

TABLE OF CONTENTS

Contents	Page
ACKNOWLEDGEMENT	iii
ABSTRACT	iv
TABLE OF CONTENTS	x
LIST OF TABLES	xiii
LIST OF FIGURES	xiv
ABBREVIATIONS	xv
CHAPTER	
I. INTRODUCTION	1
II. LITERATURE REVIEWS	
A. MAST CELL DEVELOPMENT	6
I. In animal studies	6
II. In human	6
B. DISTRIBUTION AND IDENTIFICATION OF MAST CELL	7
C. MAST CELL ACTIVATION	8
I. FcεRI Dependent	8
II. Non-FcεRI Dependent	8
1. Basic compounds	8
2. Peptides	8
3. Cytokines	9
4. Anaphylatoxins	9
D. MAST CELL-DERIVED MEDIATORS	9
I. Granule-Associated Mediators	10
1. Histamine	10
2. Proteoglycans	10
3. Proteases	11

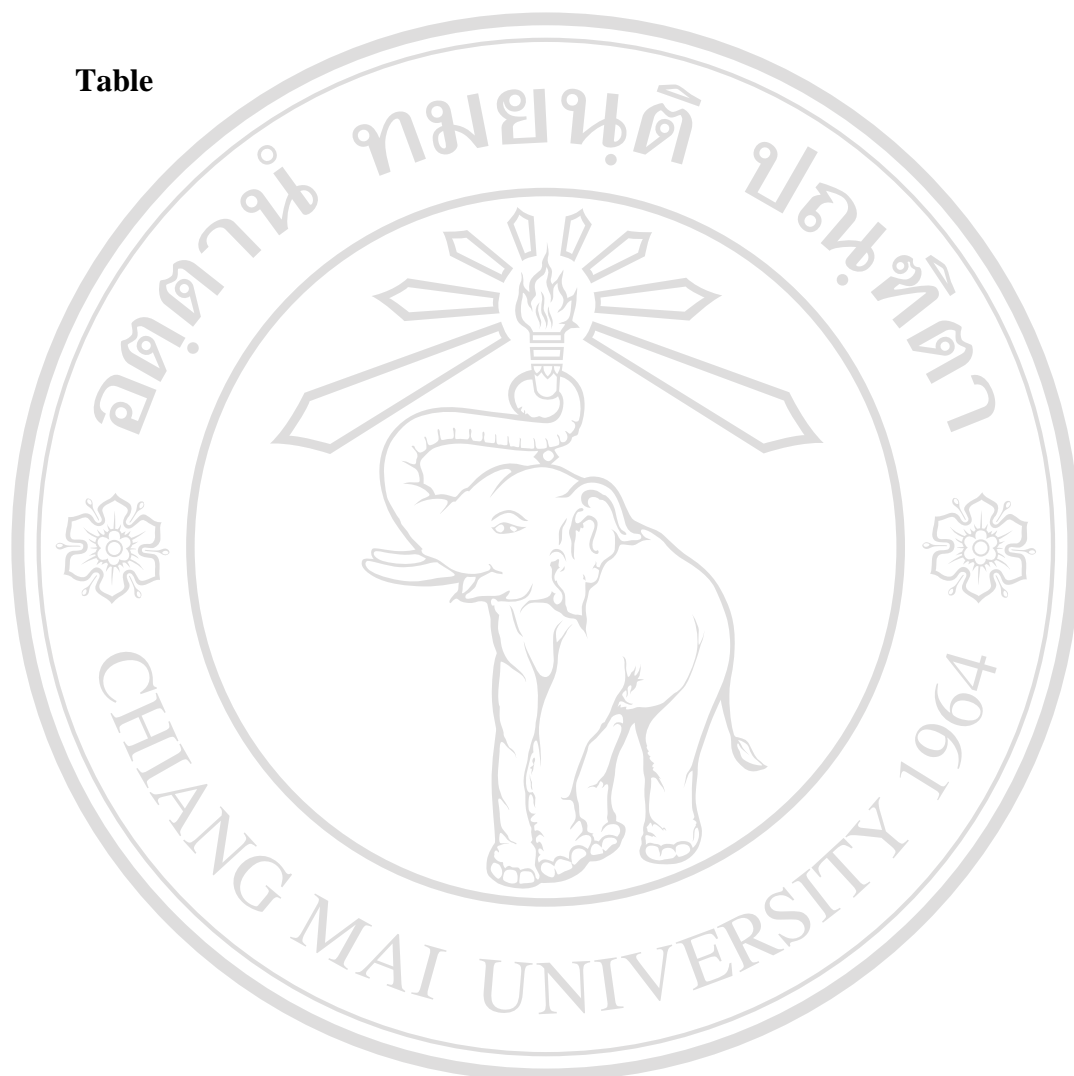
II. Lipid-Derived Mediators	12
III. Cytokines and Chemokines	13
E. MAST CELL AND ALLERGIC INFLAMMATION	13
F. ALLERGIC RHINITIS	14
I. Pathophysiology	14
II. Type f allergic rhinitis	16
III. Evaluation and Diagnosis	17
1. History	17
2. Physical examination	17
3. Diagnostic tests	17
IV. Management of allergic rhinitis	18
1. Avoidence	18
2. Pharmacotherapy	19
3. Immunotherapy	20
G. HOUSE DUST MITES	21
III. METERIALS AND METHODS	23
A. Experimental plans	23
B. Patient screening and clinical evaluation	23
1. Subjects	23
2. Clinical evaluation	24
C. Specimen collection	24
1. Nasal scraping	24
2. Blood collection	26
D. Cytospin preparation and Wright-Giemsa staining	26
E. Mast cell identification and classification	26
F. Bacteriologic examination	27
G. Examination of house dust mites specific IgE by indirect ELISA	27
H. Statistical analysis	28
IV. RESULTS	29
A. Clinical evaluation	29

B. Basophilic metachromatic cell identification	29
C. Mast cell and leukocyte recruitment	30
D. Quantitatively evaluation of mast cell degranulation	30
E. Bacteriologic finding	31
F. Examination of specific IgE against Der p 1, Der f 1 and Blo t 1	31
G. Quantitative of specific IgE antibody	32
H. Correlation between specific IgE concentration and the severity scores of AR patients	32
V. DISCUSSION	57
VI. SUMMARY	65
VII. REFERENCES	68
VIII. APPENDIXES	84
Appendix A Recipes	84
Appendix B Sample size calculation	90
Appendix C Results	91
IX. CURRICULUM VITAE	97

LIST OF TABLES

Table

page



ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright © by Chiang Mai University
All rights reserved

1A. The numbers of mast cells in nasal scraping were identified by different stains.	34
1B. The numbers of eosinophils in nasal scraping from 69 AR and 26 nonallergic subjects after staining with Wright-Giemsa stain	34
2. The percentage of mast cells and leukocytes from nasal scraping of AR patients and nonallergic healthy subjects	35
3. Quantitatively evaluation of the percentage of mast cell degranulation in AR group	39
4. The average number (mean \pm SD) of cultured total bacteria found in nasal scraping of 69 AR and 26 nonallergic healthy subjects	41
5. Prevalence of predominate bacteria isolated from nasal scraping of 69 AR patients and 26 nonallergic healthy subjects	43
6. Range of the percentage of CFU of predominate bacteria in nasal scraping of 69 AR patients and 26 nonallergic healthy subjects	44
7. Predominate bacteria isolated from nasal scraping of 69 AR patients and 26 nonallergic healthy subjects	45
8. The optical density and concentration of anti house dust mite antibody specific to Der p 1, Der f 1 and Blo t 1 antigen in AR patients	50
9. The optical density and concentration of anti house dust mite antibody specific to Der p 1, Der f 1 and Blo t 1 antigen in nonallergic healthy subjects	52
10. The severity, optical density and concentration of anti house dust mite antibody to Der p 1 in AR patients	91
11. The severity, optical density and concentration of anti house dust mite antibody to Der f 1 in AR patients	93
12. The severity, optical density and concentration of anti house dust mite antibody to Blo t 1 in AR patients	95

LIST OF FIGURES

Figure	Page
1. Basophilic metachromatic cell (BMC) stained with various stains.	33
2. The presence of mast cells in various severities of AR allergic inflammation (magnification, 100x)	37
3. Eosinophils stained with Wright-Giemsa stain	38
4. Neutrophils stained with Wright-Giemsa stain	39
5. Various morphology of degranulated mast cell types were shown in AR specimens (magnification, 1000x)	41
6. The total bacterial number (CFU/ml) presented in nasal scraping of AR and nonallergic healthy subjects.	43
7. The optical density of indirect ELISA by using r Der p 1 as an antigen	47
8. The optical density of indirect ELISA by using r Der f 1 as an antigen	48
9. The optical density of indirect ELISA by using r Blo t 1 as an antigen	49
10. Standard curve of human IgE concentration	50
11. The specific IgE concentration against various house dust mite antigens	54
12. The relationship between anti-Der p 1 IgE concentration and the severity scores of subjects who positive for anti-Der p 1 IgE	55
13. The relationship between anti-Der f 1 IgE concentration and the severity scores of subjects who positive for anti-Der f 1 IgE	56
14. The relationship between anti-Blo t 1 IgE concentration and the severity scores of subjects who positive for anti-Blo t 1 IgE	57

ABBREVIATIONS

ABTS	2,2'- azino-bis-3- ethylbenzyl thiazoline-6-sulfonic acid
ACTH	adrenocorticosteroid hormone
AD	atopic dermatitis
APCs	antigen presenting cells
AR	allergic rhinitis
ARIA	allergic rhinitis and its impact on asthma
AS	Alcian blue/Safranin
<i>Bacillus</i> spp.	<i>Bacillus</i> species
Blo t	<i>Blomia tropicalis</i>
BMC	basophilic metachromatic cell
BMMC	bone marrow mast cell
BSA	bovine serum albumin
<i>C. hoffmanii</i>	<i>Corynebacterium hoffmanii</i>
<i>C. xerosis</i>	<i>Corynebacterium xerosis</i>
CD	cluster of differentiation
CFU	colony forming unit
CGRP	calcitonin gene-related peptide
CO ₂	carbondioxide
CTMC	connective tissue mast cell
DAG	diacyl glycerol
Der f	<i>Dermatophagoides farinae</i>
Der p	<i>Dermatophagoides pteronyssinus</i>
ELISA	enzyme linked immunosorbent assay
Em	<i>Euroglyphus maynei</i>
FDA	foundation of drug administration
GM-CSF	granulocyte macrophage colony stimulating factor
GTP	glucose triphosphate
H ₂ O ₂	hydrogen peroxide
HCl	hydrogen chloride
HDM	house dust mite
HLA	human leukocyte antigen
HMC	human mast cell line
HRF	histamine releasing factor
IFN- γ	interferon-gamma

Ig	immunoglobulin
IgA	immunoglobulin A
IgE	immunoglobulin E
IgG	immunoglobulin G
IL	interleukin
IP ₃	inositol triphosphate
ITAMs	immunoregulatory tyrosine activation motifs
ITIMs	immunoregulatory tyrosine-based inhibition motifs
<i>K. pneumoniae</i>	<i>Klebsiella pneumoniae</i>
kDa	kilodalton
LPS	lipopolysaccharide
LT	leukotriene
LTA	lipoteichoic acid
MAP	mitogen activated protein
MC	mast cell
MC _C	mast cell containing chymase only
MC _T	mast cell containing tryptase only
MC _{TC}	mast cell containing both tryptase and chymase
mg	milligram
MHC	major histocompatibility complex
min	minute
MIP	macrophage inflammatory protein
ml	milliliter
MMC	mucosal mast cell
mRNA	messenger ribonucleic acid
NaOH	sodium hydroxide
NF	nuclear factor
ng	nanogram
OD	optical density
PAF	platelet activating factor
PAR	perennial allergic rhinitis
PBST	phosphate buffer saline with Tween 20
PG	prostaglandin
PGN	peptidoglycan
PLA	phospholipase A
RAST	radioallergosorbent test

<i>S. aureus</i>	<i>Staphylococcus aureus</i>
<i>S. epidermidis</i>	<i>Staphylococcus epidermidis</i>
<i>S. haemolyticus</i>	<i>Staphylococcus haemolyticus</i>
<i>S. saprophyticus</i>	<i>Staphylococcus saprophyticus</i>
SAR	seasonal allergic rhinitis
SCF	stem cell factor
SD	standard deviation
TB	Toluidine blue
TCR	T cell receptor
TGF	transforming growth factor
Th	T helper
TLR	Toll-like receptor
TNF	tumor necrosis factor
WG	Wright-Giemsa
°C	degree celcius
µg	microgram
µl	microliter
µm	micrometer