Journal of Kerbala University , Vol. 7 No.4 Scientific . 2009

Effect of Zinc deficiency on the average numbers of sperms in white mouse
تأثير نقص الزنك في معدل اعداد النطف في الفار الأبيض

وجدان ثامر مهدي
جامعة الفادسية / كلية العلوم

Abstract

The effect of zinc deficiency on sperm count was studied in mouse drinking water containing zinc-deficient diet. Thirty balb-c- mice were divided randomly in to 3 groups of 10 animals in each. Group 1 act as controls, group 2 was supplied with drinking water containing0.3gZn/100 ml water and group 3 was supplied with drinking water containing 0.3gZn/100 ml water.

The results of hole period 3 weeks show a significant reduction($P \leq 0.05$)in the group3 compared with group 2 and 1 the control. The sperm count in group 3 was significantly lower than in group 1 and 2 .

الخلاصـــة //

تم دراسة تاثير نقص الزنك على معدل اعداد النطف في الفئران المجموعة بالماء الحاوي على الزنك. 30 فأر من سلالة balb – c قسمت بصورة عشوائيا الى ثلاثة مجاميع في كل مجموعة 10 حيوانات الاولى تمثل السيطرة والثانية فئران زودت بالماء الحاوي على الزنك تركيز 0.3 غرام / 100 مل والمجموعة الثالثة تشمل فئران زودت بالماء الحاوي على الزنك تركيز 0.1 غرام / 100 مل .

اظهرت النتائج خلال مدة الدراسة والتي استمرت ثلاث اسابيع انخفاض معنوي على مستوى احتمالية 0.05 للمجموعة الثالثة بالمقارنة مع المجموعتين الاولى والثانية. اما معدل اعداد النطف في المجموعة الثالثة فقد انخفض معنويا عن المجموعتين الاولى والثانية.

Introduction

Zinc has been known to be essential element for more than a hundred years , it is present in most foods , but meat and fish provide the best source as bioavailability of zinc from animal products is considered to be far greater than from plant foods . (1). It was discovered by Raulin in1869 to be required for the growth of aspergillum higer(2). Zinc(Zn) is also required for the action of both carbonic anhydrase and super oxide dismutase .(3) Zn deficiency has been associated with hyper activity and sleeping disorders .(4) Zn is vital for spermatogenesis and for the development of primary and secondary sexual characteristics(5). Zn is the most important for reproductive function(6). Zn is indispensable for spermatogenic cells after meiosis and that testicular protein secretary functions can be preserved in the absence of zinc (7).As well as Zinc is the most important tace metal in sub cellular DNA and RNA fractions (8). Zn is one of the most prevalent trace elements found in the brain (9) In conclusion poor Zn nutrition may be an important risk factor low quality of sperm and idiopathic male infertility(10).The purpose of this study was to explore the effect of zinc deficiency on the sperm count in mouse.

Material and Methods

In studied we use zinc in constration 0.3gZn/100 ml water and 0.1gZn/100 ml water. The study has been done on the white mouse (strain-Balb.c at the age of 7-9 weeks) . It is weigh level was 25mg ,this study had done in the animals house of college of education. Al-Qadisya University.

In this study 30 mice were divided into three groups. The first :- Ten mice as a control group supplied normal slain (0.9%). The second :-Ten mice drank water with Zinc concentrates 0.3 g/100mL .

The third :- Ten mice drank water with concentrates 0.1gZn/100 ml water. After three weeks the mice were sacrificed and epididiymis and testis were quickly excised and put it in the salti physiological liquid to count the sperms number using the method like(11).

Statistical tests

The statistical tests had done by using T.test to know the effect of the lack of zinc on the average of sperm number in the wight mouse(11).

Result and discussion

The results of analysis by using T-test shows that amoral gap had happened and may be($P \leq 0.05$)in the rate of sperm count increased because zinc has been reduced as it is in the table when it is compared to the control group.

The decrease in sperm count coincided with decline in Leydig cell function and was reversed after zinc supplementation in low doses or the cause of the reduce in the level of the sperm number may be related to the dietary restriction of zinc can affect testicular function adversely(13).

Yoshikazu show that zinc deficiency for 12 weeks in male mice induced a decrease in body weight ,testis weight and sperm count.(14)The cause may be the effect of the lack of zinc on the efficiency of the reproductive system of mice.This is supported by the study of (16) which refers to that the lack of zinc leads to alack in reproductive function in rats(15) .The cause also may be related to the effect of zinc on the spermatogenesis this is supported by (12) study that zinc is an essential trace element for spermatogenesis(16) also lack of zinc effects on testicular growth and serum testosterone(17)

Table: Effect of zinc concentration in the average numbers of sperms 10 at mice

Concentration	Control group1 0.9% N.S	Group 2 0.3 g/100mL	Group 3 0.1 g/100mL
Sperm count	30.58	2.89	*19.11

Student's T-test T * P value < 0.05

References

1. International Zinc Nutrition Consultative Group Assessment of The Risk of Zinc Deficiency options for its Control . Food Nutr Bull 2004; 25: 591-204 .
2. Stawomir , T.Piotr , G.and Iwona , T. (2007) . Role of Zinc in Homeostasis . Biological Trace element research . Vol.121.N.1. P. 93-103.
3. Kirshyessher,M.and Weigand, E.(1983). Zinc absorption and excretion in nutrition in : metal ions in biological systems. Vol :15,zinc and its Role in Biology and Nutrition.
4. Ploysangam,A.Falciglia , GA. And Brehum , B.J.(1997). Nutrition Program, College of Education University of Cincinnati , oH 45221-6622 USA .
5. Krishnamarthy , H.Ganesh,C.and Jyothi,P. (1998). Radio productive effect of Zinc aspartate on spermato genesis . Mutation Research / Fundamental and Molecular Mechanisms of Mutagenesis Vol.401, issues 1-2,5 June , P.111-120.
6. Gilbert,E.R.,Ruiz,E.,Osorio,C.,Ortega,E.(1996).Effect of dietary zinc deficiency on reproductive function in male rats.Journal of Nutritional Biochemistry,Vol.7,issues 7,P:403-407.
7. Fraker,P.defasquale ,J.and Zwickicm,P.(1978). Regeneration of T-cell helper functions in Zinc deficient adult mice . Proc Natl Acad .Sci.USA,15:5660 .
8. Wacker,W.and Vallee,BL.(1959). Nucleic acids and metals . I. chromium, Manganese , Nickel Zinc ,Iron and other metals inribonucleic acid from diverse biological sources . J.Bio.chem. 234:3257.
9. Stanstead, HH.(1985) .Zinc essentiality for brain development and function .Nutr Rev, 43(5) :130-137

10. السعدي ، حيدر كامل زيدان (1992).تاثير الموثين Fex(reprodin) في مراحل نشأة النطفة في الفئران البيض . رسالة ماجستير / كلية العلوم . جامعة بغداد .

11. الراوي،خاشع محمود (1980).المدخل إلى الإحصاء.دار الكتب والنشر،جامعة الموصل.

12. Sonoko ,Y.,Chiemi,M.,Kzuya,K.,Fritzie,T.(2009)Zinc is an essential trace element for spermatogenesis.Faculy of medicine.Vol.106.N0.26.P.693-705.
13. Abbasi, AA. Prasad, AS.Rabbani, P.(1980) Experimental Zinc Deficiency in Man : Effect on Testicular Function , J.Lab Clin Med , 96: 544-50 .
14. Bedwal , RS.Edwards, MS.Katoch,M.Bahuguna, A.and Dewan, R.(1994). Histological and biochemical changes in Testis of Zinc Deficiency Balb-c-Strain of mice .Indian-J-Exp. Biol.AP: 32(4)- 243-7 .
15. Colagar, AH.Marzony, ET. and Chaichi,MJ. (2009) . Zinc Levels in Seminal Plasma are associated with sperm quality in fertile and infertile men . Depa. Of Bio. Un. Of Mazandaran . 47416-95447. Tran . Nutr. Res. Feb, 29(2) : 82-8 .
16. Wei,Q.Fan , Ruiquan, R.Yang, Ying Fen, X. and Chen, Tiejiang, T.(2003). Effect of Zinc on reproductive Toxicity in rats . School of Pablic Health Zhongshan University , Guanglhoy 510089, China .
17. Yoshikazu,M.,Toshiaki,W.(1993).Effect of oyster extract on the reproductive function of zinc in mice.Clinical Genetics ,Vol.43,P.271-279(9).