African Journal of Biomedical Research, Vol. 10 (2007); 73 - 76
ISSN 1119 – 5096 © Ibadan Biomedical Communications Group

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Short communication

Effect of Age on the Blood Profiles of the New Zealand Rabbit in Nigeria

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Received:
February, 2006

Accepted:
May, 2006

Published
January, 2007

ABSTRACT
The hematological and biochemical parameters of the young (4-8 week old) and adult (52-80 week-old) New Zealand rabbit were determined. The young rabbit had significantly higher plasma concentrations of creatinine ($P<0.01$), alkaline phosphatase ($P<0.05$), alanine aminootransaminase ($P<0.02$) and total protein ($P<0.02$) and mean corpuscular haemoglobin ($P<0.001$). However, the red blood cell counts, white blood cell counts, haemoglobin concentration, packed cell volume, mean corpuscular haemoglobin concentration and the plasma levels of sodium, potassium, chloride, bicarbonate, urea, albumin, albumin/globulin ratio and aspartate aminotranferase were similar in the young and adult rabbit. ***(Afr. J. Biomed. Res. 10:99 - 102, January 2007)***

Keywords: *Age, blood cells, rabbit*

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INTRODUCTION

Abstracted by:
African Index Medicus (WHO), CAB Abstracts, Index Copernicus, Global Health Abstracts, Asian Science Index, Index Veterinarius, Bioline International , African Journals online

The influence of age on the blood parameters of animals have been determined in several species of mammals for example in the White Fulani cattle (Oduye and Okunaiya, 1971); Nigerian goat and sheep (Oduye, 1976); Nigerian local dog (Awah and Nottidge, 1998) and the African giant rat (Nssien *et al*, 2002).

The New Zealand rabbit are very popular in this country as they are extensively used in the laboratories for research and also consumed with relish by a large segment of the population.

Jain (1986) compared some erythrocyte values in the adult and young New Zealand rabbit. There is a dearth of information in the literature concerning the plasma biochemical values of the New Zealand rabbit. Therefore the aim of this study is to have a baseline plasma biochemical values in our environment.

MATERIALS AND METHODS

Eighteen New Zealand rabbits were used for this study. The first group consisted of ten adult rabbits of both sexes with ages ranging between 52 and 80 weeks. The second group consisted of eight unsexed young rabbits between 4 to 8 weeks old. They were reared on a farm in Ibadan, Ibadan, Nigeria. They were given rabbit pellets and drinking water *ad libitum.*

Each rabbit was anaesthetized with either. Blood was then collected from the orbital sinus into bottles containing ethylene diamine tetraacetic acid (EDTA) 2mg/ml of blood as anticoagulant. Red blood cell (RBC) and white blood cell (WBC) counts were determined using a haemocytometer. The packed cell volume (PVC) was estimated by the microhaematocrit method. Haemoglobin (Hb) concentration was measured by the cyanmaethmoglobin method. From the data generated on the Hb, RBC and PVC, the mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH) and mean corpuscular haemoglobin concentration (MCHC) were calculated (Jain, 1986).

The blood samples from the adult and young rabbits were centrifuged at 3000G for 10 mins to obtain plasma. The sodium (Na) and potassium (k) concentrations in the plasma were determined by standard flame photometry. Calcium (Ca) and bicarbonate (HCO3) were determined by the method of Toro and Ackeermann (1975). Chloride (Cl) was estimated by the method of schales (1941). Total protein was determined by the Biuret method of Reinhold (1953) and albumin by the method described by Doumas *et al.* (1971). Globulin was calculated by subtracting albumin from total protein. Urea and creatinine were determined according to methods of Harrison (1947). Activities of aspartate aminootran aminase (AST) and alanine aminotransaminase (ALT) were determined colorimetrically by the method described by Mohunn and Cook (1957). Alkaline phosphatase (ALP) was determined according to the method of King and Armstrong (1934). The results were statistically evaluated using the Student's t-test with $p<0.05$ taken as significant.

RESULTS

Table 1 shows the effect of age on the RBC, WBC, PVC, Hb, MCV, MCH and MCHC values in the New Zealand rabbits. The mean values of RBC, WBC, PVC, Hb and MCHC were similar in the young and adult. However, the values of MCV and MCH were higher ($P<0.001$) in the adult than in the young rabbit.

Table 1
Erythrocye values and total white blood cell count (mean±sd) in the young and adult New Zealand rabbit

PARAMETERS	YOUNG n = 8	ADULT n = 10
RBC (X 10^6/µl)	8.38 ± 2.30	6.23 ± 2.02
PCV (%)	30.13 ± 6.10	34.60 ± 5.72
Hb (g/dl)	9.73 ± 1.96	11.98 ± 1.33
MCH (pg)	11.99 ± 2.31	19.25 ± 4.64*
MCHC (g/dl)	32.30 ± 0.70	32.82 ± 2.55
MCV (fl)	37.11 ± 7.21	58.94 ± 14.14*
WBC (X 10^6/µl)	5.20 ± 2.07	3.95 ± 0.98

*Value significantly different from young at *P<0.001*

Table 2
Plasma biochemical values (mean±sd) in the young and adult New Zealand rabbit

PARAMETERS	YOUNG (n)	ADULT (n)
Sodium (mmol/l)	172.14 ± 21.99(7)	163.90 ± 4.89(10)
Potassium (mmol/l)	40.74 ± 17.77(7)	25.22 ± 3.52(10)
Chloride (mmol/l)	131.33 ± 11.55(3)	137.50 ± 10.45(9)
Bicarbonate (mmol/l)	16.67 ± 2.89(3)	18.89 ± 2.89(9)
AST (i.u/l)	54.29 ± 15.05(7)	38.67 ± 16.42(9)
ALT(i.u/l)	73.14 ± 14.59(7)	107.00 ± 34.20 (9)*
Total protein (g/dl)	5.01 ± 0.65(7)	5.83 ± 0.55(10)*
Albumin(g/dl)	3.73 ± 0.32(7)	4.10 ± 0.42 (10)
Globulin (g/dl)	1.29 ± 0.38(7)	1073 ± 0.18(10)*
Albumin/globulin ratio	3.16 ± 1.09(7)	2.38 ± 0.21(10)
Urea(mg/dl)	23.29 ± 10.03(7)	32.50 ± 7.14(10)
Creatinine (mg/dl)	1.24 ± 0.15(7)	1.58 ± 0.21(10)**
ALP (i.u/l)	25.33 ± 21.50(3)	2.57 ± 2.15(7)***

*Value significantly different from young at *P<0.02, **P<0.01, ***P<0.05*

Table 2 presents the plasma biochemistry values in the young and adult New Zealand rabbits. Na, K, Cl, HCO_3, urea, albumin, AST and albumin/globulin ratio were similar in the young and adult. The young rabbit however had higher concentrations of creatinine (P<0.01), ALP (P<0.05), ALT (P<0.02), Total protein (P<0.02) but lower levels of globulin (P<0.02) than the adult rabbit.

DISCUSSION

The RBC counts of $6.83x10^6$/µl obtained for the adult New Zealand rabbit of the present study was similar to the RBC value of $6.05x10^6$/µl obtained by Jain (1986) in the same species of rabbit and the value of $6.88x10^6$/µl reported for the laboratory rat (Oyewale, 1987). However Dina *et al.* (2002) reported a lower RBC value of $5.05x10^6$/µl in the same species of rabbit.

In the present study, the values of RBC, PCV, Hb, MCV, MCH and MCHC and WBC were similar in the young and adult New Zealand rabbit. This observation is also similar to that made in the Jack rabbit (Jain, 1986), Aryshire cattle (Tashjan, 1968) and Nigerian local cat (Nottidge *et al.*, 1999) in which similar values were reported in the young and adult. Oduye and Okunaiya (1971) also did not observe any age difference in the values of PCV, Hb and WBC of the White Fulani cattle. However, dogs that were less than 3 months were found to have lower PCV than adult dogs (Oduye, 1978). Olusanya (1979) reported that MCV increased with age while WBC counts decreased with age in the White Fulani cattle.

There was no age difference in the mean values of plasma electrolytes (Na, K, Cl and HCO_3) in the New Zealand rabbit. Nottidge *et al.* (1999) similarly did not observe any age differences in the values of Na, K, Cl, Ca, PO_4 and HCO_3 of the Nigerian local cat. Nssien *et al.* (2002) reported that the values of Na, Cl and HCO_3 were similar in the young and adult African giant rat, however the plasma levels of K and Ca were higher while PO_4 was lower in the adult than in the young rat (Nssien *et al.*, 2002).

In the present study the young New Zealand rabbit had higher plasma creatinine, ALP, ALT, total protein but lower plasma globulin than the adult, however the levels of AST, albumin,/globulin ratio and urea were similar in the young and adult New Zealand rabbit. Nottidge *et al.* (1999) reported that the serum levels of total protein, albumin, globulin, ALP, AST, ALT, urea, albumin/globulin ratio and cratinine were similar in the young and adult Nigeria

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