

STUDY OF IMMUNE STATUS OF FEMALES IN THE CHILD BEARING PERIOD AGAINST RUBELLA AND CYTOMEGALO VIRUSES

THESIS

*Submitted for Partial Fulfillment of
Master Degree*

in

Basic Medical Science (Microbiology)

By

Sherien Bendari Elsyed

M.B., B.Ch.

Under supervision of

Prof. Dr. Laila Soliman Elsyed

Prof. of Microbiology

Faculty of Medicine, Ain Shams University

Dr. Nebal Medhat A. Darwish

Lecturer of Microbiology and Immunology

Faculty of Medicine, Ain Shams University

63948

Dr. Ahmed Ramy Mohamed

Lecturer of Gynecology and Obstetrics

Faculty of Medicine, Ain Shams University

616-079

SA.B

Faculty of Medicine
Ain Shams University

1998



سُرِّيهِمُ آيَاتُنَا فِي الْإِنشَاءِ فِي الشَّهْرِ حَتَّى يَبِينُ شَرَاهُ الْإِسْقِ

قَارَنَ كَيْفَ



Acknowledgement

Words stand short when they come to express my gratefulness to my supervisors.

*First, I would like to express my utmost gratitude to **Prof. Dr. Laila El-Sayed Soliman**, professor of the Microbiology and Immunology, Faculty of Medicine, Ain Shams University, for her kind supervision and encouragement.*

*I also want to express my feelings of gratitude and thankfulness to **Dr. Nebal Darrwish**, lecturer of Microbiology and Immunology, Faculty of Medicine, Ain Shams University, for her precious advice and relentless persistence to get the best out of this work.*

*My greatest thanks go to **Dr. Ahmed Ramy**, lecturer of Obstetrics and Gynecology, Faculty of Medicine, Ain Shams University, for his endless patience and priceless guidance.*

Last but not least, my greatest thanks and best regards to my colleagues in the Department of Microbiology and Immunology, hoping them the best in their research work.

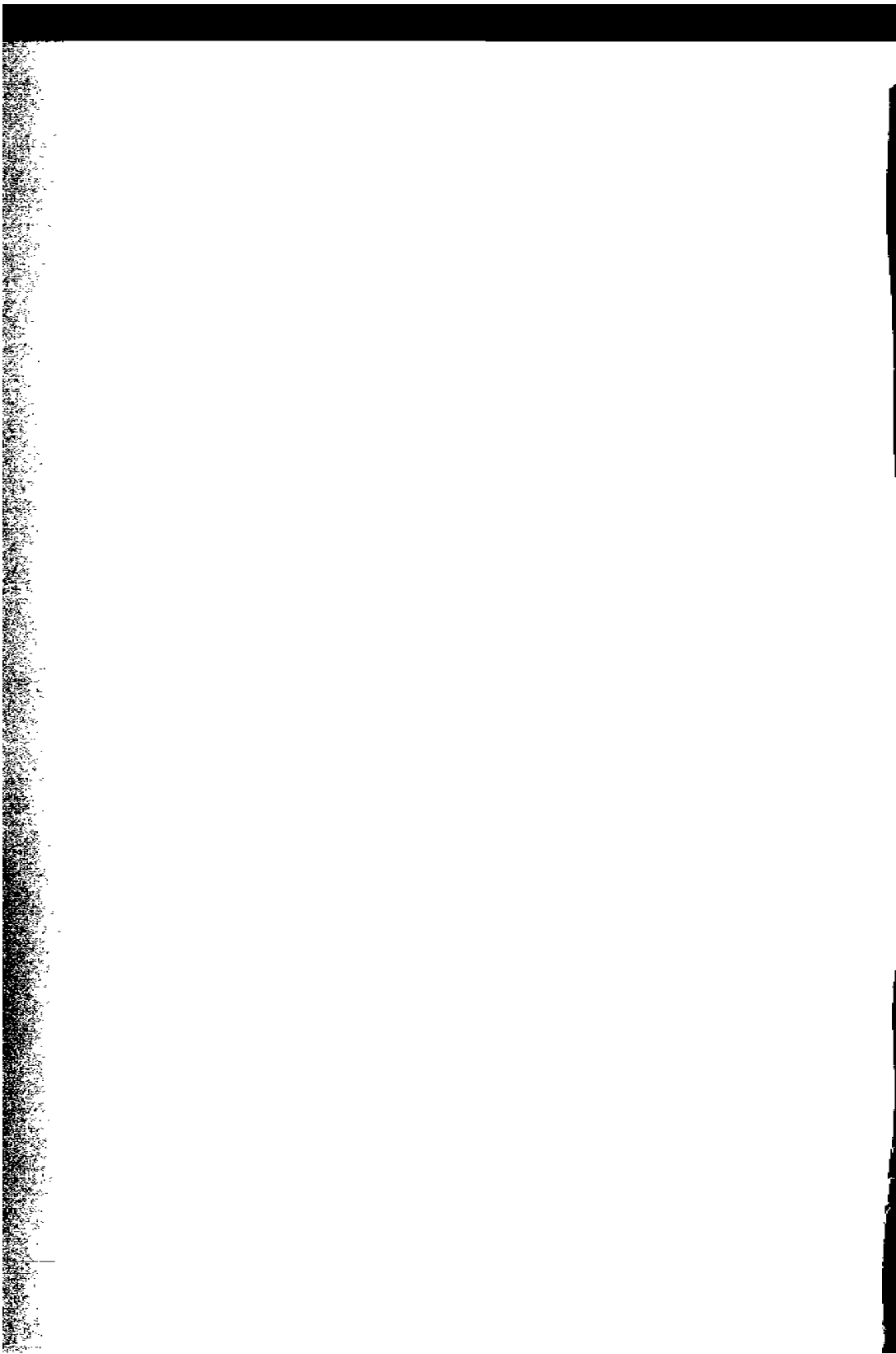
Sherien Bendari

INDEX

I. Introduction	1
II. Aim of the Work	3
III. Review of Literature	4
A. Rubella virus:	4
1) History of rubella infection	4
2) Rubella virus	5
3) Structure and nature	6
4) Antigenic structure	7
5) Effect of physical and chemical agents on rubella virus	8
6) Epidemiology of rubella infection	9
i. Transmission	9
ii. Morbidity	10
iii. Mortality	10
iv. Age incidence	11
7) Disease	11
i. Pathogenesis	11
ii. Immune response	12
iii. Clinical rubella syndrome	12
iv. Congenital rubella syndrome	13
8) diagnosis	
i. Virus isolation	16
ii. Serodiagnosis	16
9) Prevention and control	18
10) Treatment	20
A. Cytomegalovirus:	21
1) History of Cytomegalovirus (CMV)	21
2) Classification of CMV	22
3) Structure and nature of HCMV	23
4) Antigenic structure	24
5) Epidemiology of HCMV	25
i. Transmission	25
6) Disease	
i. Pathology and pathogenesis	27
ii. Clinical syndromes	29
iii. Infection in normal host	30
iv. Infection in immunocompromised host	31
v. Congenital infection	31
vi. Immune response	33
7) Laboratory diagnosis of HCMV infection	34

i. General approaches	34
ii. In immunocompetent host	35
iii. In congenital HCMV infection	35
iv. In immunocompromised adult	36
8) Prevention and control	37
i. Antiviral prophylaxis	38
ii. Immunoprophylaxis	40
9) Antiviral treatment of established HCMV.	40
IV. Subjects and Methods	41
V. Results	52
VI. Discussion	92
VII. Summary	99
VIII. Conclusion and recommendations	102
IX. References	103
X. Arabic summary	127

INTRODUCTION



INTRODUCTION

The most common agents causing congenital infections and hence congenital malformations are rubella, cytomegalovirus and herpes simplex 2 virus (*Azab et al., 1992*).

Primary infection of the mother with cytomegalovirus during the first trimester usually produces severe congenital malformations of the fetus e.g., microcephaly, deafness...etc. compared to less severe malformations if the infection occurs at the second trimester. Third trimesteric infections produce no congenital malformations of the fetus (*Randle et al., 1986*).

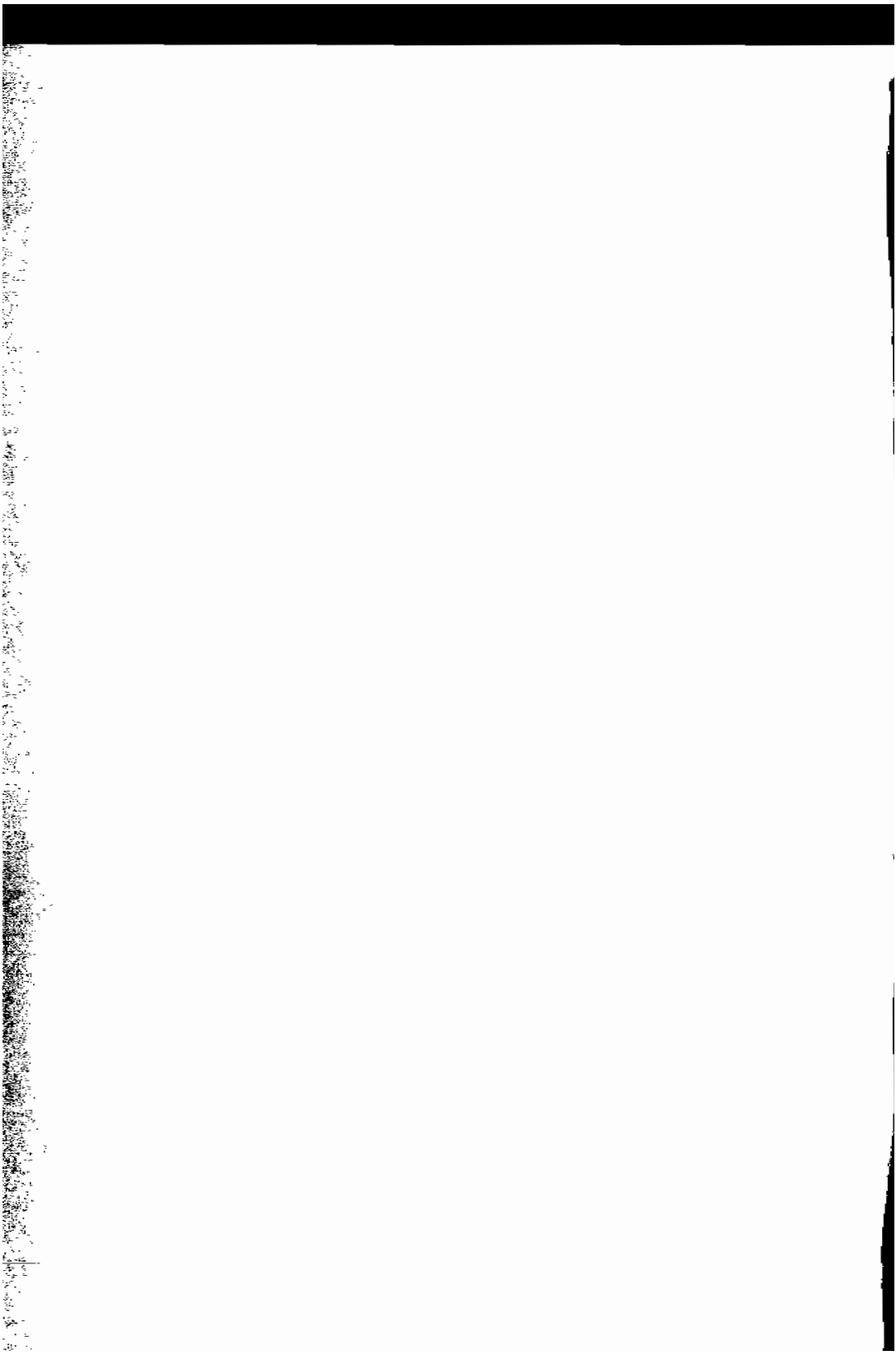
Cytomegalovirus is the most common perinatal viral infection occurring in about 1% of all live births in the United States (*Wregghitt et al., 1986*).

Newborns need protection against cytomegalovirus congenital disease and maternal immunization may provide such protection because newborns who acquire cytomegalovirus transplacentally are protected against congenital disease if their mothers had antibodies to human cytomegalovirus before pregnancy (*Fowler et al., 1992*).

Rubella virus is another common agent causing congenital malformations. Rubella infection during the first trimester of pregnancy is the most critical as it results in congenital anomalies in the newborn in about 50% of cases whereas infection in the second trimester results in defects in 20% of cases and incidence decreases to 4% if rubella infection occurred in the third trimester (*Hanshow et al., 1989*).

One attack of rubella confers a life long immunity, so by vaccination of females in the child bearing period before pregnancy we can avoid congenital malformations of the newborn (*Martin et al., 1989*).

AIM OF THE WORK



AIM OF THE WORK

The aim of this work was to:

- ◆ Determine the immune status of the females in the childbearing period against *Cytomegalo* and *Rubella* viruses.
- ◆ Develop proper vaccination scheme against *Cytomegalo* and *Rubella* viruses to protect the newborns against the severe congenita malformations resulting from maternal infection during pregnancy.