

The Influence of age and sex on some blood parameters in healthy donkey in south Valley Egypt

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A total number of 140 Egyptian breed donkeys were used in this study. Animals are classified into two groups according to the sex. Each group was further subdivided into four subgroups according to their ages. All animals were proved to be health by clinical and laboratory examinations. Two blood samples were collected from each donkey, one with anticoagulant and the other without anticoagulant for obtaining clear non-haemolysed serum. Various tests were conducted to measure the values of some blood contents. It was clear that total RBCs count, hemoglobin content and packed cells volume showed marked decrease with the increase of age. Significant difference in RBCs count between some groups and highly significant difference in Hb and PCV contents between another groups. Gradual elevation in the values of total leucocytes count from one month up to 10 years old was observed. Marked decrease in total WBCs count was reported in animals of both sexes on 10-20 years old. This denotes that Significant and highly significant differences appear in total WBCs count between animal groups. The biochemical parameters revealed highly significant difference in the total protein and albumin in some groups of male animals. Non significant fluctuation was observed in blood serum calcium, phosphorus and magnesium regarding the age and sex factors. In conclusion, it was clear that both age and sex factors has a marked influence on some blood contents in Egyptian donkeys.

The information regarding the contribution of draught animal power to the economics of developing countries is scare. Donkeys are better survived as draught due to their small size, ability to consume poor quality foods, lower feed and water requirements (Dijkman, 1995). It has been stated that the milk of lactating female donkeys is better than cows milk for human consumption (Salimei *et al.*, 2004). Donkeys are one of the most under appreciated important draught animals in the worlds, serving a key role in the agricultural economy of the developing countries. In Egypt, donkeys are considered important animals for the farmers. They are used for carrying people and transporting goods. Zinkel *et al.*, (1990); Paglia (2001) stated that sex and age factors in donkeys has significant on most of the blood picture in donkeys. French and Patrick (1995) observed that there were no significant differences for age or sex factors for any analyte in donkeys. Sato *et al.*, (1979) Mentioned that most of blood biochemicals has a correlation to age and some of them to sex in donkeys.

The aim of the present work was to find out the possible correlation between some hematological and blood serum biochemical parameters and age and sex in native breed donkeys.

Materials and methods

Animals. Animals used in the present work were 140 donkeys of both sexes. Their ages ranged between one month and 20 years old. The animals were healthy and free from internal and external parasites as proved by clinical and Laboratory examinations. According to the sex and age, animals were divided into two groups. **Samples.** Two blood samples were obtained from each animals one with EDTA as whole blood and the other for obtaining clear serum. Total Erythrocytes cells count, Hemoglobin content, packed cell and total white cells count were determined according to (Coles, 1986).

The blood serum samples were used for the estimation of total protein, albumin (Doumas, 1971), globulins by mathematical method and Also blood serum calcium, inorganic phosphorus and magnesium were determined according to the methods described by Gindler and King (1972); Morinal and Prox (1973); Gindler and Heth (1971) respectively – All the tests were done by using test kits and the values were obtained by spectrophotometer . The obtained data were subjected to statistical analysis (SPSSWIN, 1995).

Results and Discussion

The obtained results were summerized in tables 1, 2,3,4,5 and 6.

Table1: Effect of age on blood picture between male groups.

parameters	Male Group 1		Male Group 2		Male Group 3		Male Group 4		Significant					
	NO.=20		NO.=20		NO.= 20		NO.= 10		1 w 2	1 w 3	1 w 4	2 w 3	2 w 4	3 w 4
	Mean	SD.	Mean	SD.	Mean	S.D.	Mean	S.D.						
RBC, (T/L)	8.34	0.42	8.31	0.42	8.24	0.76	8.21	0.21	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Hb, (g/dl)	12.40	0.74	12.25	0.96	12.10	1.00	12.00	0.71	N.S.	N.S.	*	N.S.	*	*
PCV, (%)	36.85	2.07	36.40	0.94	36.00	1.81	35.80	0.98	N.S.	N.S.	*	N.S.	*	N.S.
MCV, (fl)	44.18	3.04	43.81	7.96	43.72	4.33	43.61	1.62	N.S.	N.S.	N.S.	N.S.	*	*
MCH, (pg)	14.87	1.13	14.74	2.79	14.69	1.85	14.62	1.04	N.S.	N.S.	*	N.S.	*	*
MCHC, (g/dl)	33.65	1.48	33.65	3.36	33.61	3.28	33.52	1.47	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
ESR, (mm)														
R110 (min.)	3.50	1.29	3.8	1.1	4.45	0.947	5.2	0.4	N.S.	*	**	N.S.	**	*
R2 20 (min.)	20.35	4.417	20.9	1.78	23.08	3.94	27.6	3.87	N.S.	N.S.	*	**	**	N.S.
R3 30 (min.)	36.42	4.79	38.5	4.11	42.7	4.44	45.0	4.47	N.S.	**	*	**	*	N.S.
R4 40 (min.)	52.29	7.12	55.1	4.62	58.91	6.27	61.0	7.34	N.S.	*	N.S.	*	N.S.	N.S.
Total WBC,(G/L)	13.2	1.39	13.8	1.16	13.9	0.789	12.6	0.76	N.S.	N.S.	N.S.	N.S.	*	*
Seg. Neutrophil, (%)	61.57	4.01	61.8	2.45	62.23	1.97	63.6	2.059	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Band cell, (%)	1.14	0.914	1.33	6.99	0.972	0.944	1.2	0.748	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Eosinophil,(%)	3.07	0.96	3.2	0.748	3.29	0.865	3.8	0.748	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Basophil, (%)	0.785	0.557	1.33	0.788	1.37	0.748	1.4	0.489	*	**	N.S.	N.S.	N.S.	N.S.
Lymphocyte, (%)	32.28	3.53	30.9	2.14	30.51	2.02	27.8	1.6	N.S.	N.S.	**	N.S.	*	*
Monocyte, (%)	1.14	0.742	1.33	0.699	1.54	0.64	2.2	0.4	N.S.	N.S.	**	N.S.	**	*

Table2: Effect of age on blood picture between female groups.

parameters	female Group 1		Female Group 2		Female Group 3		Female Group 4		Significant					
	NO.=20		NO.=20		NO.= 20		NO.= 10		1 w 2	1 w 3	1 w 4	2 w 3	2 w 4	3 w 4
	Mean	SD.	Mean	SD.	Mean	S.D.	Mean	S.D.						
RBC, (T/L)	7.80	0.62	7.79	0.39	7.65	0.30	7.50	0.28	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Hb, (g/dl)	11.00	0.41	10.80	0.43	10.50	0.40	10.00	0.33	N.S.	N.S.	N.S.	N.S.	N.S.	*
PCV, (%)	34.20	1.41	34.00	1.36	33.14	0.99	32.00	0.43	N.S.	N.S.	N.S.	N.S.	N.S.	*
MCV, (fl)	43.85	5.46	43.63	4.03	43.34	1.65	42.67	1.925	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
MCH, (pg)	14.10	2.38	13.86	0.762	13.73	0.542	13.33	0.93	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
MCHC, (g/dl)	32.16	2.34	31.76	2.02	31.68	1.18	31.25	0.92	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
ESR, (mm)														
R1(10 min.)	4	0.816	4.4	0.8	4.71	0.958	5.75	0.433	N.S.	N.S.	N.S.	N.S.	*	*
R2 (20 min.)	21.66	2.35	22	2.44	23.92	3.36	28.3	2.046	N.S.	N.S.	*	N.S.	**	*
R3 (30 min.)	40.66	0.942	42	6	45.71	5.28	46.3	6.495	N.S.	**	N.S.	N.S.	N.S.	N.S.
R4 (40 min.)	53.33	4.714	60	6.32	62.5	5.26	63.8	2.165	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Total WBC,(G/L)	12.55	0.348	12.7	0.28	13.14	1.05	12	0.152	N.S.	N.S.	N.S.	N.S.	**	**
Seg. Neutrophil, (%)	59.33	4.71	60.2	2.71	61.07	2.404	62.3	0.433	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Band cell, (%)	1.33	0.471	1.4	0.489	1.5	1.118	1.75	0.433	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Eosinophil,(%)	3	0.816	3.8	0.748	4.07	0.457	4.25	0.829	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Basophil, (%)	0.667	0.471	0.8	0.4	1.285	0.88	1.25	0.829	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Lymphocyte, (%)	35	3.74	33.2	2.31	31.07	1.533	28.8	1.639	N.S.	N.S.	N.S.	N.S.	*	N.S.
Monocyte, (%)	0.666	0.471	0.6	0.489	1.07	0.799	1.75	0.433	N.S.	N.S.	N.S.	N.S.	**	N.S.

Table 3: Effect of sex on heamtological paramter in donkey.

parameter	Male					Male					Male Group									
	Group1		Female Group1			Group2		Female Group2			Male Group3		Female Group3			4		Female Group 4		
	NO.=20		NO.=20			NO.=20		NO.= 20			NO.=20		NO.= 20			NO.=10		NO.=10		
	Mean	SD.	Mean	SD.	p	Mean	S.D.	Mean	S.D.	p	Mean	S.D.	Mean	S.D.	p	Mean	S.D.	Mean	S.D.	P
RBC, (T/L)	8.34	0.42	7.80	0.62	N.S.	8.31	0.42	7.79	0.39	N.S.	8.24	0.76	7.65	0.30	**	8.21	0.21	7.50	0.28	**
Hb, (g/dl)	12.40	0.74	11.00	0.41	N.S.	12.25	0.96	10.80	0.43	**	12.10	1.00	10.50	0.40	**	12.00	0.71	10.00	0.33	**
PCV,(%)	36.85	2.07	34.20	1.41	N.S.	36.40	0.94	34.00	1.36	**	36.00	1.81	33.14	0.99	**	35.80	0.98	32.00	0.43	**
MCV, (fl)	44.18	3.04	43.85	5.46	N.S.	43.81	7.96	43.63	4.03	N.S.	43.72	4.33	43.34	1.65	N.S.	43.61	1.62	42.67	1.93	N.S.
MCH, (pg)	14.87	1.13	14.10	2.38	*	14.74	2.79	13.86	0.76	*	14.69	1.85	13.73	0.54	**	14.62	1.04	13.33	0.93	N.S.
MCHC, (g/dl)	33.65	1.48	32.16	2.34	N.S.	33.65	3.36	31.76	2.02	N.S.	33.61	3.28	31.68	1.18	**	33.52	1.47	31.25	0.92	N.S.
ESR, (mm)																				
R1 (10 min.)	3.50	1.29	4.00	0.82	N.S.	3.80	1.10	4.40	0.80	N.S.	4.45	0.95	4.71	0.96	N.S.	5.20	0.40	5.75	0.43	N.S.
R2 (20 min.)	20.35	4.42	21.66	2.35	N.S.	20.86	1.78	22.00	2.44	N.S.	23.08	3.94	23.92	3.36	N.S.	27.60	3.87	28.25	2.05	N.S.
R3 (30 min.)	36.42	4.79	40.66	0.94	*	38.53	4.11	42.00	6.00	N.S.	42.70	4.44	45.71	5.28	N.S.	45.00	4.47	46.25	6.50	N.S.
R4 (40 min.)	52.29	7.12	53.33	4.71	N.S.	55.06	4.62	60.00	6.32	N.S.	58.91	6.27	62.50	5.26	N.S.	61.00	7.34	63.75	2.17	N.S.
WBC, (G/L)	13.2	1.39	12.55	0.348	N.S.	13.76	1.16	12.72	0.28	**	13.9	0.7886	13.14	1.05	*	12.62	0.76	12.02	0.152	N.S.
Seg. neutrophil, (%)	61.57	4.01	59.33	4.71	N.S.	61.8	2.45	60.2	2.71	N.S.	62.2	1.97	61.07	2.404	N.S.	63.6	2.059	62.25	0.433	N.S.
Band cell (%)	1.14	0.914	1.33	0.471	N.S.	1.33	6.99	1.4	0.489	N.S.	0.97	0.944	1.5	1.118	N.S.	1.2	0.748	1.75	0.433	N.S.
Eosinophil, (%)	3.07	0.96	3	0.816	N.S.	3.2	0.748	3.8	0.748	N.S.	3.29	0.865	4.07	0.457	**	3.8	0.748	4.25	0.829	N.S.
Basophil, (%)	0.785	0.557	0.667	0.471	N.S.	1.33	0.788	0.8	0.4	N.S.	1.37	0.748	1.285	0.88	N.S.	1.4	0.489	1.25	0.829	N.S.
Lymphocyte, (%)	32.28	3.53	35	3.74	N.S.	30.93	2.14	33.2	2.31	N.S.	30.5	2.02	31.07	1.533	N.S.	27.8	1.6	28.75	1.639	N.S.
Monocyte, (%)	1.14	0.742	0.666	0.471	N.S.	1.33	0.699	0.6	0.489	*	1.54	0.64	1.07	0.7985	N.S.	2.2	0.4	1.75	0.433	N.S.

Table 4: Effect of age on some biochemical parameters between male groups.

parameters	Male Group 1		Male Group 2		Male Group 3		Male Group 4		Significant					
	NO.=20		NO.=20		NO.= 20		NO.= 10		1 w 2	1 w 3	1 w 4	2 w 3	2 w 4	3 w 4
	Mean	SD.	Mean	S.D.	Mean	S.D.	Mean	S.D.						
Total Protein (g/dl)	7.73	1.252	7.86	0.509	7.86	0.604	8.01	0.567	N.S.	N.S.	N.S.	N.S.	*	N.S.
Albumin (g/dl)	3.14	0.241	3.33	0.483	3.39	0.393	3.58	0.483	N.S.	*	N.S.	N.S.	**	*
Globulin (g/dl)	4.59	1.174	4.53	0.673	4.48	0.634	4.43	0.676	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
A/G ratio	0.75	0.301	0.76	0.204	0.78	0.164	0.84	0.225	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Calcium (mg/dl)	9.34	1.279	9.45	0.064	9.51	0.72	9.63	1.41	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Phosphorus (mg/dl)	5.35	1.253	5.05	1.507	5.01	0.519	4.85	0.519	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Magnesium (mg/dl)	2.3	0.308	2.49	0.314	2.61	0.404	2.81	0.557	N.S.	**	N.S.	N.S.	N.S.	N.S.

Table 5: Effect of age on some biochemical parameters between female groups.

parameters	Female Group 1		Female Group 1		Female Group 2		Female Group 3		Significant					
	NO.=20		NO.=20		NO.= 20		NO.= 10		1 w 2	1 w 3	1 w 4	2 w 3	2 w 4	3 w 4
	Mean	SD.	Mean	SD.	Mean	S.D.	Mean	S.D.						
Total Protein (g/dl)	7.09	0.851	7.13	0.134	7.29	0.708	7.69	0.296	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Albumin (g/dl)	3.43	0.56	3.54	0.3	3.63	0.667	4.17	0.126	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Globulin (g/dl)	4.15	0.362	3.59	0.402	3.66	0.947	3.52	0.341	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
A/G ratio	0.84	0.187	1.01	0.211	1.09	0.398	1.2	0.14	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Calcium (mg/dl)	8.46	1.046	8.74	2.077	9.02	1.61	9.26	2.027	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Phosphorus (mg/dl)	5.25	0.204	5.03	1.007	4.99	1.124	4.96	0.752	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Magnesium (mg/dl)	2.45	0.238	2.56	0.127	2.59	0.214	2.64	0.099	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.

Table 6: Effect of sex on biochemical parameters in donkey.

parameter	Male Group 1		Female Group 1			Male Group 2		Female Group 2			Male Group 3		Female Group 3			Male Group 4		Female Group 4		
	NO.=20		NO.=20			NO.=20		NO.= 20			NO.=20		NO.= 20			NO.=10		NO.=10		
	Mean	S.D.	Mean	S.D.	P	Mean	S.D.	Mean	S.D.	P	Mean	S.D.	Mean	S.D.	P	Mean	S.D.	Mean	S.D.	P
Total Protein (g/dl)	7.73	1.25	7.09	0.85	N.S.	7.86	0.51	7.13	0.13	**	7.86	0.60	7.29	0.708	*	8.01	0.57	7.69	0.30	N.S.
Albumin (g/dl)	3.14	0.24	3.43	0.56	N.S.	3.33	0.48	3.54	0.30	N.S.	3.39	0.39	3.63	0.667	**	3.58	0.48	4.17	0.13	N.S.
Globulin (g/dl)	4.59	1.17	4.15	0.36	N.S.	4.53	0.67	3.59	0.40	**	4.48	0.63	3.66	0.947	**	4.43	0.68	3.52	0.34	*
A/G ratio	0.75	0.30	0.84	0.19	N.S.	0.76	0.20	1.01	0.21	N.S.	0.78	0.16	1.09	0.398	**	0.84	0.23	1.2	0.14	N.S.
Calcium (mg/dl)	9.34	1.28	8.46	1.05	N.S.	9.45	0.06	8.74	2.08	N.S.	9.51	0.72	9.02	1.61	N.S.	9.63	1.41	9.26	2.03	N.S.
Phosphorus (mg/dl)	5.35	1.25	5.25	0.20	N.S.	5.05	1.51	5.03	1.01	N.S.	5.01	0.52	4.99	1.124	N.S.	4.85	0.52	4.96	0.75	N.S.
Magnesium (mg/dl)	2.3	0.31	2.45	0.24	N.S.	2.49	0.31	2.56	0.13	N.S.	2.61	0.40	2.59	0.2144	N.S.	2.81	0.56	2.64	0.10	N.S.

Clinical laboratory diagnosis has an integral role in practice of veterinary Medicine and the availability of tests is important to clinician as are the history and clinical examination (Coles, 1986). Many of the investigated animals are owned by poor people and work in harsh environment, thus the study and recorded the healthy parameters of donkeys seemed to be important.

The obtained result (Tables 1,2) showed that the total red blood cells count were similar to those described by (Nayeri,1978) for both male and female Iranian donkeys , and higher than those reported by Enio *et al.*, (2004) in Brazilian donkeys; AL – Busadah and Homeida (2005) in Hassawi Asses.

The reported hemoglobin values as shown tables were closely related to the values reported by Enio *et al.*, (2004) in Barazilian donkeys; Al – Busadah and Hameida (2005) in Hassawi Asses , but higher than the result reported in donkeys by (Zinkel , *et al.*, 2005).

The reported values of PCV in examined animals were the same as that reported by folch *et al.*, (1997) in Catalonian donkeys, lower than Zinkel *et al.*, (1990) in us donkeys and higher than French and Patrick (1995) in UK donkeys.

Our data on the total white blood cells count were in agreement with those previously reported by Nayeri (1978) in male Iranian donkeys but not for the Females. ON the other hand, our data on WBCs count were higher than those of Enio *et al.*, (2004); Al–Busadah and Homeida (2005) in Brazilian and Hassawi Asses respectively.

The differences of analyses were due to differences in the feeding conditions among breads of donkeys, the climatic changes as well as the physiological states as pregnancy and Lactation factors (Kaneko, *et al.*, 1997). Our study revealed that age has an effect on the hematological picture where all the studied parameters decreased with the increase of age. Similar results were reported in other breads of donkeys (Zinkel1 *et al.*, 1990). On the other hand, Marco *et al.*, (2005) reported that Red cells values were greater in donkeys under one year then the adult ones.

It was clear that the sex in donkeys has an effect on the hematological picture. Our data revealed that the values of all parameters were higher in male donkeys as compared with the female ones. Some parameters has Statistical difference, while others showed difference without statistical Significance our results were

in contrast with that reported by French and Patrick (1995) .

Our data of some organic and inorganic blood serum constituents were seen in tables 4,5 where albumin in the blood of Egyptian donkeys were similar to that in U.S. donkeys (Zinkl *et al.*, 1990) and Indian donkeys (Gupta *et al.*, 1994) . In the same time,

Enio *et al.*, (2004) reported lower values in their donkeys. Enio *et al.*, (2003) stated that physiological variations of serum protein and albumin can occur because of national influences hormonal effects , stress and guild loss by sweat .

Slight non- Significant change was reported in the most studied biochemicals in blood serum of Egyptian donkeys (tables 4, 5 and 6)

Dinevv and khubenov (1986) found that the amount of total serum protein in young donkeys was lower than in older ones. It is also stated that the concentration of calcium and phosphorus was in reverse correlation with the age of animals. Phosphorus is higher and calcium is lower in young animals, but a very significant decrease with age observed for phosphors concentration in Catalonian donkeys (Folch *et al.*, 1977; us donkeys Zinkell, *et al.*, 1990).

Phosphorus decreased bare Metabolism as animals become older (kaneko etal , 1997) Growth hormones were seemed largely responsible for the increase of phosphorus in young growing animals as it increase rural tubular resumption of phosphorus (Stock ham and Michael , 2002) .

In this work, sex has effect on some blood serum biochemicals at certain age. Similar findings were previously reported by Nayeri (1978); Cubeddu, *et al.*, (1991) Who .recorded differences between female and male donkeys in serum protein and Albumin concentrations . On the other hand, French and Patrick (1995) reported non-significant differences for most of the blood biochemicals in relation to sex.

Conclusion

The total RBCs count, hemoglobin content and packed cells volume showed marked decrease with the increase of age. Significant difference in RBCs count between some groups and highly significant difference in Hb and PCV contents between other groups. Increase in total leucocytes count from one month up to 10 years old, was observed. Marked decrease in total WBCs count in animals of both sexes on 10-20 years old. Significant and highly significant differences appear in total WBCs count between

animal groups. The biochemical parameters revealed highly significant difference in the total protein and albumin in some groups of male animals. Non significant fluctuation was observed in blood serum calcium, phosphorus and magnesium regarding the age and sex factors. It was clear that both age and sex factors has a marked influence on some blood contents in Egyptian donkeys.

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تم في هذه الدراسة فحص عدد مائة وأربعين حماراً، وهذه الحمر قسمت إلى قسمين حسب الجنس، ثم قسمت الذكور والإناث حسب العمر إلى أربع مجموعات لكل منهم، كل الحيوانات تم فحصها معملياً و سريرياً.

تم أخذ عينتين من الدم من كل حيوان إحداهن تم إضافة مضاد التجلط إليها بينما بقيت الأخرى بدون هذا المضاد للحصول على عينة سليمة من مصل الدم لإجراء عدة اختبارات للحصول على قيم لبعض مكونات الدم وجد هناك و بوضوح علاقة عكسية بين كل من عدد كرات الدم الحمراء والهيموجلوبين و الخلايا المضغوطة مع تقدم السن كما كان هناك تأثير معنوي اعداد كرات الدم الحمراء بين المجموعات، و تأثير معنوي عالي للهيموجلوبين و الخلايا المنضغطة بين المجموعات الأخرى كما كان هناك ارتفاع طفيف في قيم العدد الكلي لخلايا الدم البيضاء، وجد أيضاً نقص واضح في العدد الكلي لخلايا الدم البيضاء في كل الحيوانات من الجنسين من ١٦ إلى ٢٠ سنة وجد أيضاً تأثير معنوي و تأثير معنوي جداً في خلايا الدم البيضاء بين مجموعات الحيوانات أما عن الدلالات البيوكيميائية أوضحت تأثير معنوي جداً في قيم البروتين الكلي و الزلال في بعض مجموعات الذكور. و لم يكن هناك تأثير معنوي في المكونات الغير عضوية الموجودة بمصل الدم ، الكالسيوم، الفوسفور و الماغنيسيوم بغض النظر عن عامل الجنس و العمر. لقد كان واضحاً ان العمر و الجنس كان لها تأثير واضح على بعض مكونات الدم في الحمر المصرية.

