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تأثير التجويع والاظلام والضوء المستمر على المكونات الليبيدية والفوسفوليبيدية لسيرم دم سحلية كالسيدس أو سيلاتس

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تناول البحث دراسة تأثير التجويع والاظلام والضوء المستمر لمدة ٦٠ يوما على المكونات الليبيدية والفوسفوليبيدية لسيرم دم سحلية كالسيدس أو سيلاتس.

وقد استخدمت طريقة الكروماتوجرافيا على الطبقة الرقيقة لتقدير التجزوءات الليبيدية والفوسفوليبيدية في السيرم.

وقد أظهرت النتائج وجود(٥)تجزوءات ليبيدية في سيرم السحلية وهي على وجه التحديد: الفوسفوليبيدات ، الكوليسترول ، الاحماض الدهنية الحرة، ثلاثي الجليسريدات ، استرات الكوليسترول. وبالمثل تم فصل(٥)تجزوءات فوسفوليبيدية على الكروماتوجرامات من سيرم السحلية وهي: الليسثين، الايثانولين أمينفوسفوليبيدات السيرين فوسفوليبيدات ، السفنجوميلينات ، الليسوليسثين.

هذا الى أن النتائج قد أظهرت عدم وجود اختلافات نوعية في التجزوءات الليبيدية في سيرم السحلية نتيجة لتعريضها للتجويع والاظلام والضوء المستمر لمدة ٦٠ يوما ، بيد أنه وجدت اختلافات كمية في هذه التجزوءات نتيجة لذلك.

ويجدر الاشارة الى أن التجزوءات الفوسفوليبيدية قد سلكت مسلكا مشابها للتجزوءات الليبيدية تحت نفس الظروف .

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EFFECT OF STARVATION, DARKNESS AND CONTINUOUS LIGHT ON LIPID AND PHOSPHOLIPID COMPONENTS OF THE SERUM OF THE LIZARD, CHALCIDES OCELLATUS

(With 2 Tables & 2 Figs.)

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SUMMARY

The effect of starvation, darkness and exposure to continuous light for 60 days on lipid, phospholipid fractions in the serum of the lizard, Chalcides ocellatus was investigated.

Thin layer chromatography (TLC) was used for differentiation of both lipid and phospholipid fractions.

The results revealed that there were 5 identified lipid fractions in the serum of the lizard; namely: phospholipids, cholesterol, free fatty acids, triglycerides, and cholesterolesters. Likewise, the TL chromatograms indicated the isolation of 5 identified phospholipids fractions in the serum of the lizard; namely: lecithins, ethanolaminephospholipids, sphingomyleins, and lysolecithins.

Besides, the data indicated that there are no qualitative differences in the lipid fractions between starvation, darkness, and exposure to continuous light. However, quantitative differences could be detected amongst these fractions.

Similar trend was recorded for phospholipid fractions in the serum of the lizard under the same conditions.

INTRODUCTION

The composition of the blood of all major reptilian groups is typical of that of vertebrates in general. However, concentrations of many blood constituents fluctuate to a much greater extent than one would expect from a knowledge of mammalian physiology. Daily environmental events often lead to drastics shifts in blood levels of salts and metabolities (GANS, 1970 and STEVENS, 1983).

POUGH (1969) investigated the environmental adaptation in the blood of the lizards. Likewise, total lipid levels, cholesterol, cholesterol esters, and phospholipids in some groups of reptiles during normal conditions, fasting and cold torpor was reported by several workers, i.e. CHAIKOFF and ENTENMAN (1946), RAPTAZ and MUSACCHIA (1957), KHALIL and ABDEL MESSEIH (1959 a), HAHN (1965 and 1967), JACKSON and LEGENDRE (1967), RAO and DAVID (1967), ZAIN and ZAIN UL-ABEDIN (1967) and RAO (1968). Up to the author's knowledge, the effect of starvation, darkness, and exposure to continuous light on the lipid and phospholipid

fractions in the lizard, chalcides ocellatus is not available in literature. Therefore this investigation was carried out to fill this gap.

MATERIAL and METHODS

a. Materials:

The lizard, Chalcides ocellatus, was used in this study. Fifty adult lizards obtained from a local supplier, each weighing 12 gm (on the average) were designated for this investigation. Experiments were carried out in November 1985. The lizards were divided into five groups, ten lizards each, considering the initial weights to be as close as possible in all groups. Such groups were subjected to different environmental conditions for 60 days, namely: Group I- Starvation and continuous electric light, Group II- Starvation in sand in normal light, Group III- Starvation without sand in normal light, Group IV- Starvation and continuous darkness, and Group V- was kept as control.

b. Methods:

Sampling: Blood samples were collected as described by HAGGAG, et al. (1965). While, the serum was prepared as outlined by OSER (1965).

Analytical methods:

1- Lipid extraction:

Lipid was extracted from the serum of the lizard applying the method described by GOTZ, et al. (1980) using chloroform: methanol mixture (1:1).

2- TLC fractionation of lipids:

Thin layer chromatography (TLC) silica gel G plates 13x18 cm (ca. 250 microns thickness was used for qualitative and quantitative determination of lipid fractions. The isolated lipid fractions were identified and evaluated as described by GOTZ, et al. (1980). The development was carried out in diethyl: petroleum ether, 40-60°C: acetic acid (50:50:1).

3- TLC fractionation of phospholipid:

The phospholipid fractions were separated in chloroform: methanol: water (65:30:5) as described by STAHL (1969) and GOTZ, et al. (1980).

RESULTS and DISCUSSION

a. Lipid fractions:

Thin layer chromatograms of the various fractions of lipids isolated from the serum of the lizard, Chalcides ocellatus are shown in Fig. 1. These fractions were identified as phospholipids (1), cholesterol (2), free fatty acids (3), triglycerides (4) adn cholesterol ester (5).

Results of the effect of certain environmental conditions on the lipid components in the serum of Chalcides ocellatus are summarized in table 1. Both phospholipids and cholesterol recorded the highest percentage among lipid fractions (26.49% and 23.30%, respectively) in the serum of the control lizard. Meanwhile, free fatty acids, and cholesterol ester were present

in relatively equal medium concentrations (19.27% and 19.22%, respectively), while triglycerides (7.84%) accounted for the minor share of the total lipids in the serum of the control lizard (Table 1).

In general, there are no appreciable qualitative differences in the lipid fractions of the lizard serum between the certain studied environmental conditions given in table 1. However, quantitative differences could be detected amongst these fractions. The data revealed that lipid fractions levels markedly changes during starvation and subjection to continuous electric light. While, phospholipids, cholesterol and free fatty acids levels decreased, triglycerides increased almost two fold. Meanwhile, cholesterol esters remained constant. On the other hand, starvation in normal light and sand did not change phospholipids and cholesterol esters levels in the lizard serum, although it reduced the levels of cholesterol and free fatty acids. While, triglycerides increased almost two fold.

Table (1)
The effect of certain environmental conditions on the lipid components in the serum of the lizard, Chalcides ocellatus

Group No.**	% Lipid Fractions*				
	Phospho-lipids	Cholesterol	Free fatty acids	Trigly-cerides	Cholesterol esters
1	25.28	20.86	16.64	14.43	19.21
2	26.36	21.57	17.12	15.08	19.84
3	29.60	23.41	19.32	8.52	17.56
4	27.37	21.69	18.94	7.85	20.72
5	26.49	23.30	19.27	7.84	19.22

* % = of the total lipid

** 1 = Starvation and continuous electric light.
2 = Starvation in normal light in sand.
3 = Starvation without sand in normal light.
4 = Starvation and continuous darkenss.
5 = Control.

Furthermore, starvation without sand in normal light reduced slowly the level of cholesterol esters, but resulted in an increase in the levels of phospholipids and triglycerides. Meanwhile, the levels of cholesterol and free fatty acids did not change entirely. On the contrary, starvation and continuous darkness elevated the levels of cholesterol esters and phospholipids, accompanied by a rather slight decrease in the levels of free fatty acids and cholesterol in the serum of the lizard. However, triglycerides concentration remained almost constant.

According to GANS (1970) fat levels change slowly during starvation in the turtle chrysemys picta. The data reported herein coincide with JACKSON and LEGENDRE (1967) findings on blood serum cholesterol levels in turtles.

In addition the effect of photoperiod on cholesterol and free fatty acids in the plasma

of frogs, Rana pipens reported by STEVENS (1983) is in good agreement with the obtained data.

b. Phospholipid fractions:

Chromatograms of the various fractions of phospholipids separated from the serum of Chalcides ocellatus under the certain environmental conditions are shown in Fig. 2. These fractions were identified as: lecithins (1), ethanolamine phospholipid (2), serinphospholipid (3), sphingomyelins (4), and lysolecithins (5). Results of the effect of certain environmental conditions on the phospholipids components in the serum of the lizard, Chalcides ocellatus are tabulated in Table 2. The data revealed that the principal prevalent component is lecithins, which constitute 42.24% the total phospholipids in the serum of the lizard. While, serinphospholipids and lysolecithins constitute the least percentages (10.56% and 10.16%, respectively) among phospholipid fractions.

Table (2)
The effect of certain environmental conditions on the phospholipids components in the serum of the lizard, Chalcides ocellatus

Group No.**	% Phospholipid Fractions*				
	Lecithins	Ehanolamine Phospholipids	Serin-phospholipids	Sphingom-yelins	Lysoleci-thins
1	40.10	19.60	13.21	14.19	12.80
2	40.30	20.20	13.72	15.39	10.41
3	38.52	23.31	12.93	14.74	10.43
4	39.67	22.90	12.50	14.23	10.51
5	42.24	22.73	10.56	13.87	10.16

* % = of the total phospholipid.

** 1 = Starvation and continuous electric light.
2 = Starvation in normal light in sand.
3 = Starvation without sand in normal light.
4 = Starvation and continuous darkness.
5 = Control.

On the other hand, the data revealed that the interactive effects of photoperiod and starvation resulted in a rather marked increase in serinephospholipids and sphingomyelins levels, accompanied by an apparent decline in lecithins level. Meanwhile, lysolecithins level remained almost constant in all studied environmental conditions, except in starvation and continuous electric light, where the level of this fraction was elevated. Such data are in good agreement with HUTTON (1960) findings for pseudemys. On the other hand, ethanciamine-phospholipids did not change markedly.

It is note worthy to point out that in this regard HANKE (1973) reported that long photoperiod or continuous darkness changes secretory activity of hypothalamus in Rana pipiens. Thus the wide divergence of lipids and phospholipid fractions might be due to the combined interactive effects of photoperiod and starvation in lizard serum.

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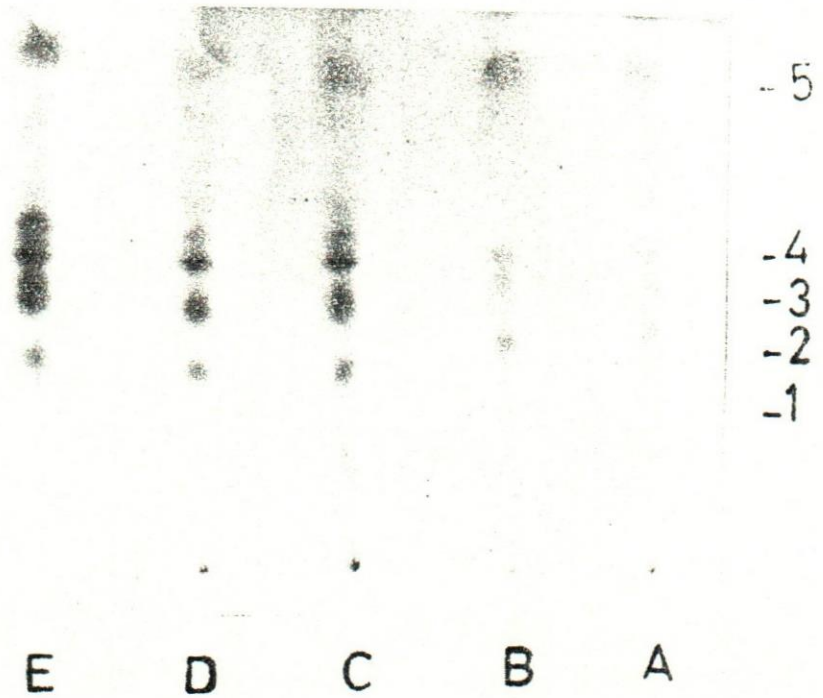

Fig. (1)
Thin layer chromatogram of lipid fractions of the serum of the lizard, Chalcides ocellatus.

A- Starvation and continouous electric light.
B- Starvation in normal light in sand.
C- Starvation without sand in normal light.
D- Starvation and continous darkness.
E- Control.
1- Phospholipids
2- Cholesterol
3- Free fatty acids
4- Tryglycrides
5- Cholesterol ester.

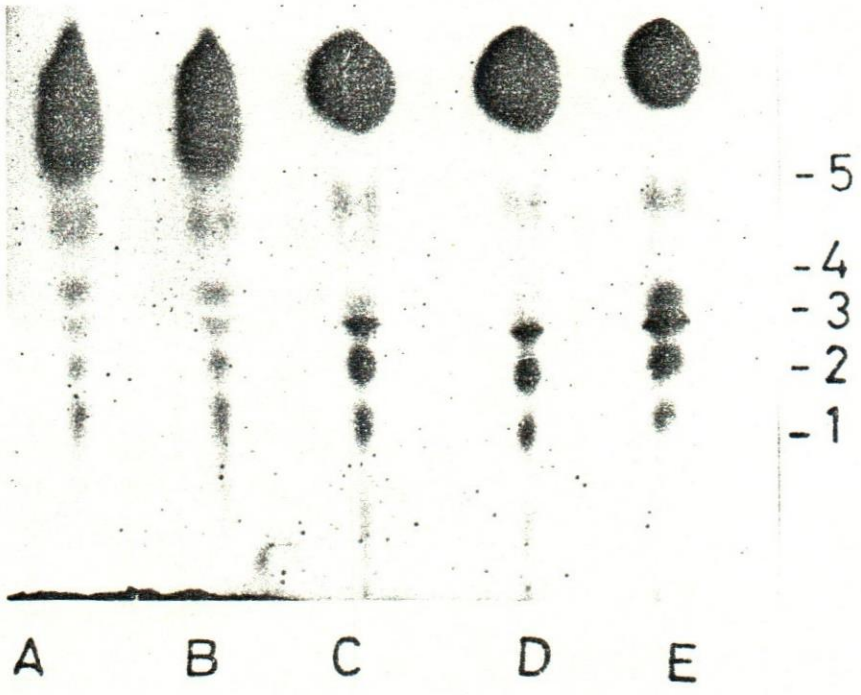

Fig. (2)

Thin layer chromatogram of phospholipid fractions of the serum of the lizard, Chalcides ocellatus.

A- Starvation in normal light in sand.
B- Starvation in normal light in sand.
C- Starvation without sand in normal light.
D- Starvation and continuous darkness.
E- Control.
1- Lecithin
2- Ethanolamine
3- Serine
4- Sphingomyline
5- Lysolecithin.