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THE RELATION BETWEEN METAL IONS AND BLOOD
COAGULATION AND FIBRINOLYSIS

THE S I S
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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

وَقَدْ رَفَعْتُمْ تِلْكَ الْقُلُوبَ

صَدَقَ اللَّهُ الْعَظِيمُ



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MEMORANDUM

This thesis includes the following papers submitted for publication:

1. Determination of lethality (LD_{50}) of common trace elements.
By: Ebtissam A. Abou Shady, M. Hani Ayobe and N.A. El-Damarawy.
2. Defects in blood coagulation caused by trace elements. Iron, Copper and Gold.
By: Ebtissam A. Abou Shady, N.A. El-Damarawy, Fatma A. Mohamed, A.M. Kamel and A.A. Massoud.
3. Defects in blood coagulation caused by trace metals Zinc and Magnesium.
By: Ebtissam A. Abou Shady, N.A. El-Damarawy, Fatma A. Mohamed, A.M. Kamel and A.A. Massoud.
4. Effects of some trace elements on platelet function in rats.
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5. In vitro effects of trace elements on blood clotting and platelet function.

A- Iron, Copper and Gold

By: Ebtissam A. Abou Shady, Hoda Farrag,
N.A. El-Damarawy, Fatma A. Mohamed, A.M. Kamel and
A.A. Massoud.

6. In vitro effects of trace metals on blood clotting and platelet function.

B- Zinc and Magnesium

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1. Changes in blood coagulation and fibrinolysis during imferon administration in rats.
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2. Effects of prolonged Zinc excess on blood coagulation and fibrinolysis in rats.
By: Ebtissam A. Abou Shady, Fatma M. Lebda,
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3. Blood coagulation and fibrinolysis profiles following long-term administration of Magnesium sulphate in rats.
By: Ebtissam A. Abou Shady, Fatma M. Lebda, Fatma A. Mohamed, A.M. Kamel and A.A. Massoud.

4. Effects of long-term administration of Copper sulphate on blood coagulation and fibrinolytic activity in rats.
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5. Changes in blood coagulation and fibrinolysis in rats treated with myocrisin.
By: Ebtissam A. Abou Shady, Fatma A. Mohamed, A.M. Kamel, Fatma M. Lebda and A. A. Massoud.

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INTRODUCTION

INTRODUCTION

Many of the heavy metals (trace elements) are known to be essential for normal health, function and development, although relatively small amounts (milligrams or micrograms) are required to be absorbed each day to maintain balance. Most essential trace elements are biochemically functional as metalloproteins, usually as enzyme cofactors.

Further, while most of the ancient medicines are now seen to be outdated and irrelevant, and, hence, have been discarded, the use of heavy metals (trace elements) as drugs has an impressive pedigree. In addition, metals have also been employed for more disreputable purposes such as murder, suicide and illegal abortion.

During the past two decades, remarkable advances have taken place in the field of trace-element research.

However, though the toxicity of trace-elements has been extensively investigated, little attention was drawn to their effects on the blood coagulation mechanism and its ally, the fibrinolytic system. In fact, data on the effects of some metals in this respect are derived from clinical observations in cases of accidental or suicidal poisoning as well as few scattered

experimental reports on either blood clotting, fibrinolytic process or platelet function.

It was, thus, stimulating to study the interaction of some metal salts with elements of blood clotting, fibrinolysis and platelet function in more detail.

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AIM OF THE WORK

A I M O F W O R K

The present study was carried out to investigate the relation between some metal ions, namely Iron, Zinc, Magnesium, Copper and Gold and the blood coagulation mechanism, fibrinolytic system as well as platelet function, in order to throw more light on the role of these trace elements in the field of hemostasis, and, as well, to help clarify the possible pathophysiology encountered in conditions of metal toxicity.