The histological effect of selenium and vitamin E on liver and testis of Domestic *Lepus lepus* rabbits

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Abstract

The study was conducted to investigate the effect of selenium and selenium in addition to vitamin E on liver , and testis of ***Lepus lepus*** rabbits after 30 days of treatment . The histological study revealed that The liver which had treated with selenium showed obvious necrosis and mild inflammation in constract with control liver where the hepatic cells arranged around the central vein. While , necrosis was not well visible in rabbit treated with vitamin E and selenium . We can conclude that vitamin E had decreased the hepatocellular damage caused by selenium .

The degeneration in spermatocyte cell in selenium treated rabbits was very clear , but there was an obvious increase in the number of spermatogonia cell in rabbits testis treated with vitamin E and selenium . These results showed that selenium has antigonadal activities that can be ameliorated by vitamin E administration .

Introduction :-

selenium (se) is a metalloid element , of atomic weight 79 , located in group VI of the periodic table , The element is essential for mammals , including humans , as a component of two enzymes , glutathionine peroxidase and iodothyronine 5'-de-iodinase.In addition ,adistinct et selenium-containing protein , selenoprotein p , has been identified in the plasma . (sheenan and Halls, 1999) .

Selenium exerts its anticarcinogenic effects by multiple mechanism. In the physiologyical dosage range , selenium appears to function as an antimutagenic agent , preventing, the malignant transformation of normal cells and the activation of oncogenes .

The protective effects of selenium associated with its presence in the glutathione peroxidases which protect DNA and other cellular components from damage by oxygen radicals (Schrauzer, 2000) . Sappington(2002) showed that selenium is a normal component for enzymes , proteins , and aminoacyl transfer rilonucleicacid.

The acute selenium toxicity causes Blind staggrs and the features of acute poisoning include vomiting and diarrhoa, mucosal damage , metabolic acidosis and muscle spasm (Ruta & Haider , 1989; Garcia *et al* , 2000) . However, the chronic selenium toxicity causes Alkali disease and the features of chronic selenosis include gastro- intestinal disturbance , loss of hair and nails, infection of nail beds and skin lesion, and neurological inpairment (Ruta & Haider, 1989; Davis *et al* , 2001) . The need of vitamin E depends on the supply with selenium , with unsaturated fatty acids and with S- containing amino acids. Selenium is necessary for the synthesis of glutathion peroxidase. The vitamin E is effective in the degradation of fattyacid – proxidase compounds in the membranes, the glutathione peroxidase in the soluble proportions of the cells. The vitamin E is important for the detoxication processes in the liver and for the immune defense (Kolb, 1982) .

Material and Methods :

Eighteen male adult rabbits ***Lepus lepus*** (6 weeks old) (1500 -1750 gm weight) were housed in iron cages with (1x 0.5 x 0.5) m dimensions. They were separated into 6 rabbits as a contral group and 12 rabbits as experimental group .The later group was divided to group (1) which the animals in oculated with (10) µg selenium taken orally and group (2) were the animals had inoculated with (10) µg selenium with addition (0.4)mg vitamin E was given orally as small capsules. All the animals were killed under ether anaesthesia after (30) days of treatment . Specimens from liver and testis related to control and experimental groups were prepared for light microscopic study according to (Luna , 1968) . The samples were cut off, washed with normal saline and immediately immersed in 10% formaline fixative. The tissue samples dehydrated in a graded ethanol series (50 % , 70 % , 95 % and absolute alcohol) after that they were cleared with xylene , two changes 15 min in each . All the specimens were infiltratd with melted paraffin for 6-12 hr . Finally these pieces were embedded in paraffin – wax , serially sections of about (5 micron) thicknees were cut and stained with hematoxylin-eosin . The sections were dehydrated, cleared, mounted in (D.P.X) and examined microscopically with phase contrast light microscope.

Results :

Examination of control sections related to liver showed normal architecture . The hepatic cell arranged as hepatic plates around central vein .(Fig 1) .

Light microscope examination of the experimental rabbits related to group (1) treated with selenium showed changes in liver architecture

characterized by altered hepatic cells arranged , increased necrosis and mild inflammation. (Fig 2) .

Sections from liver related to experimental rabbits related to group (2) treated with (selenium + vitamine E) illustrated the hepatic cells were more regularly and the necrosis not well visible but still with significant differences from the control group (Fig 3) .

Moreover sections of the testis taken from control rabbits show the spermatogonia cells were arranged peripherally and spermatocytes in different stages of development (Fig 4) .

Our results identified the histological changes of testis excised from animals treated with selenium, the seminiferous tubules were enlarged, complete degeneration in spermatocytes and decrease in spermatogonia cells (Fig 5) . while sections of testis from rabbits treated with (selenium + vitamine E) show less changes in histological structure of the seminiferous tubule and the vitamin E causing increase in the spermatogonia cells (Fig 6) .

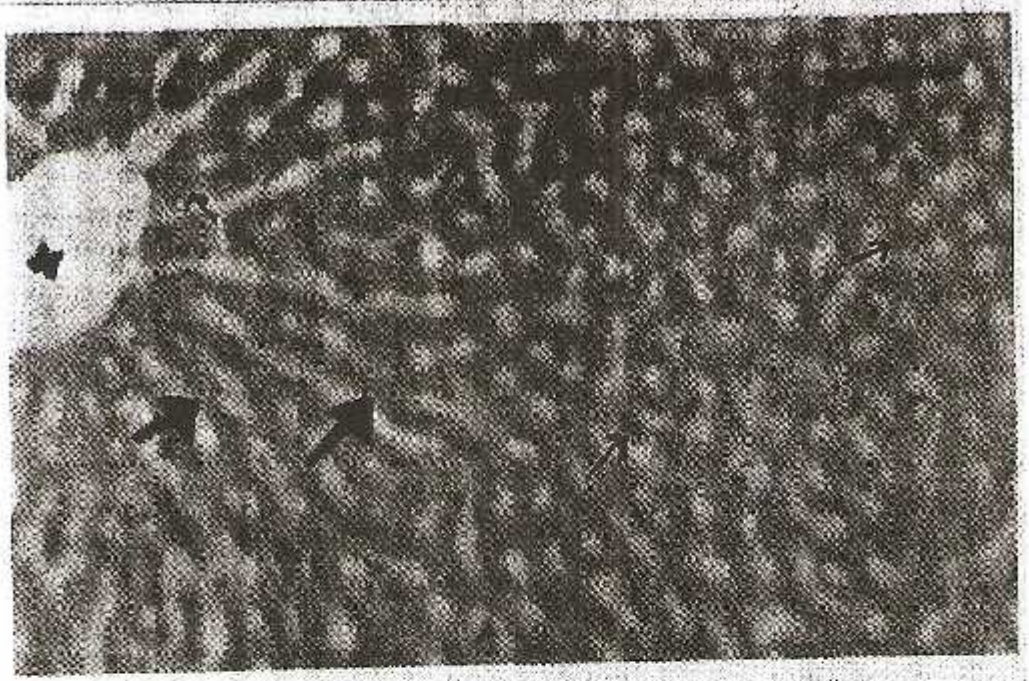

Fig. 1 :- section of liver taken from control animal (330x)

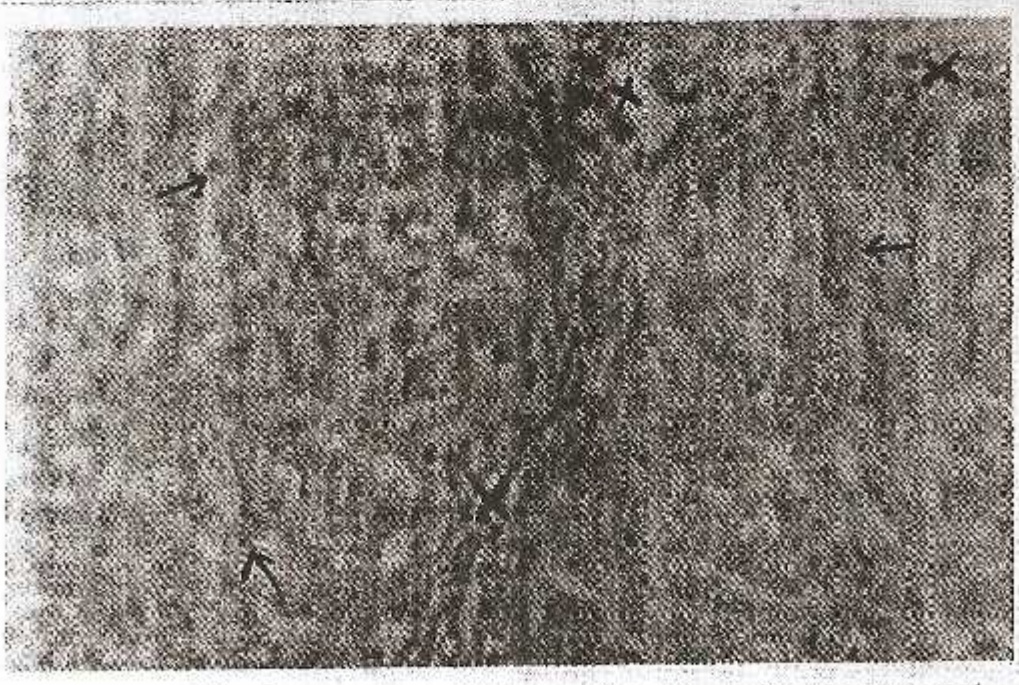

Fig. 2 - section of liver related to selenium treated rabbits (330x).

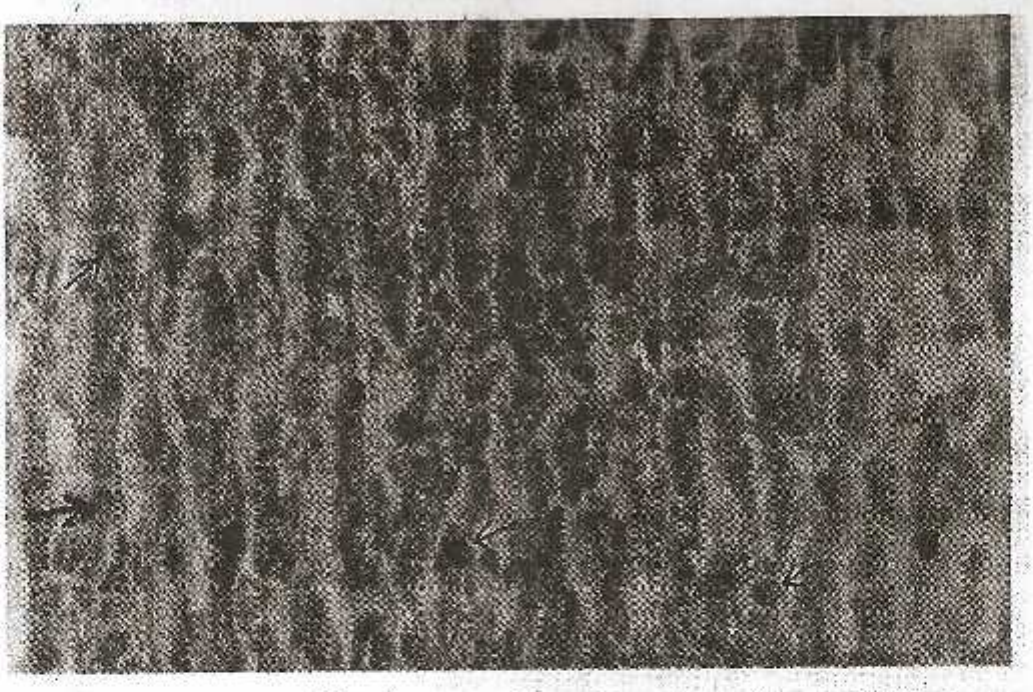

Fig. 3 :- section taken from liver of (selenium and vitamin E) treated animals.(330x)

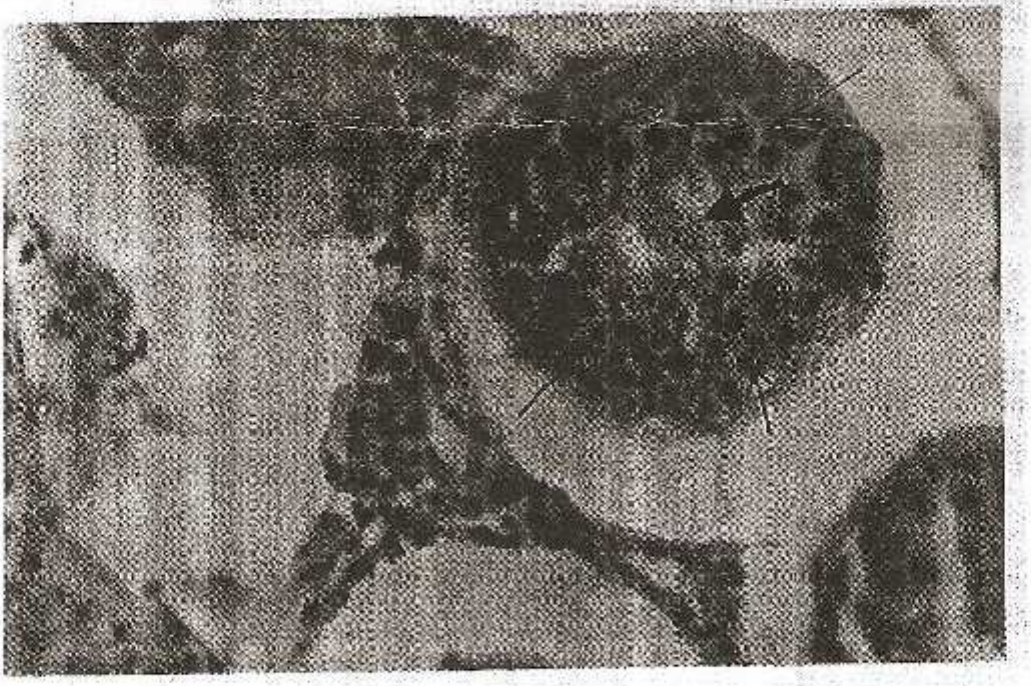

Fig. 4 :- section illustrated the control animal testis (330x)

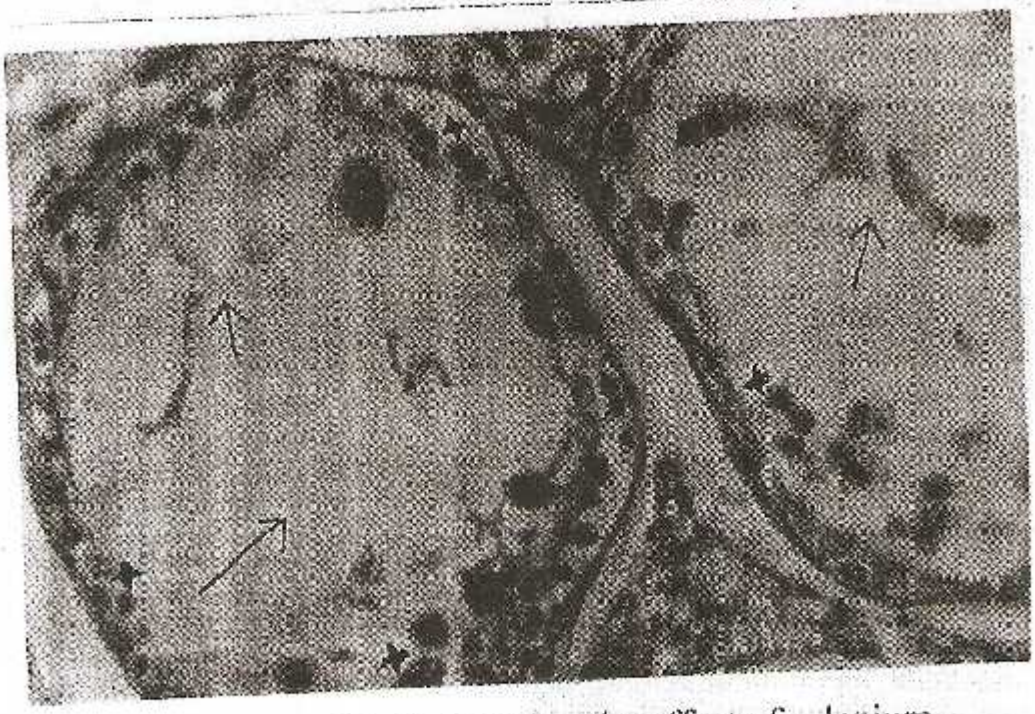

Fig. 5 showing the effect of selenium on the rabbits testis after (30) days of treatment (660x.

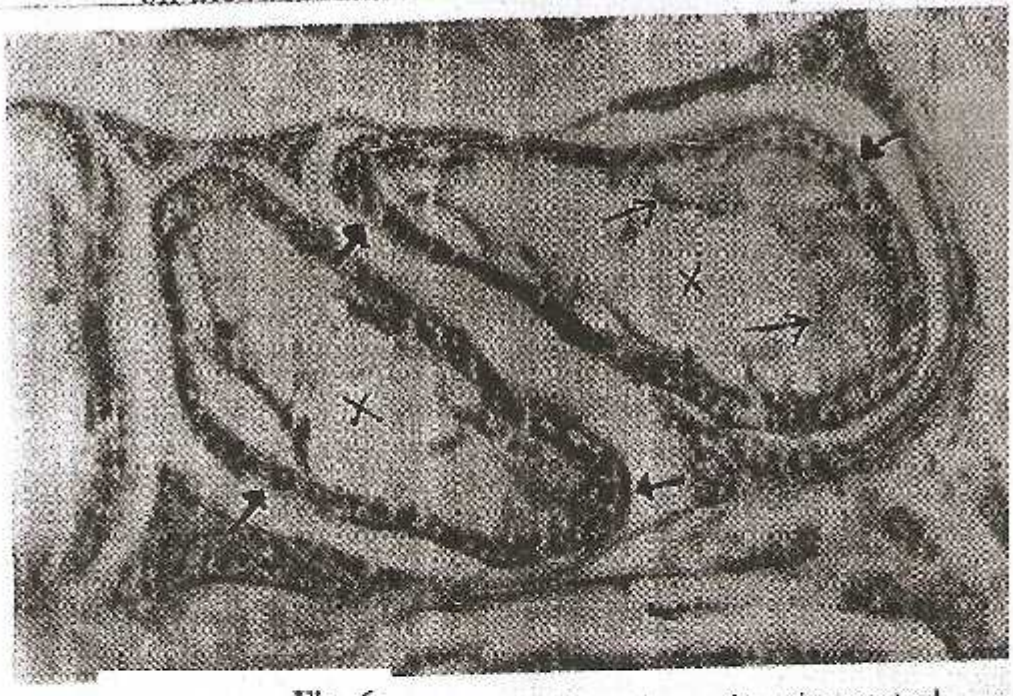

Fig. 6 - illustrated section of testis treated with selenium and vitamin E (330 x)

Discussion

Livers from reader sunfish which had accumulated approximately 20 ppm selenium in the liver showed central necrosis-, reduced quantites of rough endoplasmic reticulum and glycogen particles (Sorensen, *et al* ; 1983) .

On the other hand , the submicroscopic studies reveald that repeated administration of sodium selenite in rats contributed to chromatin destruction in the hepatocyte nuclei (chmielnicka , *et al* , 1978). selenium may by like cadmium which caused acute necrosis and damage in rabbits liver (Dudley *et al* ; 1985) (Suheyla *et al* 2000) found that no hepatocellular damage , portal fibrosis and inflammatory infiltration were found in the selenium and vitamin E group in comparison with cholesterol fed group , it was noticed that this group has the same histological appearance as the control group. As a result , we can say that combined vitamin E and selenium therapy decreases the hepatocellular damages and these antioxidant agents have protective effects on the hepatocytes cells. Histopathological studies of the testes and cauda epididymis in rats have revealed that se-rich diets cause dose-time-dependent reduction in tubular diameter , epithelial height , number of spermatogenic cells and disintegration of cellular associations in the seminiferous tubules of testes along with reduction in the diameter of cauda epididymal tubules and pseudostratification of the epithelial lining (Kaur & Kaur, 2000) . (Delidas *et al,* 2002) found that cyclophosphamide induced oxidative stress in the testis , asignificant diminution in the activities of testicular J5,3g – hydroxysteroid dehydrogenase and 17g – hydroxysteriod dehydrogenase with reduction in the plasma level of testerone and number of spermatogonia and step 7 spermatidat stage vll of spermatogenic cycle in mature albino rats , while vitamin E administration resulted asignificant restoration of all the above parameter to the control level.

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التأثير النسيجي لمادتي السيلينيوم وفيتامين E على كبد وخصى الارانب المحلية

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الخلاصة

أظهرت الدراسة النسيجية لكبد وخصى الأرانب المحلية المعاملة بالسيلينيوم والسيلينيوم مضاف إليه فيتامين E وحيوانات السيطرة إن السيلينيوم كان له تأثير واضح على نسيج الكبد حيث يحدث التلف في الخلايا الكبدية والتنخر Necrosis مع وجود الارتشاح الدموي blood infiltration في الخلايا الدفاعية مقارنة مع نسيج الكبد في حيوانات السيطرة حيث تترتب وتنتظم الخلايا الكبدية بشكل صفائح كبدية حول الوريد المركزي central Nein .

اماعند إضافة فيتامين E إلى مادة السيلينيوم وتجريعها للأرانب فيظهر هناك نقصان واضح في تأثير السيلينيوم على حصول التنخر في الخلايا الكبدية وتظهر مقاربة في الشكل لأكباد حيوانات السيطرة .

اما بالنسبة لتأثير السيلينيوم على الخصى ، فقد حدث التلف الكامل في المراحل المكونة للنطف مع وجود بعض الخلايا المولدة للنطف والتي تترتب محيطيا ضمن النبيب المنوي . أما الزيادة النسبية في عدد الخلايا المولدة للنطف فقد حصلت نتيجة لتأثير فيتامين E المضاف إلى مادة السيلينيوم .