## Lymphocyte Production Of Interleukin-2 (IL-2) In Preterm Neonates Receiving Honey Supplemented Formula

Thesis
Submitted In Partial Fulfillment of MD
Degree in Pediatrics.

By
Dr. Essam El Din Gad El Rab Ahmed
M.B BCh, Ms Pediatrics

Under Supervision of

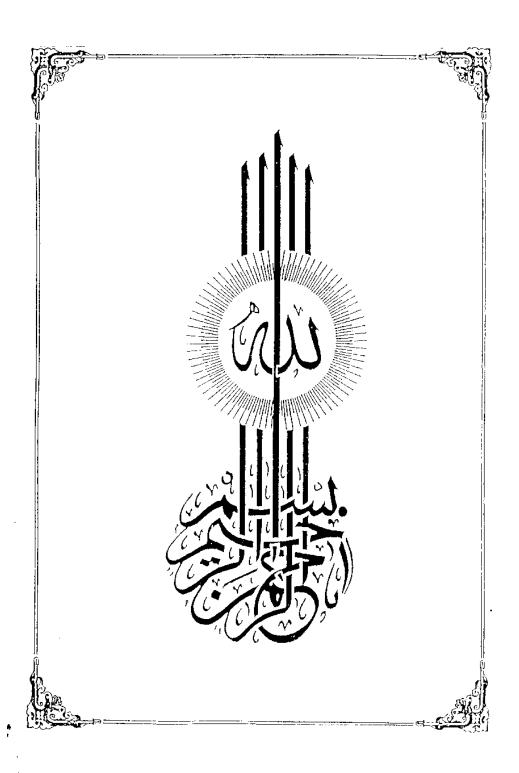
Prof. Dr. Hamed Ahmed El-Khayat Prof. of Pediatrics, Faculty of Medicine

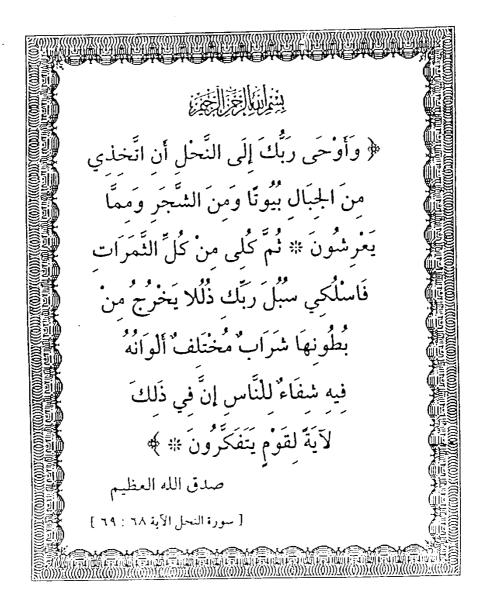
Dr. Nagia M.Bahget Assis Prof. of Pediatrics Faculty of Medicine

Dr. Hanan M.El-Shakankiry Lecturer of Pediatrics Faculty of Medicine

Dr. Hanaa Ahmed Amer Lecturer of Clinical Pathology Faculty of Medicine

Faculty of Medicine Ain Shams University 1999





## ACKNOWLEDGEMENT

First and foremost, thanks to GOD, to whom I related any success in achieving any work in my life.

I whish to express my deep thanks and gratitude to my professor Dr. Hamed A. El-Khayat, porf. of pediatrics, Faculty of Medicine, Ain Shams University, for giving me the honor of working under his supervision, for his patience and kind guidance and for his continuous encouragement throughout the whole work and always.

I am deeply grateful to Dr.Nagia M.Bahget, Assis. prof. of pediatrics, Faculty of Medicine, Ain Shams University, who gave me much of her time and experience, kindly supervised my work and guided every step till it was completed.

I am sincerely thankful to. Dr. Hanan M.El-Shakankiry,Lecturer of Pediatrics,Faculty of Medicine,Ain Shams university, for his kindness and great cooperation and support.

I'd like also to express my utmost gratitude and respect to DR. Hanaa A. Amer, Lecturer of Clinical Pathology, Faculty of Medicine, Ain Shams University, for her sincere help and encouragement.

I am deeply grateful to prof. Dr. Sanaa Abd El- Rahman, prof. of Pediatrics, Faculty of Medicine, Ain Shams University for her Kindness and great cooperation and support.

Last and not least, I wish to extend my thanks to my colleagues and to the nurses in the Neonatal Intensive Care Unit, for their cooperation and help.

Dedication
To my beloved family
"every thing 9 do
9 do it for you"
With my best wishes

## **Contents**

	Page
Introduction and aim of the work	1
Review of literature	
<ul> <li>Premature and low birth weight infants</li> </ul>	3
<ul> <li>Feeding of the premature infant</li> </ul>	20
Immune system	36
• Interleukins	47
• Interleukin-2	54
Honey	61
<ul> <li>Nutrition, Immunity and Cytokines</li> </ul>	76
Subjects and methods	80
Results	87
Discussion	106
Summary	117
Conclusions and Recommendations 1	20
References	
Appendix	
Arabic summary	

[TRIDE

## List of Tables

Table (1)	: The external characteristics of the Dubowitz examination.	5
Table (2)	: Identifiable causes of preterm birth.	9
Table (3)	: Factors often associated with intrauterine growth retardation	10
Table (4)	:Physiologic handicaps and related problem: associated with premature infants.	s 1 1
Table (5)	: Guidelines for energy requirement in Preterm infants	16
Table (6)	: Sequelae of low birth weight infants	18
Table (7)	: The gastrointestinal barrier factors	21
Table (8)	: Recommended intakes of individual nutrients for formula-fed preterm infants	24
Table (9)	: Suggested schedule for feeding of preterm infants	33
<b>Table (10)</b>	:Volumes of milk for artificial feeding during the first few days of life.	33
<b>Table (11)</b>	: Sites of synthesis and age of first appearance of complement components	40
Table (12)	: Selected cytokines and their functions	48

Table (13)	: Data of studied infants upon inclusion into the Study	90
Table (14)	: Comparison between the data of the patients in the 2 groups (A and B) upon inclusion	90
Table (15)	: Follow up data of the 2 groups of infants at the end of the first day	91
Table (16)	: Comparison between the 2 groups as regards the mean values of daily (cc./d) and residue /milk % during the 10 days of the str	92 the udy.
<b>Table (17)</b>	: Comparison between the 2 groups as regards the mean daily caloric intake (K.cal /day)	93
<b>Table (18)</b>	: Comparison between the 2 groups as regards the mean milk intake and the residue % on days 1 and 10.	94
<b>Table (19)</b>	: Comparison between values of daily mean weight (gm) at the start and at the end of th study and between mean weight gain in bo groups.	e
<b>Table (20)</b>	: Comparison between daily mean random blood glucose level in both groups during the 10 days of the study.	96
Table (21)	: Comparison of the 2 groups as regards stool pH on day 5 and day 10.	96

Table (22)	: Comparison among the mean values of hemoglobin level, white blood cell count and platelet count on days 1 and 10 in each group.	97
Table (23)	: Mean IL-2 production (Pg/ml) on days 1 and 10 of the 2 groups.	98
<b>Table (24)</b>	: Comparison between the mean IL-2 production at the start and at the end of the study for each group and for both groups.	98
Table (25)	: Comparison between the mean rate of change of IL-2 production from day 1 to day 10 for the 2 groups.	99