STUDIES ON THE RELATIONSHIP BETWEEN SERUM CHOLESTEROL LEVEL, IMMUNITY, SOME PHYSIOLOGICAL ASPECTS AND PRODUCTIVE PERFORMANCE FOR SOME LOCAL STRAINS OF CHICKENS

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Abstract

The present study was conducted to study the relationship between level of serum cholesterol, immunity, and physiological and productive performance for some local strains of chicken. A total of 400 One-day- old female chicks from four local strains of chicken, Dandarawi, Dokki 4, Baladi and Sinai (100 female chicks of each) were used to estimate some productive, physiological and immunological parameters as indicators to productive performance. The chicks were reared on deep litter, under natural day light and environmental temperature. The feed and water were provided *ad.lib.*

The experiment continued for 6 months. The obtained results were as following:

1. Sinai strain female chicks had higher body weight and feed consumption at almost ages.
2. Serum cholesterol , serum LDL and serum HDL were higher in Dokki strain chicks at all ages, Dandarawi strain gave the lower serum levels of cholesterol, LDL and HDL .
3. Liver cholesterol, LDL and HDL were lower in Dandarawi strain, liver triglyceride, and total lipids were lower in Dandarawi and Baladi compared with other strains at almost ages.
4. Serum triglyceride and total lipids were lower in Baladi chicks at all ages.
5. Sinai strain chicks were higher in serum total protein, albumin, and globulin.
6. With regard to immune response, we found that Baladi strain chicks gave the best response against sheep red blood cells (SRBC) at early age (12, 16 weeks).
7. At late ages (20, 24 weeks), Dokki strain presents higher response against SRBC.

The relationship between serum cholesterol level, immune response, and physiological and productive performance for Dandarawi and Baladi strains may explain the importance of selection for decrease level serum and liver cholesterol with increase the immune response before egg production to improve the production of eggs with less cholesterol level and increasing the immunity of these local strains in the future.

INTRODUCTION

The possible relationship between dietary cholesterol and health problems particularly heart diseases had a negative impact on egg consumption and hence, it is of great importance to produce egg of less cholesterol. It is recommended that, the dietary cholesterol intake must be less than 300 mg / d (Brown, 1999).

Intensive poultry production in Egypt depends, not only on commercial hybrids but also on local strains of chicken. During the last three decades serious efforts have been done to improve the performance of these strains through continuous selection under different environmental conditions. (Yonis and Abd El-Ghany, 2003). The differences among Egyptian local strains of chickens are widely varied under different factors such as genetic factors (Elewa, 2004, Kosba *et al.,* 2003 and Abd El-Hady *et al.,* 2003), environmental conditions (Yonis and Abd El-Ghany, 2003) and dietary factors (Kosba *et al.,* 2003, Salwa Siam *et al.*, 2004 and Abd El-Hady *et al.,* 2003). Several investigators found significant differences between local strains of chicken in body weight, growth rate at different ages (Saleh *et al.,* 1994 and, Masood et. al., 1995), and in feed consumption and conversion (Saleh *et al.,*1994).

It is very important that a mature pullets body weight is attained before pullets are stimulated into production. Abd El-Hady *et al.*, (2003) reported that genotype did not affect body weight, body weight gain and feed consumption at 4 and 8 weeks of age for Mandarah and El-Salaam local strains of chicken. Many investigators studied the level of serum cholesterol and other components of blood (Umoren, 1989).

The main objectives of the present study were to study the relationship between level of serum cholesterol, immunity, and physiological and productive performance in some local strains of chicken for improving the immunity and the productive performance of some local strains.

MATERIALS AND METHODS

This study was carried out at poultry research station, Faculty of Agriculture, Cairo University, Giza, Egypt, The experimental period continued for 6 months.

a) General management. One hundred one-day-old female chicks of each Dokki 4, Dandarawi, Baladi, and Sinai strains were used in this study. The chicks were obtained from El-Azab Project EL-Fayum. At hatch, all chicks were wing banded and individually weighed to the nearest gram. The chicks were placed intermingled on floor brooder pens, which contained wood shaving litter. All chicks were reared under natural day light and environmental temperature (after the brooding period). The chicks were fed a starter, grower and pre-production rations according the age

as shown in Table 1. The feed and water were provided *ad-lib.* . The chicks were vaccinated according to the recommended local vaccination programme.

b) **Productive.** Body weights were individually recorded on the first day and every four weeks till 24 weeks of age. Feed consumption was recorded as a mean every four weeks started from one-day age till the end of experiment.

c) **Physiological parameters.** Blood samples were collected from brachial vein of a random sample of 5 chicks from each strain at 8,16and 24 weeks of age. The blood samples (5 ml) were immediately centrifuged at 3000 rpm for 20 min, and serum was stored at – 40 °C until analysis for some blood constituents as following: Total Protein, Globulin, Albumin, Cholesterol, LDL, HDL, Triglceride, Total lipids.

In addition, Cholesterol, LDL, HDL, Triglceride, Total lipids were determined in liver at 8and 20 weeks of age. The determination performed calorimetrically using available commercial diagnostic kits at Animal Production Research Institute laboratory and central laboratory of the Faculty of Agriculture, Cairo University.

d) **Absolute and relative weights of internal organs.** At 8 and 20 weeks of age, five chicks of each strain were weighed and slaughtered. The lymphoid organs (spleen, thymus gland and the bursa of fabricious) and some internal organs (liver, heart, kidney, gizzard, abdominal fat, ovary and oviduct) were weighed to the nearest 0.1 g. The relative weights of these organs were calculated to body weight.

e) **Immunization and titration against sheep red blood cells (SRBCs).** Ten chicks from each strain were randomly chosen to detect primary and secondary immune responses (antibody titers against SRBC, s). At 8,16weeks of age for primary immune response, the chicks were immunized intravenously with 1 ml of SRBC, s suspension (7 % SRBC) via brachial vein. At 12,20 weeks of age, the same ten chicks were re-immunized with the same antigen, concentration and dose to detect the secondary immune response (against SRBC). Blood samples were drawn 7 days post-injection to detect both primary and secondary immune responses. The titration procedures described by Van-der Zijpp and Leenstra (1983) and Bachman and Mashaly (1986) were used.

f) **Statistical Analysis.** The data were analyzed by one-way analysis of variance (one-way ANOVA) using the general linear model (GLM) procedures of SAS (1998). When significant strain effect was detected, means were separated using Duncan's new multiple range test.

RESULTS AND DISCUSSION

a) **Productive performance.** Strain effect on body weight, feed consumption are shown in Table 2. At early age (1-4 weeks) there were no significant differences between strains. At 12and16 weeks of age, the Dokki 4 strain was heavier than others and the differences between strains were significant. At late age (20and24

weeks) the Sinai strain became heavier than others and the differences between strains were significant. Dokki 4 and Sinai strains consumed feed more than the other strains. On the other hand, body weight of Sinai strain birds had surpassed the other three strains significantly ($P \leq 0.05$) at 20 and 24 weeks of age. It could be seen that growth pattern is not similar for these strains. Body weight differences between local strains were found by Saleh *et al.* (1994).

b) **Physiological parameters.** Changes in serum and liver cholesterol, LDL, HDL, triglycerides total lipids, serum total protein, albumin, globulin and glucose, as affected by strains, were listed in Tables 3, 4 and 5. With regard to serum total protein and albumin, there were no significant differences ($P \leq 0.05$) found between all strains. For serum cholesterol, Baladi and Dandarawi strains presented the lowest ($P \leq 0.05$) concentration of serum cholesterol at early ages (8, 16 and 24 weeks). The same trend was noticed for serum LDL, for HDL, Dokki strain presented the highest values ($P \leq 0.05$) than the other strains at early age (8 weeks). These results agree with Metwally (2002) who found the same cholesterol level in liver and blood for Dandarawi strain at early age (4 and 8 week).

Lower significant differences ($P \leq 0.05$) were found for Baladi and Dandarawi in serum and liver triglycerides and total lipids than other strains at all ages.

Table 4 showed that the liver cholesterol, LDL and HDL were lower in Dandarawi strain, liver triglyceride and total lipids were lower in Dandarawi and Baladi compared with other strains at almost ages.

Our data showed that Dokki and Sinai strains had higher level of serum glucose ($P \leq 0.05$) than other strains (Table 5). The enhancement in some metabolic concentrates may be due to the strain effect. These may be due to the nature of internal environment and intestinal micro flora. The increase in metabolic concentrates may explain the increase in growth and body weight. Such metabolic activities are controlled by hormones (Elewa, 2004). The differences between strains for total protein level, serum albumin, were not significant ($P \leq 0.05$) at all ages. Serum globulin levels were higher in Baladi and Dandarawi than other strains at all ages.

c) Immune responses against SRBC. Geometric means of antibody production against SRBC were calculated and shown in Table 6. It showed that Baladi strain had higher levels of primary and secondary immune responses at early age (8 and 12 weeks). At late age (16 and 20 weeks) both Baladi and Dandarawi had higher primary and secondary immune responses, this may be due to natural selection in the Baladi strain. Similar results for some local strains of chickens were obtained by Hamdy (2000). Inooka et. al. (1994) suggested an attribution between genetic regulation and antibody production is involved in general antibody production and resistance, namely common genetic control system, exist among mechanisms of diseases resistance and antibody production.

d) Lymphoid and some internal organs weights. Means of absolute and relative weights of lymphoid and some internal organs were presented in Tables 7 and 8. Our results declared that Baladi strain female chicks have higher ($P \leq 0.05$) relative body weights (% of B.W.) for spleen, bursa and thymus at 8 weeks of age, but, at 20 weeks of age, the differences between strains were not significant. Dandarawi strain had significant ($P \leq 0.05$) higher relative weights of heart, kidney and gizzard. Dokki strain had significant lower ($P \leq 0.05$) relative weight of abdominal fat. At 20 weeks of age, we found no significant differences almost between strains for all organs except abdominal fat, where Dokki and Baladi strains showed a significant lower level of abdominal fat. This data agreed with previous study reported by Elewa (2004) who showed the differences between strains for local chickens of all organs.

It could be advisable to give more attention for local strains of chickens, where these strains have better production levels, body weight and highly immune responses. This may be due to acclimatization in different environmental conditions. It could be concluded that selection and crossing between these strains may improve the immunological status, egg production and degree of acclimatization for hot environment. Also, the results may explain the importance of selection for some physiological and immunological parameters in local chickens before egg production to improve productive performance, egg quality, production of egg, less cholesterol and increasing the immunity of these local strains in the future.

Table 1. Composition and calculated analysis of diets.

Ingredient (%)	Starter	Grower	Pre-production
Yellow corn	63	63	65
Soybean meal (44% CP)	30	16.5	23.3
Wheat bran	3	16.7	1.9
Di-calcium phosphate	1.8	1.3	1.5
Limestone	1.5	1.8	7.6
NaCl	0.3	0.3	0.3
Premix (Vitamins minerals mixture*)	0.3	0.3	0.3
Methionine	0.1	0.1	0.1
Total	100	100	100
Calculated analysis: Metabolizable energy K cal/kg	2800	2700	2700
Crude protein, %'	19	15	16
C/P ratio	147	193	168
Calcium, %	1	0.9	3.3
Available phosphorus, %	0.45	0.4	0.4
Lysine, %	0.95	0.7	0.73
Methionine, %	0.38	0.3	0.32
Methionine and cystine, %	0.70	0.54	0.62

* Each2.5 kg of vitamins and minerals mixture contain:

12000.000 IU vitamin A acetate, 2000.000 IU vitamin D_3, 10.000 mg vitamin E acetate, 2000 mg vitamin K_3, 100 mg vitamin B_1, 4000 mg vitamin B_2, 1500 mg vitamin B_6, 10 mg vitamin B12i 10.000 mg pantothenic acid, 20.000 mg Nicotinic acid, 1000 mg Folic acid, 50 mg Biotin, 500.000 mg chorine, 10.000 mg Copper, 1000 mg Iodine, 300.00 mg Iron, 55.000 mg Manganese, 55.000 mg Zinc, and 100 mg selenium.

Table 2. Body weight and feed consumption at different ages for some local strains of chicken.

Parameters	Age (weeks)	Strains			
		Dokki 4	Dandarawi	Baladi	Sinai
Body weight (g /bird)	1 day	*38.27± 4.83 ^{a}	37.81 ± 4.83 ^{a}	37.70 ± 4.83 ^{a}	40.33 ± 4.83 ^{a}
	4	223.52 ± 29.90^{a}	215.27 ±29.90^{a}	211.31±29.90^{a}	231.65±29.90^{a}
	8	462.33±56.11^{a}	395.21±56.11^{b}	385.55±56.11^{b}	436.46±56.11^{a}
	12	697.53±70.73^{a}	549.61±70.73c	559.65±70.73^{c}	628.11±70.73 ^{b}
	16	1072.15±72.11^{a}	937.33±72.11^{c}	963.85±72.11^{ab}	1106.52±72.11^{b}
	20	1216.65±80.05^{b}	1094.31±80.05^{c}	1078.71±80.05^{c}	1253.03±80.05^{a}
	24	1503.66±93.30^{c}	1398.90±93.30^{c}	1417.81±93.30^{c}	1572.10±93.30^{a}
Feed consumption (g/ bird/day)	4	35.60±5.11^{a}	37.12±5.11^{a}	36.33±5.11^{a}	37.97±5.11^{a}
	8	46.77±6.30^{ab}	47.83±6.30^{b}	45.91±6.30^{b}	49.22±6.30^{a}
	12	59.26±6.71^{a}	57.80+6.71^{b}	60.46+6.71^{b}	61.35±6.71^{a}
	16	70.82±7.03^{a}	68.56±7.03^{ab}	67.98+7.03^{b}	72.11±7.03^{a}
	20	89.32±9.25^{a}	86.41±9.25^{b}	90.22±9.25^{a}	92.76±9.25^{a}
	24	107.19±13.60^{ab}	102.42±13.60^{b}	111.55±13.60^{a}	116.30±13.60^{a}

* Values are means ± S .E

a, b and c means in the same row with different superscripts are significantly different ($P \leq 0.05$).

Table 3. Serum cholesterol, LDL, HDL, triglyceride and total lipids at different ages for some local strains of chicken.

Parameters	Age (weeks)	Strains			
		Dokki 4	Dandarawi	Baladi	Sinai
Serum Cholesterol (mg / dl)	8	*115.26± 8.01 ^{a}	94.55 ± 8.01^{c}	92.73 ± 8.01^{c}	103.67 ±8.01^{b}
	16	128.11 ± 10.20^{a}	107.80 ±10.20^{c}	110.89±10.20^{c}	119.56±10.20^{b}
	24	146.77±13.70^{b}	133.06±13.70^{c}	131.56±13.70^{c}	156.32±13.70^{a}
Serum LDL (mg/dl)	8	87.56±6.11^{a}	69.90±6.11^{c}	68.60±6.11^{c}	78.70±6.11^{b}
	16	97.31±9.55^{a}	79.80±9.55^{c}	81.90±9.55^{c}	90.86±12.70^{b}
	24	111.40±12.70^{b}	98.46±12.70^{c}	97.36±12.70^{c}	118.77±12.70^{a}
Serum HDL (mg / dl)	8	27.70±3.21^{a}	24.65±3.21^{b}	24.13±3.21^{b}	24.97±3.21^{b}
	16	30.80±4.00^{a}	28.00±4.00^{a}	28.99±4.00^{a}	28.70±4.00^{a}
	24	35.37±3.91^{ab}	34.60±3.91^{b}	34.20±3.91^{b}	37.60+3.91^{a}
Serum Triglyceride (mg / dl)	8	63.81± 9.20 ^{ab}	60.44 ±9.20^{b}	63.42± 9.20^{ab}	69.17 ±9.20^{a}
	16	86.65 ± 8.55^{b}	79.92 ±8.55^{c}	85.56±8.55^{b}	91.82±8.55^{a}
	24	100.22±11.01^{ab}	86.09±11.01c	95.77±11.01^{b}	104.95±11.01^{a}
Serum total Lipids (g/ dl)	8	13.50±2.07^{a}	12.82+2.07^{a}	13.00±2.07^{a}	14.61±2.07^{a}
	16	15.88±3.00^{a}	14.80±3.00^{ab}	13.21+3.00^{b}	15.66±3.00^{a}
	24	16.93±3.21^{a}	16.02±3.21^{ab}	14.88±3.21^{b}	17.82±3.21^{a}

* Values are means ± S .E

a, b and c means in the same row with different superscripts are significantly different (P ≤ 0.05).

Table 4. Liver cholesterol, LDL, HDL, triglyceride and total lipids at different ages for some local strains of chicken.

Parameters	Age (weeks)	Strains			
		Dokki 4	Dandarawi	Baladi	Sinai
Liver Cholesterol (mg / g)	8	*123.20 ± 9.55^{ab}	107.39±9.55^{b}	101.86±9.55^{b}	135.12 ±9.55^{a}
	20	172.03±15.05^{a}	125.93 ±15.05^{b}	133.37±15.05^{ab}	164.10±15.05^{a}
Liver LDL (mg / g)	8	86.15±5.70^{a}	72.70±5.70^{b}	69.11±5.70^{b}	93.07±5.70^{a}
	20	121.41±9.12^{a}	85.18±9.12^{b}	92.08±9.12^{ab}	119.06±12.12^{a}
Liver HDL (mg / g)	8	37.05±3.21^{ab}	34.69±3.21^{b}	32.75±3.21^{b}	42.05±3.21^{a}
	20	50.62±3.80^{a}	40.25±3.80^{b}	41.79±3.80^{ab}	45.04±3.80^{ab}
Liver Triglyceride (ng / g)	8	439.70± 9.20 ^{a}	401.31 ±9.20^{ab}	395.00± 9.20^{b}	456.22 ±9.20^{a}
	20	486.18 ± 18.33^{a}	426.05 ±18.33^{b}	442.90±18.33 ^{ab}	493.35±18.33^{a}
Liver Total lipids (mg / g)	8	240.11±11.10^{a}	211.73±11.10^{b}	226.22±11.10^{ab}	242.80±11.10^{a}
	20	261.17±12.5^{ab}	240.86±12.55^{b}	251.15±12.5^{ab}	269.01±12.55^{a}

* Values are mean ± S .E

a, b and c means in the same row with different superscripts are significantly different (P ≤ 0.05).

Table 5. Serum total protein, albumin, globulin and glucose at different ages for some local strains.

Parameters	Age (Weeks)	Strains			
		Dokki 4	Dandarawi	Baladi	Sinai
Serum total Protein (mg/100ml)	8	*4.33±0.82 ^{a}	4.81 ± 0.82^{a}	4.93 ± 0.82^{a}	4.57±0.82^{a}
	16	5.19 ± 0.91^{a}	5.55±0.91^{a}	5.82±0.91^{a}	5.03±0.91^{a}
	24	6.08±0.65^{a}	6.39±0.65^{a}	6.35±0.65^{a}	5.77±0.65^{a}
Serum albumin (mg /100 ml)	8	2.70±0.32^{a}	3.17±0.32^{a}	3.18±0.32^{a}	2.95±0.32^{a}
	16	3.42±0.35^{a}	3.66±0.35^{a}	3.80±0.35^{a}	3.36±0.35^{a}
	24	4.11±0.35^{a}	4.39±0.35^{a}	4.26±0.35^{a}	3.93±0.35^{a}
Serum globulin (mg / 100ml)	8	1.63±0.12^{a}	1.64±0.12^{a}	1.75±0.12^{a}	1.62±0.12^{a}
	16	1.77±0.20^{ab}	1.89±0.20^{b}	2.02±0.20^{a}	1.67±0.20^{b}
	24	1.97±0.35^{ab}	2.00±0.35^{a}	2.09±0.35^{a}	1.84±0.35^{b}
Serum glucose (mg / 100ml)	8	128.93+4.22^{b}	137.11 ±4.22^{a}	140.39 +4.22^{a}	111.06 ±4.22^{c}
	16	131.91 ± 6.20^{b}	128.55 ±6.20^{b}	143.76±6.20^{a}	130.44±6.20^{b}
	24	151.35±7.11^{c}	166.69±7.11^{a}	160.22±7.11^{a}	147.80±7.11^{c}

* Values are mean ± S .E

a, b and c means in the same row with different superscripts are significantly different ($P \leq 0.05$).

Table 6. Primary and secondary responses of antibody production against SRBC s at different ages for some local strains of chicken.

Response	Age (Weeks)	Strains			
		Dokki 4	Dandarawi	Baladi	Sinai
Primary	12 week	*37.55±5.81^{b}	41.08 ± 5.81^{ab}	46.32 ±5.81^{a}	39.60±5.81^{ab}
Secondary	16 week	* 155.81±23.11^{c}	180.60±23.11^{b}	187.22±23.11^{a}	178.20±23.11^{b}
Primary	20 week	66.42±9.13^{c}	86.34±9.13^{a}	83.50±9.13^{a}	79.70±9.13^{b}
Secondary	24 week	237.51±35.00^{c}	273.30±35.00^{a}	268.91±35.00^{a}	249.31±35.00^{b}

*G.M.of antibody production of primary response and secondary response, values are Mean ± S. E, a, b and c means in the same row with different superscripts are significantly different ($P \leq 0.05$).

Table 7. Absolute weight of some internal organs at different ages for some local strains of chicken.

Weight (g)	Age (Weeks)	Strains			
		Dokki 4	Dandarawi	Baladi	Sinai
Body	8	*407.11±25.07^{b}	481.70 ±25.07^{a}	396.59 ±25.07^{b}	455.18±25.07^{ab}
Bursa		1.78 ± 0.27^{b}	2.21 ±0.27^{a}	2.10±0.27^{a}	1.85±o.27^{ab}
Spleen		1.65±0.19^{b}	1.88±0.19^{a}	1.90±0.19^{a}	1.33±019^{c}
Thymus		2.97±0.39^{b}	3.55±0.39^{a}	3.70±0.39^{a}	2.66±0.39^{c}
Liver		22.30±3.11^{a}	20.14±3.1 I^{ab}	18.93±3.11^{b}	19.08±3.11^{b}
Heart		4.06±0.33^{b}	3.98±0.33^{b}	4.39±0.33^{a}	4.66±0.33^{a}
Kidney		5.23±0.41^{a}	4.95±0.41^{a}	4.88±0.41^{a}	5.09±0.41^{a}
Gizzard		15.07±2.71^{a}	14.66± 2.71^{a}	13.91± 2.71^{a}	14.73± 2.71^{a}
Abdominal fat		16.55± 2.24^{a}	7.09± 2.24^{c}	10.50± 2.24^{c}	13.50 ±2.24^{b}
Body	20	1430.80±109.90^{c}	1578.71±109.90^{b}	1563.11±109.90^{b}	1623.33±109.90^{a}
Spleen		2.87 ± 0.52^{b}	3.55±0.52^{a}	3.41±0.52^{a}	3.27±0.52^{a}
Thymus		4.87±0.43^{a}	5.21±0.43^{ab}	5.11±0.43^{a}	4.50±0.43^{b}
Liver		25.71±4.13^{b}	29.05±4.13^{a}	31.11±4.13^{a}	26.92±4.13^{ab}
Heart		6.33±0.32^{ab}	5.91±0.32^{b}	7.22±0.32^{a}	6.18±0.32^{b}
Kidney		7.91±0.50^{a}	7.53±0.50^{a}	8.04±0.50^{a}	7.42±0.50^{a}
Gizzard		25.07+3.26^{b}	20.20±3.26^{a}	19.36+3.26^{b}	22.11±3.26^{ab}
Abdominal fat		78.09±5.08^{a}	28.61±5.08^{c}	25.70± 5.08^{c}	62.77+5.08^{b}
Ovary		16.09±6.40^{c}	31.14± 6.40^{a}	29.33±6.40^{a}	21.11±6.40^{b}
Oviduct		22.27±4.50^{c}	46.90±4.50^{a}	40.00± 4.50^{ab}	29.91 ±4.50^{b}

* Values are mean ± S .E

a, b and c means in the same row with different superscripts are significantly different ($P \leq 0.05$).

Table 8. Relative weight of some internal organs at different ages for some local strains of chicken.

Relative weight (mg/100gB.w)	Age (Weeks)	Strains			
		Dokki 4	Dandarawi	Baladi	Sinai
Body (g)	8	*407.11±25.07^{b}	481.70 ±25.07^{a}	396.59±25.07^{c}	435.19±25.07 ^{ab}
Bursa		0.53±0.05 ^{a}	0.41±0.05^{b}	0.44±0.05^{ab}	0.46 ±0.05^{ab}
Spleen		0.41±0.02^{ab}	0.39±0.02^{b}	0.48±0.02^{a}	0.29±0.02 ^{c}
Thymus		0.73±0.08^{b}	0.74±0.08^{b}	0.93±0.08 ^{a}	0.58±0.08 ^{c}
Liver		5.48±0.59^{a}	4.18±0.59^{b}	4.77±0.59^{ab}	4.19±0.59^{b}
Heart		1.00±0.14^{a}	0.83±0.14^{b}	1.11±0.14^{a}	I.02±0.14^{a}
Kidney		1.29±0.06^{a}	1.03±0.06^{b}	1.23±0.06^{a}	1.12±0.06^{ab}
Gizzard		3.70±0.25^{a}	3.04± 0.25^{b}	3.51± 0.25 ^{ab}	3.24±0.25^{ab}
Abdominal fat		4.06±0.28^{b}	1.47± 0.28^{c}	2.65±0.28 ^{b}	2.97±0.28^{b}
Body	20	1430.80±109.90^{c}	1578.71±109.90^{b}	1563.11±109.90^{b}	1623.33±109.90^{a}
Spleen		0.20 ± 0.01^{a}	0. 22± 0.01^{a}	0.22±0.01^{a}	0.20±0.01^{a}
Thymus		0.34±0.03^{a}	0.33±0.03^{a}	0.33±0.03^{a}	0.28±0.03^{b}
Liver		1.80±0.18^{ab}	1.84±0.18^{a}	1.99±0.18^{a}	1.66±0.19^{b}
Heart		0.44±0.04^{a}	0.37±0.04^{b}	0.46±0.04	0.38±0.04^{b}
Kidney		0.55±0.05^{a}	0.48±0.05^{b}	0.51±0.05^{sb}	0.46±0.05b
Gizzard		1.75±0.26^{a}	1.28±0.20^{b}	1.24±0.26^{b}	1.36±0.26ab
Abdominal fat		5.46±0.19a	1.81±0.19^{c}	1.64±0.19^{c}	3.87±0.19^{b}
Ovary		1.12±0.12^{b}	1.97± 0.12^{a}	1.88±0.12^{a}	1.30±0.12^{ab}
Oviduct		1.56±0.30^{b}	2.97±0.30^{a}	2.56±0.30^{ab}	1.84 ±4.5^{b}

* Values are mean ± S .E

a, b and c means in the same row with different superscripts are significantly different ($P \leq 0.05$).

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العلاقة بين مستوى كوليسترول السيرم والمناعة وبعض المظاهرالفسيولوجية والأداء الإنتاجى لبعض سلالات الدجاج المحلى

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أجريت هذه الدراسة لدراسة العلاقة بين مستوى كوليسترول السيرم والمناعة والحالة الفسيولوجية والانتاجية لتحسين الإنتاج والحالة المناعية لبعض سلالات الدجاج المحلية وإمكانية الاستفادة من هذة العلاقة فى التحسين الوراثى والانتخاب لزيادة إنتاج بيض قليل الكوليسترول من دجاج مرتفع المناعة. وأستخدم في هذه الدراسة عدد ٤٠٠ كتكوت إناث عمر يوم من كل السلالات التالية : بلدي وسينا و دندراوي ودقي ٤ (١٠٠ كتكوت إناث من كل سلالة).

وهذه الكتاكيت تم تربيتها على فرشة عميقة تحت الظروف الطبيعية من الإضاءة ودرجة الحرارة وتم تقديم العلف والماء بصورة حرة لحد الشبع والتجربة استمرت حتى عمر حوالي ٦ شهور وكانت أهم النتائج المتحصل عليها كما يلي :

١. كانت كتاكيت سلالة السينا هي الأعلى في صفة وزن الجسم واستهلاك العلف في معظم فترات التجربة .

٢. سلالة الدقي كانت أعلى في مستوى كوليسترول السيرم و LDL وHDL في الدم وسلالة الدندراوى اعطت اقل مستوى لها .

٣. كانت سلالة البلدي هي الأعلى في مستوى الجليسريدات الثلاثية والدهون الكلية في الدم خلال فترات التجربة وسلالة الدندراوى أعطت أقل مستوى لها.

٤. سلالة الدندراوى كانت اقل في مستوى الكوليسترول،LDL ،HDL في الكبد وكذلك أقل مستوى للجليسريدات الثلاثية والدهون الكلية في الكبد كان لسلالتى الدندراوى والبلدى .

٥. بالنسبة لصفة الاستجابة المناعية كانت سلالة البلدي هي الأعلى وأعطت أحسن استجابة مناعية أولية وثانوية ضد خلايا دم الغنم الحمراء خلال العمر الأول من التجربة .

٦. في العمر المتأخر من التجربة كانت سلالة الدندراوى هي الأحسن في الاستجابة المناعية الأولية والثانوية .

٧. فى الاعمار المتاخرة (٢٠ ، ٢٤ أسبوع) كانت سلالة الدقى ٤ هى الأقل فى الاستجابة المناعية الأولية والثانوية بالمقارنة بباقى السلالات .

من هذة الدراسة يتضح أن هناك علاقة بين انخفاض مستوى الكوليسترول والصور المختلفة منه بالسيرم والكبد وإرتفاع مستوى الاستجابة المناعية الأولية والثانوية لبعض السلالات المحلية كالبلدى والدندراوى فى المراحل الأولى من العمر قبل الإنتاج ويمكن الاستفادة من هذة العلاقة الفسيولوجية لتحسين الحالة الإنتاجية وجودة البيض وإنتاج بيض منخفض الكوليسترول من دجاج مرتفع المناعة من هذة السلالات المحلية باستخدام برامج الإنتخاب والتحسين الوراثى فى المستقبل .