THE ROLE OF VITAMIN E AND ZINC ON CADMIUM INDUCED INJURY OF THE ALBINO RAT TESTES AND KIDNEYS. A HISTOLOGICAL AND HISTOCHEMICAL STUDY

A Thesis

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By

GEHAN KHALAF MEGAHED

(M.B, B.Ch)

Supervised by

Prof. Dr. MOHAMED ESSAM ANWAR

Prof. of Histology

Faculty Of Medicine - Ain Shams University

Prof. Dr. FATEN SOBHY KOSHA

Prof. of Histology

Faculty Of Medicine - Ain Shams University

Dr. NAGAH MORAD YAHIA

Lecturer of Histology

Faculty Of Medicine - Ain Shams University

Faculty Of Medicine - Ain Shams University

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الحمد لله الذى هدانا لهذا و ما كنا لنهتدى
لولا أن هدانا الله

صدق الله العظيم

(سورة الأعراف الآية ٤٣)

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Abbreviations and Glossary

Cd	cadmium
vit E	vitamin E
Zn	zinc
ttt	treated
PCTs	proximal convoluted tubules
DCTs	distal convoluted tubules
SNTs	seminiferous tubules
+ve	positive
gr	group
E/M	electron microscopy
MT	metallothionein
IP	intraperitoneal
SC	subcutaneous
L	liter

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CONTENTS

Page

- Introduction and aim of the work ---------- 1
- Review of Literature ---------- 4
- Material and methods ---------- 13
- Results ---------- 24
  - Kidney ---------- ---------- 24
  - Testis ----------72
- Discussion ---------- 109
  - Kidney ---------- - 109
  - Testis ---------- 118
- Summary and conclusion ---------- 125
- Abstract ---------- 130
- References ---------- 131
- Arabic summary. ----------

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INTRODUCTION AND AIM OF THE WORK

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INTRODUCTION

Among the most common hazards found nowadays in the environment is pollution with the toxic metals.

Toxic metals have been shown to affect almost every organ of the body. The chances of serious damage increase with continued exposure due to their poor excretion ***(Goyer, 1996).***

Several metals have been found to produce both acute and chronic tissue injury in humans and animals. An example of such a toxic metal is cadmium.

Cadmium is a new toxic metal and its sources of environmental pollution are variable.

In industry, its use was minor until about 50 years ago, but now it is a very important metal with many industrial applications. Its main use is electroplating, color pigment for paints and plastics, and cathode material for nickel-cadmium batteries. Also cadmium is a byproduct of zinc and lead mining which are one of important sources of environmental pollution with cadmium ***(Doull, Amdur, Curtis, and Klaassen, 1986).***

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In addition, cigarettes are a major non occupational source for cadmium pollution (1-2 µg cadmium/cigarette). Air borne cadmium in urban areas is generally 0.03 to 0.06 µg/m^3 ***(Kneip, Eisenbud, Strehlow and Freudenthal, 1970).***

On the other hand, exposure to cadmium have increased in the last 20 years because of the wide use of fertilizers rich with cadmium e.g., sewage sludge ***(George, Clayton, and Florence, 1994).*** Therefore, increased cadmium levels have been reported in tissues of animals fed on grass gown in soil fertilized with sewage sludge ***(Miller and Boswell, 1981).***

So, the food is the principal source of cadmium exposure for humans ***(Friberg, Piscator, Nordberg, and Kjellstrom, 1974).*** Meat, fish, fruit and especially liver and kidneys of animals contain high concentration of cadmium. Also shellfish may be a major source of dietary cadmium ***(Doull, et al., 1986).***

The total daily intake of cadmium from food, water and air in North America and Europe is estimated to be about 10 to 40 µg/day ***(Doull, et al., 1986).***

The effects of inorganic cadmium on human health had attracted considerable attention in the last 20 years. Much of this attention had been the result of the discovery of a disease called Itai-Itai (Pain-Pain) reported from Japan by ***Hogino and Yoshioka (1961)*** among people exposed to cadmium in

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