have great influence on blood constituents and there are variations in such conditions.

The object of the present study is to establish the normal standards of haematological values of New Zealand White rabbits raised in the International Centre for Diarrhoeal Disease Research Animal House at Dhaka, Bangladesh where a good number of clinical and experimental researches are done on rabbits round the year.\*

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\* 1981–997 rabbits, 1982 – 1421 rabbits, 1983 – 988 rabbits.

MATERIALS AND METHODS

One hundred eight clinically healthy New Zealand White rabbits from the Animal House of the International Centre for Diarrhoeal Disease Research, Bangladesh were randomly selected for the study. The rabbits were initially obtained from U.K. and bred for generations in the colony through random inbreeding system. They were housed in stainless steel cages. The unit cage measurement was 21" x 16" x 14" where one adult was accommodated. Feed was supplied in the form of pellet prepared according to the ICDDR,B formula out of the locally available feed ingredients\* plus supplement of vitamin and mineral. Water was given ad libitum. The temperature of the room was between 70<sup>o</sup>-80<sup>o</sup>F and relative humidity 65-80 per cent. The lighting cycle was 12 hours of light and 12 hours of darkness. Food was not withheld prior to or during specimen collection. Blood collection was done between 0900 to 1100 hours. 3-5 ml of blood were withdrawn from the central artery of the ear as per method described by Fettleers (1972). Collected blood were immediately placed in the heparin vial (1 drop of 0.8 per cent sodium heparin solution). In order to observe the influence of age and sex the rabbits were divided into groups.

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\*Protein 15-16%, Fat 2.5-30%, Fibre 7.5-9.0%

Ash 7.25-8.00%, N.F.E. (by difference) 66.88%.

The erythrocyte counts were made on Thoma haemocytometer. Each sample was diluted to 1:200 with Hayem's solution in a red blood diluting pipette. The leucocyte counts were made using white blood diluting pipette after sample was diluted to 1:20 with N/10 hydrochloric acid (Coffin, 1955; Schalm, 1965). The haemoglobin concentration was determined with special Sahli haemoglobinometer by using N/10 Hydrochloric acid and matched with the standard. The sedimentation rate was calculated for 1 hour with Wintrobe's haematocrit tubes and the packed cell volume was calculated by centrifuging the same tubes at 3,200 r.p.m. for 15 minutes. (Wintrobe, 1956). The differential counts of leucocytes were based upon the count of 100 cell. The percentages of polymorph, bands, lymphocytes, monocytes, eosinophils and basophils were then calculated.

#### RESULTS AND DISCUSSIONS

The haematological values of 108 clinically healthy New Zealand White rabbits were investigated. The results obtained were presented in Table I and II. A compilation from the available literature of haemograms for the rabbits were furnished in Table III for comparative discussions. ESR was not checked by most of the investigators except Dittmer (1961). The value obtained by him corresponded with the value obtained in the present investigation. The results obtained in the present investigation

showed low counts of erythrocyte, PCV, total leucocytes, neutrophil and basophils as compared with the corresponding values obtained by other investigators (Table III). The values of eosinophil more or less corresponded with the reports of other investigators. The present investigation showed high counts of lymphocytes as compared with the reports of other investigators.

No significant differences could be detected on the influence of age amongst the parameters studied. Only ESR and total leucocytic counts were found to increase with the increase in age. ESR of the female subjects were found to be lower than that of males.

In the report of Feters (1972) on the haematology of the black-tailed Jack rabbit, (Lepus californicus californicus), a wild variety, showed higher values in all the blood components than the reports of the present findings.

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TABLE 1

INFLUENCE OF AGE ON THE MEAN BLOOD VALUES OF NEW ZEALAND  
WHITE RABBITS (ORYCTOLAGUS CUNICULUS)

Age in weeks	1-8	9-24	25+ above	Overall mean standard error
No. of rabbits	24	24	60	
ESR (mm/hr.)	0.17	0.38	1.2	0.58 <sub>±</sub> 0.54
Hb (gm%)	11.96	11.78	11.75	11.83 <sub>±</sub> 0.114
RBC (10 <sup>6</sup> /Cmm)	4.12	4.06	4.03	4.07 <sub>±</sub> 0.045
PCV (%)	35.58	35.17	34.8	35.18 <sub>±</sub> 0.39
MCV (Cu.micron)	86.29	86.25	86.39	86.31 <sub>±</sub> .072
MCH (micro <sup>2</sup> gm)	28.92	28.87	28.85	28.88 <sub>±</sub> 0.036
MCHC (%)	33.96	33.92	33.90	33.93 <sub>±</sub> .30
WBC (10 <sup>3</sup> /Cmm)	4.51	6.92	8.68	6.70 <sub>±</sub> 2.09
Polymorpho (%) nuclears	28.46	29.92	36.67	31.58 <sub>±</sub> 4.21
Bands (%)	0.79	0.75	0.49	0.68 <sub>±</sub> 0.163
Lymphocytes (%)	67.62	65.71	58.82	64.04 <sub>±</sub> 4.63
Monocytes (%)	1.59	2.21	1.83	1.88 <sub>±</sub> 0.312
Eosinophils (%)	1.12	1.04	2.42	1.53 <sub>±</sub> 0.774
Basophils (%)	0.08	0.45	0.08	0.20 <sub>±</sub> 0.213

TABLE II

INFLUENCE OF SEX ON THE MEAN BLOOD VALUES OF NEW ZEALAND  
WHITE RABBITS (ORYCTOLAGUS CUNICULUS)

Sex	Male	Female	Overall mean & S.E.
No. of Rabbits	54	54	
ESR (mm/hr.)	0.69	0.38	0.54 <sub>±</sub> 0.22
Hb (gm.%)	11.83	11.83	11.83 <sub>±</sub> 0
RBC (10 <sup>6</sup> /Cmm)	4.08	4.05	4.06 <sub>±</sub> .021
PCV (%)	35.28	35.08	35.18 <sub>±</sub> 0.141
MCV (Cu micron)	86.24	86.38	86.31 <sub>±</sub> 0.098
MCH (micro <sup>2</sup> gm.)	28.94	28.82	28.88 <sub>±</sub> 0.084
MCHC (%)	33.89	33.96	33.93 <sub>±</sub> 0.049
WBC (10 <sup>3</sup> /Cmm)	7.15	6.26	6.70 <sub>±</sub> 0.628
Polymorpho nuclears (%)	33.21	29.95	31.58 <sub>±</sub> 2.305
Bnads (%)	0.71	0.65	0.68 <sub>±</sub> 0.042
Lymphocytes (%)	63.16	64.93	64.05 <sub>±</sub> 1.251
Monocytes (%)	1.94	1.81	1.88 <sub>±</sub> .092
Eosinophils (%)	1.12	1.90	1.51 <sub>±</sub> 0.549
Basophils (%)	0.22	0.20	0.21 <sub>±</sub> 0.014

TABLE III

COMPILATION FROM THE LITERATURE OF HEMOGRAM FOR THE RABBIT

Source	RBC x 10 <sup>6</sup>	Hb. gm. %	PCV %	ESR	WBC x 10 <sup>3</sup>	Neutrophils	Lymphocytes	Monocytes	Eosinophils	Basophils
Bushnell	5.98±0.78	-	-	-	5.8-15.4 (10.7)	39.1±10.8	56.4±13.3	1.5±1.4	1.1±0.8	3.6±2.1
Dittmer	4.5-7.0 (5.7)	8.0-15.0 (11.9)	33-50 (41.5)	1.05	6.0-13.0 (9.0)	36-52 (46)	30-52 (39)	4-12 (8)	0.5-3.5 (2)	2-7 (5)
Gardner	4.6-6.9 (5.61)	- (12.1)	36-48 (41)	-	5.0-21.5 (8.6)	32-59 (45.0)	20-68 (38.4)	1.5+16.0 (9.0)	1.0-4.0 (1.6)	2.4-9.0 (6.3)
MacNames	6.35	12.2	42.2	-	8.4-9.2	42.2	41.4	9.2	1.8	5.4
Pintor	5.4±0.55	11.18±1.06	-	-	7.07±1.88	37.8±13.18	53.26±14.0	-	-	-



ABSTRACT

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Blood samples of 108 healthy New Zealand white rabbits (Oryctolagus cuniculus) of both sexes belonging to three age groups (1-8 WK, 9-24 WK and 25 WK & above) were analysed to estimate the haematologic parameters. The results showed low counts of total erythrocytes, PVC, total leucocytes, neutrophils and basophils as compared with the corresponding values obtained by other investigators.

No significant differences could be detected on the influence of age amongst the parameters studied except ESR which was found to increase with the increase of age. Interestingly, female rabbits had lower ESR counts than that of the males.

