

***Evaluation of Role of intestinal microflora
on Phagocytic Function of Leucocytes
in Diabetic Patients***

Thesis

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By
Nagwa Ibrahim El-Deeb

(M.B.B.Ch)

Supervisors

Prof. Dr. Fawzia Hassan Abo-Ali

**Professor of Internal Medicine and Immunology
Faculty of Medicine - Ain Shams University**

Dr. Zeinab Ahmed Ashour

**Assistant Professor of Internal Medicine and Immunology
Faculty of Medicine - Ain Shams University**

Dr. Rasha Youssef Shahin

**Lecturer of Internal Medicine and Immunology
Faculty of Medicine - Ain Shams University**

**Faculty of Medicine
Ain Shams University
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تحت إشراف
أ.د/ فوزية حسن أبو على
أستاذ الباطنة العامة
كلية الطب - جامعة عين شمس

د/ زينب أحمد عاشور
أستاذ مساعد الباطنة العامة
كلية الطب - جامعة عين شمس

د/ رشا يوسف شاهين
مدرس الباطنة العامة
كلية الطب - جامعة عين شمس

كلية الطب
جامعة عين شمس
٢٠١٠م

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Contents

	Page
Introduction	1
Aim of the work	4
Review of literature	5
Immune system in diabetes	5
Intestinal microflora	35
Intestinal microflora and diabetes	111
Subjects and methods	121
Results	130
Discussion	160
Summary	170
Conclusion	174
Recommendations	175
References	177
Arabic summary	

LIST OF FIGURES

No.		page
Figure (A):	Summary of the effects of diabetes mellitus on the metabolism of neutrophils	33
Figure (B):	Physiologic and microbiological features of the gut	41
Figure (C):	Lactobacillus acidophilus	68
Figure (D):	Postulated mechanism involved in the onset of diabetes upon prolonged consumption of high-fat diets.	120
Figure (1):	Comparison between the 3 studied groups regarding Fasting and Postprandial blood sugar (mg/dl)	138
Figure (2):	Comparison of Phagocytosis index% between the studied groups	139
Figure (3):	Comparison of Lactobacillus a. count in stool between healthy and all diabetics patients	141
Figure (4):	Comparison between studied groups as regard stool Lactobacillus A Count(CFU/ML)	142
Figure (5):	Correlation of stool lactobacillus acidophilus counts with fasting blood sugars in the 3 studied groups	147
Figure (6):	Correlation of stool lactobacillus acidophilus counts with post-prandial blood sugars in the 3 groups	148
Figure (7):	Correlation of stool lactobacillus acidophilus counts with HbA1c in groups A (controlled	149

lists

	diabetics) and B (uncontrolled diabetics)	
Figure (8):	Correlation of phagocytosis index with fasting blood sugars in the 3 studied groups	153
Figure (9):	Correlation of phagocytosis index with post-prandial blood sugars in the 3 studied groups	154
Figure (10):	Correlation of phagocytosis index with HbA1c in groups A(controlled diabetics) and B(uncontrolled diabetics)	155
Figure (11):	Correlation of phagocytosis index with stool lactobacillus acidophilus counts in all groups	156
Figure (12):	Culture of stool on MRS agar. Lactobacillus acidophilus colonies are small, creamy, white, transparent ones. The large colonies are other lactobacillus strains	158
Figure (13):	Gram stained film of Lactobacillus acidophilus bacilli	159

LIST OF TABLES

No.		page
Table A:	Function of intestinal microflora	47
Table B:	The differences between prebiotics and probiotics	73
Table (1):	Comparison between the studied groups as regards the clinical characteristic	137
Table (2):	Comparison between the studied groups regarding laboratory data	138
Table (3):	Description of phagocytosis index % in the three studied groups	139
Table (4):	Comparison of Phagocytosis index% between the studied groups	140
Table (5):	Comparison of Lactobacillus a. count in stool between healthy and all diabetics patients	141
Table (6):	Description of Lactobacillus a. count in stool of the three studied groups	142
Table (7):	Comparison between studied groups as regard stool Lactobacillus A Count (CFU/ML)	143
Table (8):	Correlation between Lactobacillus acidophilus count and clinical and laboratory data in all diabetic patients	144

lists

Table (9):	Correlation between Lactobacillus acidophilus count and clinical and laboratory data in controlled diabetic patients	145
Table (10):	Correlation between Lactobacillus acidophilus count and clinical and laboratory data in uncontrolled diabetic patients	146
Table (11):	Correlation of phagocytic index with clinical and laboratory data in all diabetic patients	150
Table (12):	Correlation of phagocytosis index % as regards all parameters in controlled diabetic	151
Table (13):	Correlation of phagocytosis index % as regards all parameters in uncontrolled diabetic	152
Table (14):	Correlation of systolic and diastolic blood pressure with lactobacillus counts in the three studied groups	157

LIST OF ABBREVIATIONS

AAT	= α 1-antitrypsin
AAD	= antibiotic-associated diarrhea
AC	= acarbose
AGEs	= advanced glycated end products
AKt	= associated kinase t
ATP	= adenosine triphosphate
BMI	= body mass index
CBC	= Complete blood count
CD	= Crohn's Disease
CFU	= Colony forming unit
Cox	= cyclo-oxygenase
CTLA-4	= cytotoxic T-lymphocyte-associated protein-4
DCs	= Dendritic cells
DM	Diabetes mellitus
DNA	= Deoxy riboneuclic acid
EHEC	= enterohemorrhagic E. coli
FBS	= fasting blood sugar
FFA	= free fatty acids
FIAF	= fasting-induced adipocyte factor
G6PD	= glucose 6 phosphate dehydrogenase
GALT	= Gut-associated lymphoid tissue
GI	= gastrointestinal

lists

GLP-2	glucagon-like peptide-2
GLUT	= glucose transporter
HbA1c	=glycated hemoglobin
HCAs	= heterocyclic amines
HF-OFS	= high-fat oligofructose
H.Pylori	= Helicobacter Pylori
IBD	= inflammatory bowel diseases
IBS	= irritable bowel syndrome
ICAM-1	= intercellular adhesion molecule-1
IDDM	= insulin dependant diabetes mellitus
sIgA	= secretory Immunoglobulin A
IgE	= Immunoglobulin E
IGF1	= insulin growth factor 1
IgG	= Immunoglobulin G
IkB	= inhibitory kB
IL	= interleukin
La	= Lactobacillus acidophilus
LAB	= Lactic Acid Bacteria
LcS	= Lactobacillus casei strain Shirota
LF	= lactoferrin
LPS	= lipopolysaccharide
MAP	= mitogen-activated protein
MRS agar	= de man rogosa sharp agar
NAD	= nicotinamide adenine dinuclotide

lists

NADPH	= nicotinamide adenine dinucleotide diphosphate
NF-κB	= nuclear factor-kappa-B
NK	= natural killer cells
NO	= Nitric oxide
NOD mice	= non obese diabetic mice
OVA	= ova-albumin
PBMCs	= peripheral blood mononuclear cells
PDX-1	= Pancreatic duodenal homeobox-1
PKC	= protein kinase C
PMNs	= polymorphonuclear leucocytes
PPBS	= postprandial blood sugar
PRR	= pattern recognition receptors
RAGE	= The receptors for AGE
ROS	= Reactive Oxygen Species
SCFAs	= short chain fatty acids
<i>SPP</i>	= Species
T1D	= Type1 diabetes
T2D	= type 2 diabetes
TAG	= triacylglycerol
TGFβ	= transforming growth factor β
Th1	=T helper1
Th2	= T helper2
TLC	= total leukocytic counts
TLR	= Toll-like receptors

lists

TNF	= tumor necrosis factor
Treg	= regulatory T-cell
Tr1	= regulatory T-cell1
UC	= ulcerative colitis
Vs.	= versus

Introduction

Diabetes is a chronic global health problem; about 246 million peoples worldwide are currently estimated to have diabetes, a global prevalence of 5.9% (*IDF, 2006*).

The diabetes is expected to cause 3.8 million deaths among adults 20 years of age and older, approximately 6% of total world mortality. Over two third of these death occur in developing countries (*IDF, 2006*).

Type 2 diabetes is the most common form of diabetes and accounts for 85%-95% of all diabetes in developed countries and higher proportion in developing countries (*Essue et al., 2007*).

Infection is an important cause of morbidity and mortality in diabetic patient. Infection is responsible for 6.0% of diabetic deaths; chronic hyperglycemia impairs host defense mechanism, such as polymorphonuclear leucocytes (PMNL) function including chemotaxis, adherence and phagocytosis (*Bhattacharya et al., 2007*).

Introduction

Several studies work upon the intestinal microflora and their capacity to interact with the immune system of the host showing the following results. The intestinal microflora keep normal physiological and immunological intestinal barrier by secretion of antimicrobial substances, stimulation of expression of protective molecules including Toll Like Receptors family (TLRs) that signal the presence of specific microorganism to the host to initiate specific intracellular immune response (*Corthésy et al., 2007*).

Lactobacillus acidophilus increase the phagocytic capacity of murine peritoneal macrophages in addition ,it was demonstrated that L-acidophilus La1 increase the phagocytic capacity of leucocytes (mononuclear and polymorphonuclear) isolated from the blood of humans who had consumed probiotics, a further study showed that a milk product containing L-rhamnosus GG up-regulate the expression of important phagocytosis receptors (*Delecenserie et al., 2008*).

Lactobacillus increases the cytotoxic activity of natural killer cells (*Corthésy et al., 2007*).

Furthermore, it seems that the positive effects of probiotics on phagocytosis and NK cell function may be greater in immune

Introduction

deficient elderly persons. Thus consumption of probiotics may favour innate immune defences in immune deficient individuals (*Delecenserie et al., 2008*).

Lactobacilli keep Th1\Th2 balance via stimulation of T regulatory cell (*Yeun et al., 2007*).