A STUDY OF ESSENTIAL FATTY ACIDS IN ATOPIC DERMATITIS

Thesis
Submitted for Partial Fulfilment of
the Requirements of the M.D. Degree
(Dermatology and Venereology)

By

Maha Mohamed Adel Shaheen
M.B.; B. Ch., M.S.
(Dermatology and Venereology)

Supervised By

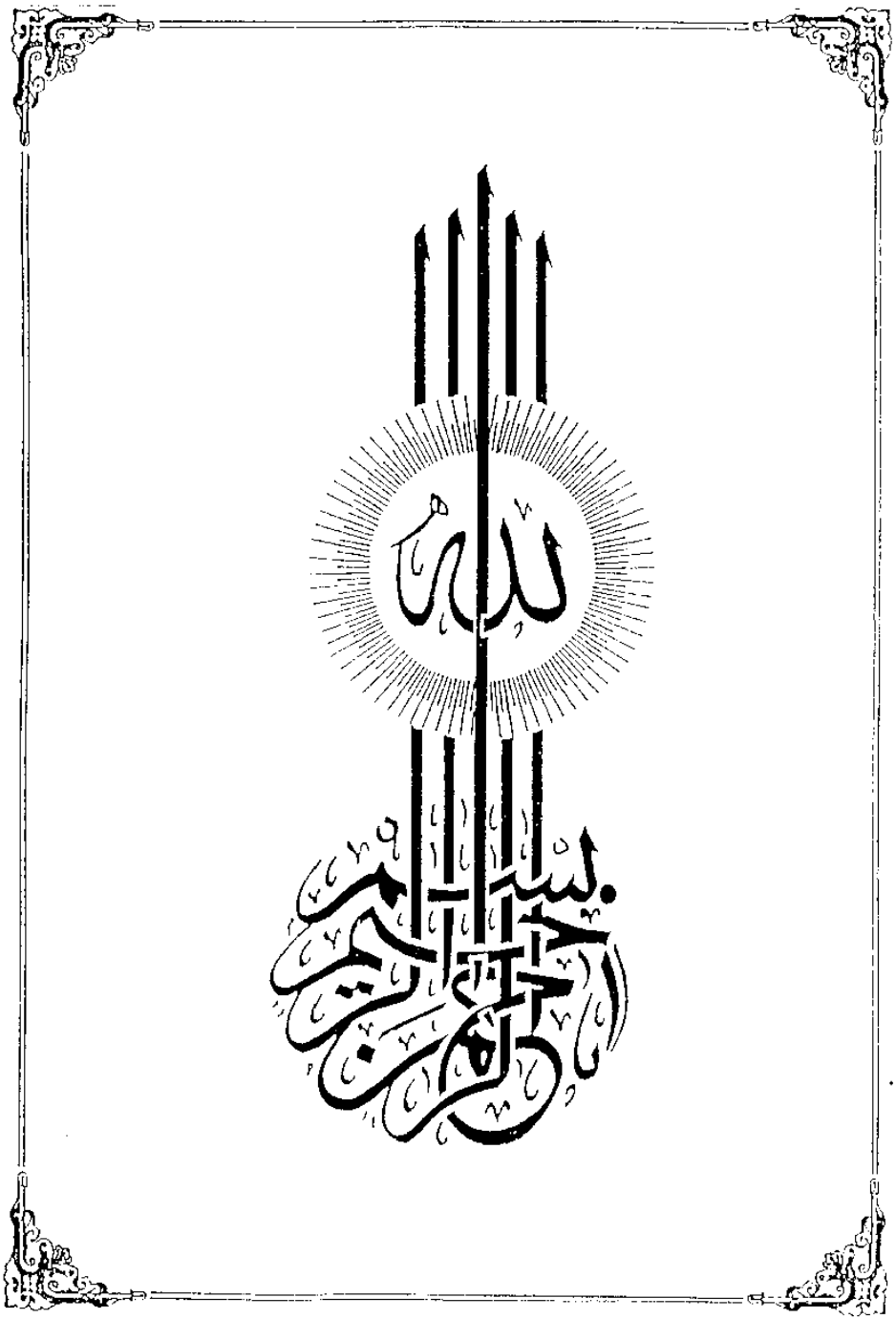
Prof. Dr. MONA ABD EL-HALIM EL-OKBY
Professor of Dermatology and Venereology
Faculty of Medicine
Ain Shams University

Dr. GAMAL MOHAMED MABROUK
Assistant Professor of Biochemistry
Faculty of Medicine
Ain Shams University

Dr. MAHA ANWAR ABOU EL-MAGD
Lecturer of Dermatology and Venereology
Faculty of Medicine
Ain Shams University

1995

مها أنور أبو المجد



الكليـــة:

رسالـــة ماجستير / دكتـــوراه

أسم الطـــالب:.....

عنوان الرسالة:... A Study of Essential Fatty Acids In Atopic Dermatitis

أســم الدرجـــة : (ماجستيـــر / دكتـــوراه)

لجنـــة الاشـــراف

١- الاسم/ ٢- الوظيفة/

١- الاسم/ ٢- الوظيفة/

١- الاسم/ ٢- الوظيفة/

تاريخ البحـــث : / / ١٩

الدراســـات العليـــا

ختـــم الإجـــازة :
/ ١٩٩

أجيزت الرسالـــة بتـاريخ /

موافقة مجلس الكلية
/ / ١٩٩

موافقة مجلس الجامعة
/ / ١٩٩

جامعة عين شمس

الكليـــة :

شكـــــر

اشكـــر الســـادة الأســـاتذة الـــذين قامـوا بالأشـــراف

وهـــم :

١) أ.د/ رضى عبد الحليم السعيد (أستاذ الأمراض الجلدية والتناسلية المتفرغ)
٢) أ.د/ جمال محمد صدقى (أستاذ مساعد الكيمياء الحيوية الطبية)
٣) أ.د/ محمد أنور أبو اليزيد (مدرس الأمراض الجلدية والتناسلية)
٤) .....

ثـم الأشخـاص الذيـن تعـاونوا معـى فـى البحـث

وهـــم :

١) د/ أحمد إبراهيم سليم مدرس الأمراض الجلدية والتناسلية
٢) الكيميائى محمد أكرم أحمد
٣) .....

وكـذلك الهيئـات الآتيـة :

١) قسم الأمراض الجلدية والتناسلية (المباحث)
٢) .....
٣) قسم الكيمياء الحيوية (المباحث)

ACKNOWLEDGEMENT

I would like to express my deep gratitude and acknowledgement to Prof. Dr. Mona Abd El-Halim El-Okby, Professor of Dermatology and Venereology, Ain Shams University, for her wise supervision, continuous guidance and unfailing support throughout the entire work.

I am really grateful to Dr. Gamal Mohamed Mabrouk, Assistant Professor of Biochemistry, Oncology Diagnostic Unit, Ain Shams University, for his invaluable scientific help and his generous assistance to achieve this work.

I appreciate the keen guidance, meticulous supervision and advice of Dr. Maha Anwar Abou El-Magd, Lecturer of Dermatology and Venereology, Ain Shams University.

I would like to thank Prof. Hesham Hussein Khalifa, Professor of Animal Physiology and Animal Production, Faculty of Agriculture, Al Azhar University, for performing statistical analysis of the data.

I appreciate the effort of Chemist/ Amr A. Amin, Oncology Diagnostic Unit, Ain Shams University, for his help in the technical work.

I wish also to thank Dr. Ahmed Ibrahim Rasheed, Lecturer of Dermatology and Venereology, Ain Shams University for his valuable suggestions and generous co-operation.

Lastly but not least, I wish to thank all members of the Dermatology and Venereology Department, Ain Shams University, for their kind help and co-operation.

Maha M.A. Shaheen

CONTENTS

INTRODUCTION

For almost 60 years, it has been known that essential fatty acids (EFAs) are necessary for normal skin function and integrity [1, 2, 3]. That EFAs may play a role in several common skin disorders has begun to be widely appreciated only in the last decade [4, 5]. A dietary deficiency of EFAs as a cause of skin problems in adults is exceedingly rare as almost all diets contain adequate amounts of linoleic acid [3]. Most of the current interest regarding EFAs and the skin relates to the concept that intake of EFAs is usually adequate but abnormalities of EFA metabolism may lead to various skin diseases [6, 7].

The fundamental defects in atopy remain largely unknown. Cellular infiltrates consisting of T-helper lymphocytes, altered interleukin expression and secretion, and increased IgE production, are factors which indicate profound immunological changes in atopic dermatitis (AD). Accordingly most studies on AD have concentrated on deficiencies in immune-cell regulation and cytokines [8, 9, 10, 11]. Recent evidence however, suggests that the pathogenesis of AD might be related to a genetically inherited abnormality of the enzyme delta-6- desaturase activity; the first enzyme involved in the metabolism of EFAs [12, 13]. The resultant fatty acid abnormality is assumed to play a role in the pathophysiology of the disease [7, 14, 15].

The inhibition of EFA desaturation is suggested to lead to an imbalance in the synthesis of PUFA metabolites such as prostaglandins and leukotrienes which are important mediators of inflammation and have

profound effects on lymphocyte functions [15, 16]. Moreover, a reduction in PUFAs which are of major structural importance in cell membranes, may interfere with the integrity of cell membranes and the normal function of membrane bound receptors and enzyme systems [6, 7].

Support for this concept comes from several controlled clinical studies that demonstrate a significant clinical improvement in AD subjects following the administration of an oil containing gamma - linolenic acid (GLA) which would bypass the first step in the EFA metabolic pathway [17, 18, 19].

Aim of the work

Available data on plasma EFA abnormalities in AD patients have been reported in patients belonging to western populations who differ from Egyptians in their dietary habits. As it has been shown that differences in dietary habits between different populations influence their plasma lipid fatty acid composition [20, 21], this prompted us to carry out this study in order to elucidate whether EFA metabolism is disturbed among Egyptian patients who have AD. This will be achieved by comparing the plasma levels of the 2 main dietary EFAs; linoleic and alpha-linolenic acids and their major metabolites in AD patients with their corresponding levels in normal control individuals.

EFA measurements will also be investigated in relation to the IgE level, severity of the disease, age at onset of the dermatitis and the presence of a family and/or personal history of atopy.