Reference Value of Some Hematological Parameters in Female Newzealand Rabbits

Olaitan O.H[1], *Ekpruke C.D[2]

[1] Department of Dentistry, Irrua Specialist Teaching Hospital, Irrua, Edo State, Nigeria.
[2] Department of Physiology, University of Benin, Benin-City, Edo State, Nigeria

QR CODE

Website:http://ijfmi.com/

Doi: https://doi.org/10.21816/ijfmi.v4i2

[2]corresponding author email: damilola.ekpruke@uniben.edu

ABSTRACT

Introduction:
This research work was aimed at determining reference value for some haematological parameters such as Total Red Blood Cell Count (RBC), Pack Cell Volume (PCV), Haemoglobin concentration (Hb) and Total White Blood Cell count (WBC).

Materials and Methods:
Twenty-seven (27) female New Zealand white rabbits were used for this study. They were housed in standard laboratory condition, had free access to pelleted rabbits chow and water for the period of 2 weeks before the commencement of the study. At the end of the two weeks, bloodsamples were collected from each animal through vein puncture into EDTA bottles for Haematological analyses using automated haematology analyzer. Statistical analyses were done using Microsoft excel, 2010. Result was expressed in Mean ± Standard Error of Mean, the minimum and maximum values were also recorded.

Results:
The average value of PCV(%) was 37.19± 0.92; RBC ($x10^6/mm^3$) 2.81 ± 0.16; Hb (g/dl) 13.84± 0.26 and WBC($x10^3/mm^3$)5.70±0.38.

Conclusion: The result obtained from this study can serve as some haematological reference values for NewZealand rabbits during scientific or clinical researchers.

Key words:
Haematological indices, New Zealand Rabbits, Reference value

INTRODUCTION

The most popular breed of rabbits used by researchers over the years are the New Zealand Rabbits due to the fact that they have been known to be very fertile, easily housed, fed and also their availability in different parts of the world.[1,2] Haematological parameters have been used over the years to evaluate various disease conditions like malaria and chronic kidney diseses and also provide useful information to researchers and clinicians.[3-5]Although, haematological parameters may be influenced by different factors such as disorders, type of breed, sex, age, feeding, environmental conditions, stress, cardiac rhythm and pregnancy.[4, 6] Rabbits are widely being used by many but the lack of reference values for haematological parameters is a big constraint.[7]

Hence, this study was carried out to define the reference values of some haematological parameters using New Zealand Rabbits.

MATERIALS AND METHODS

Animals

Twenty-seven (27) female New Zealand Rabbits were used for this study with average weight of 900g. They were housed under standard laboratory condition. The animals were kept for 2 weeks before the commencement of the research for them to get acclimatized and during this period they had free access to pelleted rabbit chows and clean drinking water.

Collection of blood sample for haematological analyses

Blood samples (5m/ls) were obtained from each animal by marginal ear vein puncture and drawn into EDTA bottles using needle and syringe for haematological analyses.

Haematological Analysis

Packed Cell Volume (PCV), Red Blood Cell count (RBC), Haemoglobin concentration (Hb) and White Blood Cell count were analysed using automated hematology analyser.

Statistical Analysis

Statistical analyses were performed using Microsoft excel 2010. Data was expressed in Mean ± Standard Error of Mean (SEM). The minimum and maximum values were also recorded for each parameter.

RESULTS

Result shows the mean value of RBC, PCV, Hb and WBC values in normal female New Zealand rabbits as expressed in Table 1.

Table 1: Haematological analysis

HAEMATOLOGICAL PARAMETERS	MEAN± SEM	RANGE
PCV (%)	37.19±0.92	28.00-47.00
RBC($x10^6/mm^3$)	2.81±0.16	0.9-4.20
Hb (g/dL)	13.84±0.26	11.80-16.41
WBC($x10^3/mm^3$)	5.70± 0.38	2.50-9.30

DISCUSSION

In oftentimes, to determine the presence or absence of anaemia, RBC, PVC and Hb are very useful while in case of any infection, the WBC count gives useful information. The values of RBC, PCV and Hb obtained in this research were higher than that from previous studies[8] and lower than the value reported by.[9] RBC counts in rabbit is said to increase until the age of six months, at this age the rabbit is said to have attained adulthood.[10, 11] RBC, PCV and Hb values may be physiological in respect to the age of tested rabbits[9] and they have also been reported to be influenced greatly by stress, gender, season and breed[11, 12]. Although the research carried out by Schalm et al[13] showed that haematological parameters of various farm animals including rabbits showed no significant breed effect. Increased RBC or decreased plasma volume has been strongly linked to increased PCV.[14]

WBC counts have been reported to show rhythmic variation[15] which may be due to influence of age,[16] feeding pattern,[17] breed, gender and season.[18] WBC count also decrease in this study, it was 2.50-9.30 $x10^3/mm^3$ while in previous study it was 8.45-13.34 $x10^3/mm^3$.[8] The changes in WBC may not be due to infection but may be due to the method used in collecting blood sample and also stressful environmental conditions.[3, 11, 12] Studies have shown that haematological indices are a very important tool to knowing the state of health of an individual however, different factors influence the value. Rabbits have shown to have unpredictable fluctuations in values of haematological parameters caused by different physiological conditions such as breed, age, stress and sex.[15, 19] This must be taken into consideration when interpreting result.

However, there is need for more reference values of haematological parameters of rabbits in this part of the world.

REFERENCES

1. Jurcik R, Suvegova K, Hanusova E, Massanyi P, Ryban L, Chrenek P. Evaluation of Haematological, Biochemical and Histopathological Parameters of Transgenic Rabbits. J *Vet Med*. 2007; 54:527-531.

2. Jeklova E, Leva L, Knotigova P, Faldyna M. Age-related changes in selected haematology parameters in rabbits. **Res Vet Sci**. 2009.86: 525-528

3. Silva T.O, KreutzL C, Barcellos L.J.G, Borella J, Soso A. B, Souza C. Reference values for chinchilla (Chinchilla laniger)blood cells and serum biochemical parameters, **Ciência Rural**. 2005.35: 602-606.

4. Chineke C.A, Ologun A.G, Ikeobi C.O.N. Haematological Parameters in Rabbit Breeds and Crosses in Humid Tropics, **Pak J Biol Sci**. 2006.9: 2102-2106.

5. Archetti C, Tittarelli M, Cerioli R, Brivio G.L, Grilli A. Serum chemistry and haematology values in commercial rabbits.preliminary data from industrial farms in northern Italy, In proceed of 9th World Rabbit Congress. 2008. 10–13

6. Abdel-Azeem A.S, Abdel-Azim A.M, Darwish A.A, Omar E.M. Haematological and biochemical observations in four pure breeds of rabbits and their crosses under Egyptian environmental conditions.**World Rabbit Sci**. 2010. 18: 103-110.
7. Zhao S, Wei K, Yu Q, Li Y, Cheng F, Wang Y, Yang P, Fan J, Liu E. General topic: applications of transgenic rabbits in biomedical research -based on literature search.**World Rabbit Sci.** 2010.18:159-167.

8. Saad M.S, Mohamed A, Mahmoud, K.H. Some HaematoBiochemical Values in White New Zealand Rabbits. **IOSR-JAVS**. 2017. 7: 40-44

9. Poljičak-Milas N.I, Kardum-Skelin M, Vuđan T.S, Marenjak A, Ballarin-Perharić Z.M. Analizakompletnekrvneslike i morfometrijaeritrocitanovozelandskogabijelogakunića. **Vet. Arhiv**. 2009. 79: 561-571.
10. Moore D.M. In: Feldman B.F, Zinkl J.G and Jain N.C. (Eds.). Schalm's Veterinary Hematology, 5th ed., Blackwell Publishing Professional, Ames, Iowa, USA, 2009. 170:1100-1106.
11. Jenkins J.R. Rabbit Diagnostic Testing **J ExotPet Med**. 2008. 17: 4-15
12. Melillo A. Rabbit Clinical Pathology.**J ExotPet Med**. 2007. 16: 135-145.

13. Schalm O.W, Jain N.C, Caroll E.J. Veternity Haematology. 3rd Edn., Lea and Fabiger, Philadelphia, 1975.pp: 15-218.

14. Kopp R, Hetesa J. Changes of Haematological Indices of Juvenile carp (CyprinusCarpio L.) under the influence of natural populations of cyanobacterial water blooms. **Acta Vet Brno.**2000. 69:131 – 137.

15 Fox R.R, Laird C.W. Diurnal variations in rabbits: Hematological parameters. **Am JPhys**. 1970. 218: 1609-1612.
16. Harcourt-Brown. Radiographic signs of renal disease in rabbits. The Veterinary Record. 2007. 160:787-794.
17. Schermer S. The Blood Morphology of Laboratory Animals, 3rd ed., F. A. DavisCompany. Philadelphia. 1967. pp. 5-24.
18. McLaughin R.M, Fish R.E. Clinical biochemistry and haematology. In: The Biologyof the Laboratory Rabbit. (Ringler, D. H., P. J. Manning, C. E. Newcomere, Eds.). 2nd ed.Academic Press. 1994. pp. 111-124.
19. Bortolotti A, Castelli D, Bonati M. Hematology and Serum Chemistry Values of Adults, Pregnant and Newborn New Zealand Rabbits (Oryctolaguscuniculus).**Lab Anim Sci**. 1989. 39 (5), 437-439.