The Effect of Folic Acid Administration of Some Physiological Parameters in Normal Adult Male Rabbits

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Summary

This study was conducted to find out the effect of folic acid at different doses (5 µg and 10µg/animal daily) on blood parameters in adult male rabbits. The animals were divided into 3 equal groups each group contained five animals. One of them as control and other as treated groups T1 and T2. The experiment lasted four weeks. GroupT1 got folic acid at dose 5 µg/daily/animal and GT2 10µg/animal. To study the hematological parameters such as [total red blood cell (RBC), total white blood cell (WBC), packed cell volume PCV, hemoglobin concentration (Hb) and using serum to detect total serum protein. The folic acid was causing significant increasing in most of these parameters due to the stimulating effect of it and anti-oxidant properties that protect the cell membrane from free radical. Therefore, the administration of folic acid is useful especially for children, pregnant women and aging people.

Keywords: Folate, RBC, anemia, Folic acid, male rabbit.

تأثير إعطاء حامض الفوليك في بعض المعايير الفسلجية في ذكور الأرانب البالغة

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الخلاصة

أجريت هذه الدراسة للكشف عن تأثير إعطاء حامض الفوليك بجرع مختلفة (5 مايكروغرام و10 مايكروغرام) يومياً لكل حيوان على بعض المعايير الدمية في ذكور الأرانب البالغة. تم تقسيم الحيوانات عشوائياً إلى ثلاثة مجاميع متساوية مجموعة سيطرة ومجموعتي معالجة ، عوملت المجموعة الأولى T1 بحامض الفوليك بجرعة (5 مايكروغرام) ومجموعة المعالجة الثانية بجرعة (10 مايكروغرام) واستمرت التجربة لمدة أربعة أسابيع لغرض دراسة بعض المعايير الدمية مثل (العدد الكامل للكريات الدموية الحمراء والعدد الكامل للخلايا الدموية البيضاء وقياس مستوى تركيز الهيموغلوبين وحجم الخلايا المرصوصة) وأخذ المصل لإجراء قياس لمستوى البروتين الكلي في مصل الدم. أظهرت النتائج وجود زيادة معنوية لمعظم المعايير المدروسة عند إعطائها الفوليك وذلك بسبب التأثير المحفز له لتلك الخلايا وكذلك فعله كمضاد أكسدة حيث يعمل على حماية الغشاء الخلوي للخلايا من تأثير الجذور الحرة، لذلك إعطاء الفوليك مهم وضروري للأطفال والنساء الحوامل وكذلك كبار السن.

الكلمات المفتاحية:حامض الفوليك ، كريات الدم الحمراء , فقر الدم , ذكور الأرانب .

Introduction

Folic acid (folate or folacin) is a coenzyme for many important biochemical reactions including synthesis of pyrines, pyrimidin sand neucloe proteins (1). The folate prevents the risk of cardio-vascular-disease (CVD) by decreasing homocyste in level (2).folic acid decline still birth premature, increasing lactation for woman, also preventing the development of cancer especially colic cancer (3).

The vitamin plays a great role in preventing the occurrence of anemia especially macrocytic anemia. The deficiency the vitamin B9 or folic acid is causing general health problems such as weakness, fatigue, premature birth (4 and 5).

The aim of this study was studying the effect of different doses of folic acid (5 µg and 10 µg)/Kg B.W/daily on hematological parameter such as RBC, WBC, PCV, Hb and total serum protein in adult male rabbits.

Materials and Methods

In this study, were used 15 adult male rabbits weights ranged from (1000-1500) grams which kept from two weeks for adaptation period as *adlibitum* and fed pellets, then it divided into 3 groups:

Control group: fed ordinary diet and water.

Treated group (T_1): given folic acid at dose 5 µg/Kg B.W. daily by using stomach tube.

Treated group (T_2): given folic acid at dose 10 µg/Kg B.W daily by using stomach tube.

The study lasted for four weeks. The blood samples collected from heart and kept in EDTA tubes haematological parameters and isolated serum for biochemical parameters (6). The blood samples collected (5 ml) every two weeks. The statistical analysis system: Steel and Torries, (7).

Results and Discussion

The effect of folic acid in different doses (5, 10 µg/Kg B.W/daily) on total red blood cell count (cell × 10^{12}) in male rabbits. There is a significant increasing in level of ($P<0.05$) in RBC values in treated groups as compared with control and also within group along experimental period. The folic acid acts as anti-oxidant compound which preventing the damage effect of free radicals (8), also it prevents occurrence of pernicious anemia by increasing the absorption of B12 (9), beside that the folic acid increasing cell division(10), (table 1).

The total WBC count in adult male rabbits were significant increasing ($P<0.05$) in the level of ($P<0.05$) in treated groups as compared with control due to anti-oxidant effect of this vitamin which also increasing phagocytic process(8), (table 2).

The result of PVC percentage showed folic acid causing increasing in RBC counting (10) which lead to increasing the packed cell volume levels in treated groups as compared with control. The vitamin was causing increasing the absorption of ascorbic acid which stimulating erythrocytosis (11), (Table 3).

Table 4 show there are significant increasing in Hb concentration due to the increasing the RBC count. There is a significant in 3rd group at 4th week as compared with the 2nd week (12 and 13). The effect of folic acid on total serum protein concentration (g/dL) was demonstrated in table (5). There is a non-significant increasing ($P<0.05$) in total protein groups as compared with control. The folic acid stimulated the synthesis of methionine which interacted in protein synthesis (13), also it increases the level of emmunoglobins which lead to improve the immune capacity (14,15and 16).

Table (1): The effect of folic acid on total red blood cell (cell×10^{12}) in adult male rabbits

Week	Control	Folic acid 5µg/daily	Folic acid 10µg/daily
2	3.3±0.2 Aa	6.4±0.7 Ba	7.1±0.7 Ba
4	3.8±0.07 Aa	7.4±0.3 Bb	7.8±0.4 Bb

Mean ± SE (N=5) Small letters denote: the difference within group, Capital letters denote: the difference between group.

Table (2): The effect of folic acid on the total leukocyte count (cell × 10^9) in adult male rabbits

Week	Control	Folic acid 5µg/daily	Folic acid 10µg/daily
2	5.2 ±0.2 Aa	6.7±0.3 Ba	6.6±0.4 Ba
4	5.5 ±0.2 Aa	6.9±0.7 Ba	7.0±0.3 Ba

Mean ± SE (N=5) Small letters denote: the difference within group, Capital letters denote: the difference between group.

Table (3): The effect of folic acid on pack cell volume (PCV)(%) in adult male rabbits

Week	Control	Folic acid 5µg/daily	Folic acid 10µg/daily
2	27± 0.4 Aa	34±2.1 Ba	37±3.0 Ba
4	25 ± 0.6 Aa	38± 2.3 Ba	40 ±2.6 Ba

Mean ± SE (N=5) Small letters denote: the difference within group, Capital letters denote: the difference between group.

Table (4): The effect of folic acid on hemoglobin concentration (g/dL) in adult male rabbits

Week	Control	Folic acid 5µg/daily	Folic acid 10µg/daily
2	9.0± 0.4 Aa	11.3±0.3 Ba	12.3 ± 0.4 Ba
4	8.3± 0.1 Aa	12.0± 0.6 Ba	13.3± 0.6 Ba

Mean ± SE (N=5) Small letters denote: the difference within group, Capital letters denote: the difference between group

Table (5): The effect of folic acid on total serum protein (g/dL) in adult male rabbits

Week	Control	Folic acid 5µg/daily	Folic acid 10µg/daily
2	5.8± 0.1 Aa	6.6± 0.3 Ba	7.1± 0.2 Ba
4	6.3 ± 0.4 Aa	7.0 ± 0.2 Ba	7.4± 0.4 Ba

Mean ± SE (N=5) Small letters denote: the difference within group, Capital letters denote: the difference between group

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