IV. RESULTS

A. Clinical evaluation

Nasal mucosal specimens of 69 AR and 26 nonallergic healthy subjects were investigated. By using the standard criteria (Meltzer, 1988), the 15, 24, and 30 of AR were classified into mild, moderate, and severe, respectively. These AR subjects did not significantly differ from the nonallergic healthy subjects in age or sex distribution.

B. Basophilic metachromatic cell identification

Since the number of BMC was significantly high in AR patients and correlated with AR symptoms, it was valuable to identify whether BMC was mast cell, which was important in the allergic response. Toluidine blue and Alcian blue/Safranin staining were performed to identify for mast cells. With Wright-Giemsa staining, the large cells which numerous granules, called Basophilic metachromatic cell, were presented in nasal mucosal specimens of AR (Figure 1A). The features of these cells were similarly observed in Toluidine blue and Alcian blue/Safranin staining. These cells were stained blue in Wright-Giemsa staining, deep purple metachromatic color in Toluidine blue staining (Figure 1B) and blue or orange-red metachromatic color in Alcian blue/Safranin staining (Figure 1C). With Wright-Giemsa staining, the number of mast cells per 50 oil immersion fields in mild, moderate, and severe AR were 0.5 ± 1.0, 2.0 ± 4.0, and 8.5 ± 7.5, respectively (Table 1A). These cells were showed closely in the number with Toluidine blue staining, 0.5 ± 1.0, 2.0 ± 3.5, and 5.5 ± 4.5, respectively and with Alcian blue/Safranin staining, 0.2 ± 0.4, 2.0 ± 4.0, and 7.0 ± 5.0, respectively. This data indicated that the positive cells stained with Toluidine blue and Alcian blue/Safranin is mast cells. In contrast, these cells were not found in nonallergic healthy subjects in any staining.

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C. Mast cell and leukocyte recruitment

Staining with Wright-Giemsa, Toluidine blue, and Alcian blue/Safranin could demonstrate leukocytes and mast cells in nasal mucosal specimens. Examination of mast cells and leukocytes recruitment into the nasal mucosa was performed. Nasal cytological study of nasal scraping specimens from 69 AR subjects showed mast cells and leukocytes. Nasal cytology was identified by differential cell count. The leukocytes recruited in nasal mucosa were neutrophil, eosinophil, monocyte, lymphocyte and basophil. The inflammatory cells in nasal mucosa of AR, especially neutrophil, were not predominate as of infection. Eosinophils observed in nasal scraping of AR patients were 1.3 ± 2.5, 2.7 ± 6.5, and 2.5 ± 5.1 cells per 50 oil immersion fields in mild, moderate, and severe AR, respectively (Table 1B). The percentage of mast cell in mild, moderate and severe AR were 7.92 ± 13.74, 8.74 ± 18.84, and 42.07 ± 42.47, respectively, which in severity dependent pattern. There was rarely inflammatory cell observed in nasal scraping of 26 nonallergic subjects (Table 2 and Figure 2). All of nasal scraping was properly done since every sample showed numerous nasal mucosa epithelial cells. Leukocytes were presented in AR specimens; similarly characteristics appear in blood circulation (Figures 3 and 4).

D. Quantitatively evaluation of mast cell degranulation

The mast cells in nasal scraping of AR showed various morphology, which were classified into three categories (normal, slightly to moderately, and extensively). Degree of degranulation was correlated with severity of symptom. The mean ± SD of the percentage of normal, slightly to moderate and extensively degranulation of mast cell in mild AR were 25.00 ± 35.36, 25.00 ± 35.36 and 50.00 ± 0.00 respectively, in moderate AR were 7.14 ± 12.54, 38.53 ± 32.95 and 54.33 ± 31.10 respectively, and in severe AR were 5.53 ± 10.54, 21.90 ± 15.09 and 72.23 ± 19.85 respectively. The extensively degranulated mast cell was predominantly seen in severe cases more than moderate and mild cases (Table 3). The various morphology of degranulated mast cell was shown in Figure 5.

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E. Bacteriologic finding

Several studies have previously shown some factors that modify the pathogenesis of AR; the association between bacterial colonization and AR pathogenesis has not been well documented. To determine the colonizing bacteria in nasal cavity of AR, the nasal scraping specimens were cultured and identified for predominant bacteria. The total number of bacteria in mild and moderate AR was significantly lower than that in severe AR and nonallergic group (Table 4 and Figure 6). There were mix organisms, the mean number of the kind of bacteria per sample was 2.5 (range, 1 to 5). *Staphylococci*, *Corynebacterium* species were the predominant isolates. *S. aureus* (44.44 %), *S. haemolyticus* (36.11 %), *S. epidermidis* (36.11 %), and *Klebseilla pneumoniae* (33.33 %) were frequently found in nasal scraping specimens of AR, whereas *S. haemolyticus* (100 %), *C. hoffmanii* (69.23 %), *K. pneumoniae* (53.85 %), and *S. epidermidis* (38.46 %) were predominately found in nonallergic specimens. The prevalence and the range of the percentage of CFU of isolated bacteria in AR and nonallergic subjects were found that *S. aureus*, *S. saprophyticus*, *C. xerosis*, *Bacillus* spp. and *Citrobacter freundii* were significantly higher in AR subjects ($p < 0.01$) as shown in Table 5 and 6. The number of predominant bacteria in various AR groups, *S. aureus* and *K. pneumoniae*, were increased in parallel to severity whereas these bacteria were less in nonallergic group ($p < 0.01$) as shown in Table 7.

F. Examination of specific IgE against Der p 1, Der f 1, and Blo t 1

House dust mite allergens are well known important in the pathogenesis of allergic asthma. It is interested to know whether it also involve in pathogenesis of AR. If house dust mites involve in the AR symptoms, specific IgE against house dust mite should be detected. Specific IgE anti Der p 1, Der f 1, and Blot 1 in sera of 55 AR and 27 nonallergic subjects were detected by indirect ELISA. The specific IgE antibodies to house dust mite antigens were measured and expressed as optical density (OD). The percentage of AR patients who positive for specific IgE antibodies to Der p 1, Der f 1, and Blo t 1 were 45.45 (25/55), 25.45 (14/55), and 5.45 (3/55), respectively. Fourteen sera were both positive to Der p 1 and Der f 1 (25.45%) and 2 sera were both positive to Der p 1 and Blo t 1. Only few nonallergic sera were

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positive to Der p 1 (2/29, 6.89 %), Der f 1 (1/29, 3.45 %), and Blo t 1(2/29, 6.89 %) (Figure 7, 8 and 9).

G. Quantitative of specific IgE antibody

The standard human IgE with known concentration, diluted to several concentrations, was determined for OD value on every assaying day (Figure 10). The standard curve was transformed to linear regression line and used in the determination of IgE concentration in tested sera. The IgE antibody specific to each antigens was determined. The results obtained were expressed as OD and concentration in nanogram per milliliters (ng/ml). The serum was considered to be positive for IgE antibody, if the OD exceeds mean + 3SD of nonallergic group. Because of the OD value of antibody was transformed to concentration value (ng/ml), therefore the concentration of antibody exceeds mean + 3SD of nonallergic group also considered as positive. The mean OD ± SD of specific IgE to Der p 1, Der f 1 and Blo t 1 in AR were 0.233 ± 0.330, 0.217 ± 0.345, and 0.109 ± 0.017, respectively, and in nonallergic group were 0.111 ± 0.038, 0.099 ± 0.020, and 0.106 ± 0.19, respectively. The concentration of the specific IgE to Der p 1, Der f 1 and Blo t 1 in AR were 100.558 ± 297.898, 81.603 ± 290.320, and 0.205 ± 1.012 ng/ml, respectively, and in nonallergic group were 9.407 ± 35.289, 1.174 ± 6.324, and 1.241 ± 5.701 ng/ml, respectively (Table 8, 9 and Figure 11).

H. Correlation between specific IgE concentrations and the severity scores of AR patients

The symptom of AR patients who positive for specific anti-house dust mite was interpreted whether the severity score was correlated with the concentration of quantitated antibody. The results showed that the correlation between anti Der p 1, anti Der f 1 and anti Blo t 1, and severity score of any pairs were low, with relative value (*r*) of 0.03, 0.03 and 0.45, respectively (Figure 12, 13 and 14).

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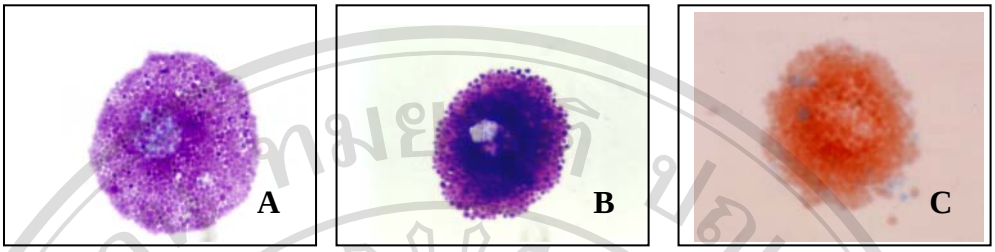

Figure 1. Basophilic metachromatic cell (BMC) stained with various stains. This cell showed the large cell contains numerous granules occupies the whole cell and obscure the nucleus. The granules of BMC stained deep blue color with Wright-Giemsa (A), deep purple metachromatic color with Toluidine blue (B), and blue or orange-red metachromatic color with Alcian blue/Safranin (C). BMC was found in nasal scraping of AR patients but not in nonallergic subjects.

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Table 1A. The number of mast cells in nasal scraping were identified by different stains.

Groups	Number of mast cells per 50 oil immersion fields (Mean ± SD)		
	Wright-Giemsa	Toluidine blue	Alcian blue/ Safranin
Mild AR (15)	0.5 ± 1.0	0.5 ± 1.0	0.2 ± 0.4
Moderate AR (24)	2.0 ± 4.0	2.0 ± 3.5	2.0 ± 4.0
Severe AR (30)	8.5 ± 7.5	5.5 ± 4.5	7.0 ± 5.0
Nonallergic (26)	0.0	0.0	0.0

Table 1B. The number of eosinophils in nasal scraping of 69 AR and 26 nonallergic subjects

Groups	Number of eosinophils per 50 oil immersion fields (Mean ± SD)
Mild AR (15)	1.3 ± 2.5
Moderate AR (24)	2.7 ± 6.5
Severe AR (30)	2.5 ± 5.1
Nonallergic (26)	0.0

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Table 2. The percentage of mast cells and leukocytes from nasal scraping of AR patients and nonallergic healthy subjects

Groups (No.)	Differential cell count (Mean ± SD)					
	Neutrophil	Eosinophil	Lymphocyte	Monocyte	Basophil	Mast cell
Mild AR (15)	35.24 ± 32.29	39.25 ± 28.25	17.59 ± 5.59	0.00	0.00	7.92 ± 13.74
Moderate AR (24)	30.32 ± 35.48	31.65 ± 33.23	13.29 ± 19.44	10.49 ± 27.17	5.51 ± 10.03	8.74 ± 18.84
Severe AR (30)	22.18 ± 6.18	14.87 ± 13.91	15.88 ± 21.16	3.51 ± 12.26	1.49 ± 5.02	42.07 ± 42.47
Nonallergic (26)	0.00	0.00	0.00	0.00	0.00	0.00
Upper respiratory tract infection* (6)	77.1 ± 21.8	1.1 ± 1.6	21.8 ± 21.9	0.00	0.00	0.00

* The patients with upper respiratory tract infection including common cold, sinusitis were used as control group of infection.

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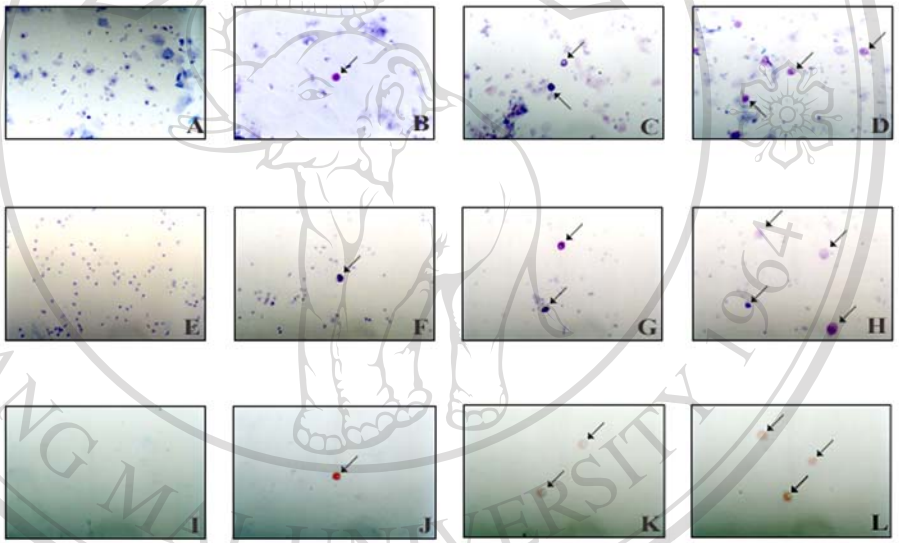

Figure 2. The presence of mast cells in various severities of AR allergic inflammation (magnification, 100x). Mast cells were shown in mild, moderate, and severe AR (arrow indicated) but not in nonallergic specimens. Mucosal epithelial cells were presented in all specimens and were seen in Wright-Giemsa staining (A-D), Toluidine blue (E-H), but not seen in Alcian blue/Safranin stain (I-L).

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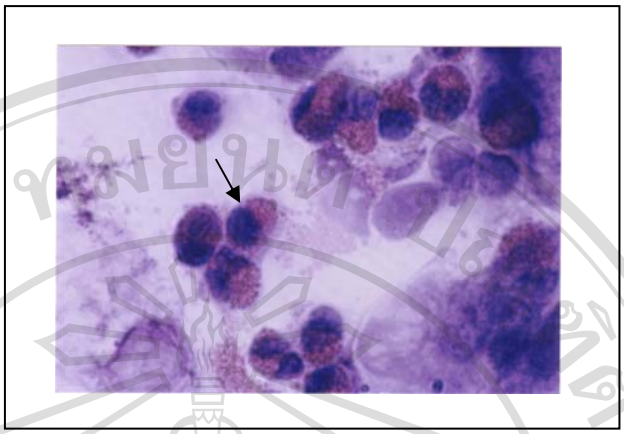

Figure 3. Eosinophils stained with Wright-Giemsa stain. These cells were presented red granules and dark blue nucleus (black arrow indicated at magnification, 1000x), found in AR nasal scraping specimens but not found in nonallergic specimens. The morphology cell was similar to those presented in blood circulation.

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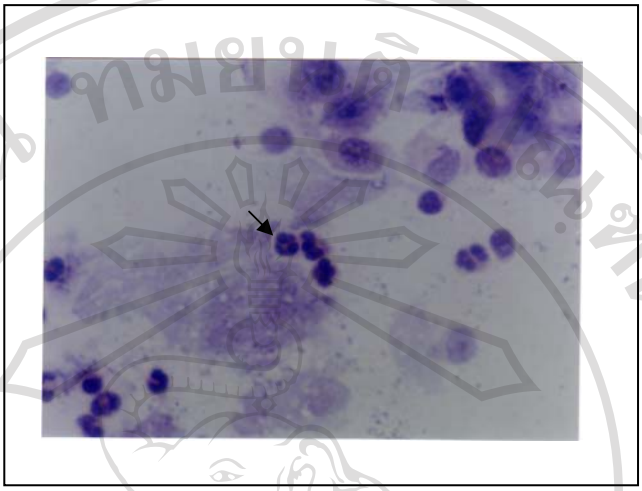

Figure 4. Neutrophils stained with Wright-Giemsa stain. These cells were shown in blue color and closely clear bilobed nucleus (black arrow indicated at magnification, 400x), found in AR nasal scraping specimens but not found in nonallergic specimens. The morphology of these cells was similar to those presented in blood circulation.

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Table 3. Quantitatively evaluation of the percentage of mast cell degranulation in AR groups

Degranulated cell type	Severity groups (Mean ± SD)*		
	Mild AR	Moderate AR	Severe AR
Normal (N)	25.00 ± 35.36	7.14 ± 12.54	5.53 ± 10.54
Slightly (+) to Moderately (++)	25.00 ± 35.36	38.53 ± 32.95	21.90 ± 15.09
Extensively (+++)	50.00 ± 0.00	54.33 ± 31.10	72.23 ± 19.85

* Data shown was mean ± SD percentage of each type.

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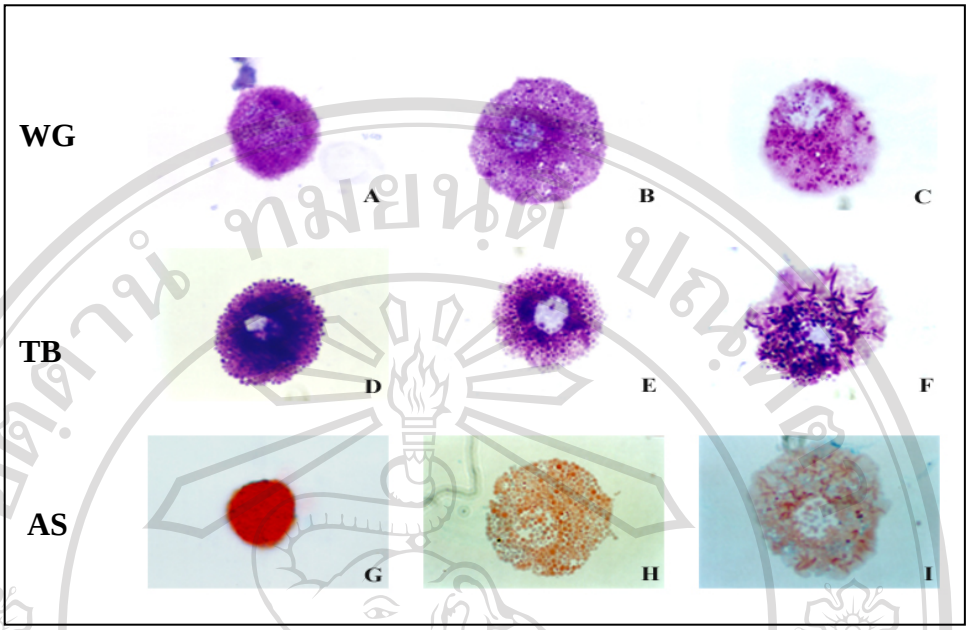

Figure 5. Various morphology of degranulated mast cell types were shown in AR specimens (magnification, 1000x). Normal (intact granules) type of mast cell was shown in A, D, and G stained with Wright-Giemsa (WG), Toluidine blue(TB), and Alcian blue/Safranin (AS) stain, respectively. B, E, and H showed slightly to moderate degranulated mast cell type and C, F, and I showed extensively degranulated type stained with WG, TB, and AS, respectively.

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Table 4. The average number (mean ± SD) of total cultured bacteria found in nasal scraping of 69 AR and 26 nonallergic healthy subjects.

Groups	Number of bacterial cells (CFU/ml)
Mild AR	243.14 ± 202.61
Moderate AR	292.67 ± 274.10
Severe AR	434.35 ± 318.97
Nonallergic	486.69 ± 211.25

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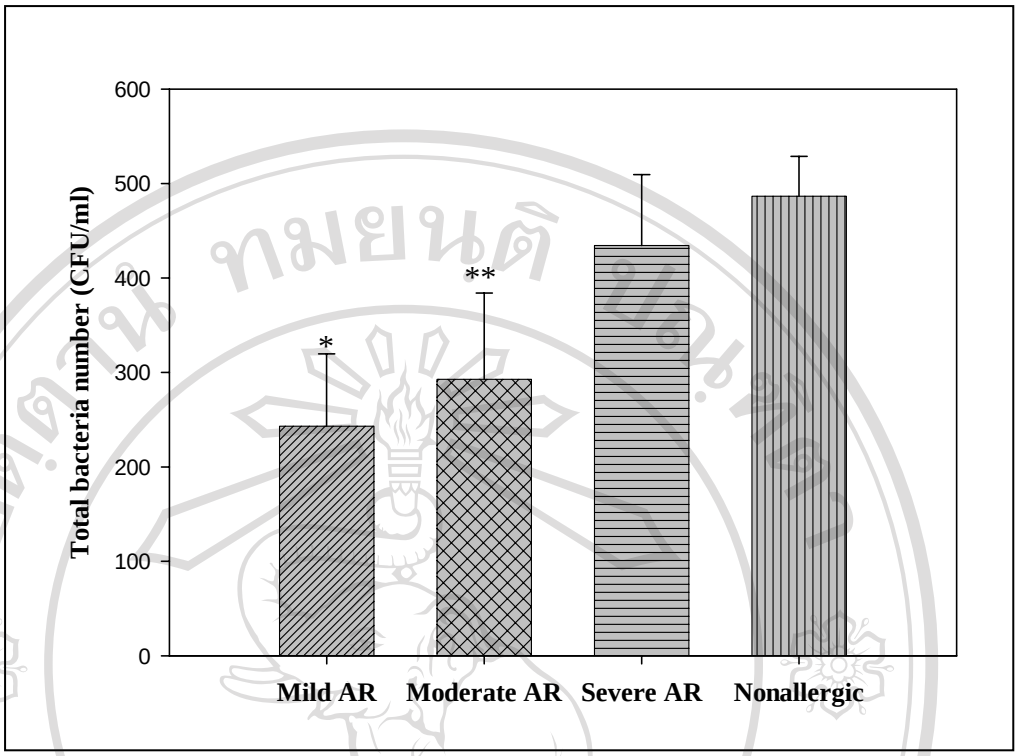

Figure 6. The total bacterial number (CFU/ml) presented in nasal scraping of AR and nonallergic healthy subjects. The number of bacteria in mild and moderate AR was significantly lower than nonallergic group (*p = 0.002, **p = 0.001) but the number of bacteria in severe AR was not differed from nonallergic group (p = 0.49). Data shown were mean ± SD value.

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Table 5. Prevalence of predominate bacteria isolated from nasal scraping of 69 AR patients and 26 nonallergic healthy subjects.

Microorganisms	AR patients (%)	Nonallergic subjects (%)
Staphylococci spp.		
S. haemolyticus	13 (36.11)	26 (100)
S. aureus	16 (44.44)*	1 (3.85)
S. epidermidis	13 (36.11)	10 (38.46)
S. saprophyticus	7 (19.44)*	0
Corynebacterium spp.		
C. xerosis	7 (19.44)*	1 (3.85)
C. hoffmanii	7 (19.44)	18 (69.23)
C. ulcerans	0	1 (3.85)
Bacillus spp.	8 (22.22)*	0
K. pneumoniae	12 (33.33)	14 (53.85)
Citrobacter freundii	3 (8.33)*	0
Others gram- negative bacilli	5 (3.89)	3 (11.54)

* The percentage of predominate bacteria from allergic patients observed significantly frequent more than from nonallergic subjects ($p < 0.01$).

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Table 6. Range of the percentage of CFU of predominate bacteria in nasal scraping of 69AR patients and 26 nonallergic healthy subjects

Microorganisms	Range of % CFU (Mean ± SD)	
	AR patients	Nonallergic subjects
Staphylococci spp.		
S. haemolyticus	0.78 - 98.68 (58.00±31.26)	9.79 - 96.23 (43.63±24.05)
S. aureus	2.70 - 100 (48.67±31.76)	4.05
S. epidermidis	11.00 - 70.01 (45.13±26.47)	1.85 - 89.34 (47.70±31.50)
S. saprophyticus	22.99 - 100 (52.63±32.75)	0.00
Corynebacterium spp.		
C. xerosis	5.88 - 85.65 (32.56±27.01)	60.57
C. hoffmanii	1.32 - 99.22 (42.52±33.68)	4.76 - 82.64(40.44±18.18)
C. ulcerans	0.00	15.11
Bacillus spp.	0.39 - 1.37 (2.33±3.49)	0.00
K. pneumoniae	4.46 - 49.75 (26.56±17.07)	0.61 - 9.16 (5.39±5.51)
Citrobacter freundii	37.93 - 44.12 (41.02±4.37)	0.00
Others gram- negative bacilli	0.14 - 50.00 (25.52±34.90)	16.95 - 52.26 (29.77±19.51)

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Table 7. Predominant bacteria isolated from nasal scraping of 69AR patients and 26 nonallergic healthy subjects.

Microorganisms	Number of bacteria (CFU/ml)			
	Mild	Moderate	Severe	Nonallergic
Staphylococci				
S. haemolyticus	11.86±26.69	21.89±41.13	75.1±163.46	215.40±154.54
S. aureus	73.29±112.93	28.33±56.24	72.45±136.10	0.32±1.60
S. epidermidis	31.57±83.09	78.22±129.88	80.9±175.33	86.20±189.47
S. saprophyticus	0.57±1.51	88.89±183.33	33.10±111.75	0
Corynebacterium				
C. xerosis	71.57±149.52	0	11.45±28.34	11.00±54.95
C. hoffmanii	54.29±143.63	66.78±141.36	37.00±117.53	123.20±133.65
C. ulcerans	0	0	0	2.00±9.99
Bacillus spp.	0	0.11±0.33	2.30±3.48	0
K. pneumoniae	0	7.78±23.33	110.40±158.12	12.52±18.73
Citrobacter freundii	0	0	12.00±29.40	0
Others gram- negative bacilli	0	0.78±1.30	0.55±2.24	12.92±39.83

* 0 ; not found this bacteria in nasal scraping specimens

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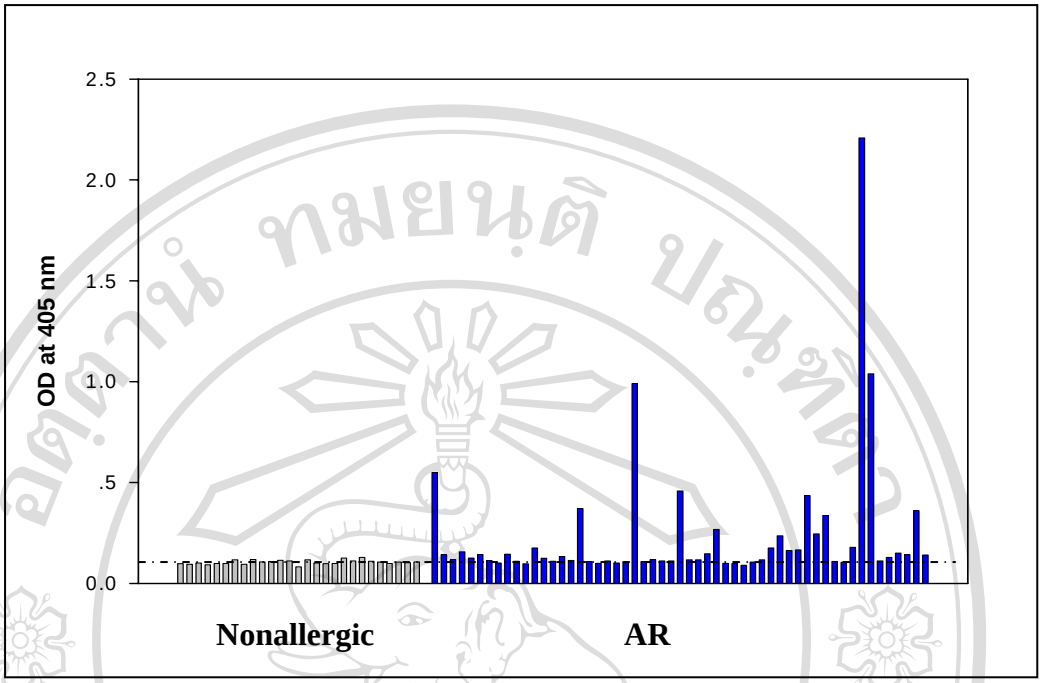

Figure 7. The optical density of indirect ELISA by using r Der p 1 as an antigen. Fifty-five sera of AR (black bar) and 29 sera of nonallergic subjects (striated bar) were tested. Each bar represents an individual serum. Dot line indicated the cut-off value which was calculated by mean OD + 3SD of nonallergic group (0.139).

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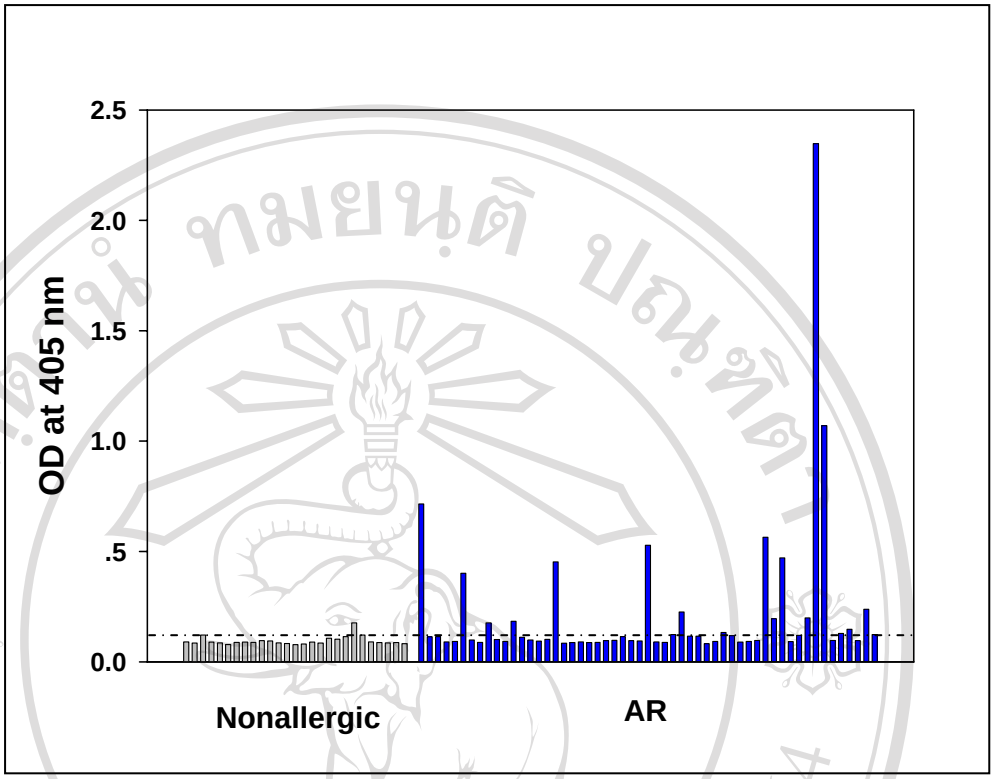

Figure 8. The optical density of indirect ELISA by using r Der f 1 as an antigen. Fifty-five sera of AR (black bar) and 29 sera of nonallergic subjects (striated bar) were tested. Each bar represents an individual serum. Dot-line indicated the cut-off value which was calculated by mean OD + 3SD of nonallergic group (0.155).

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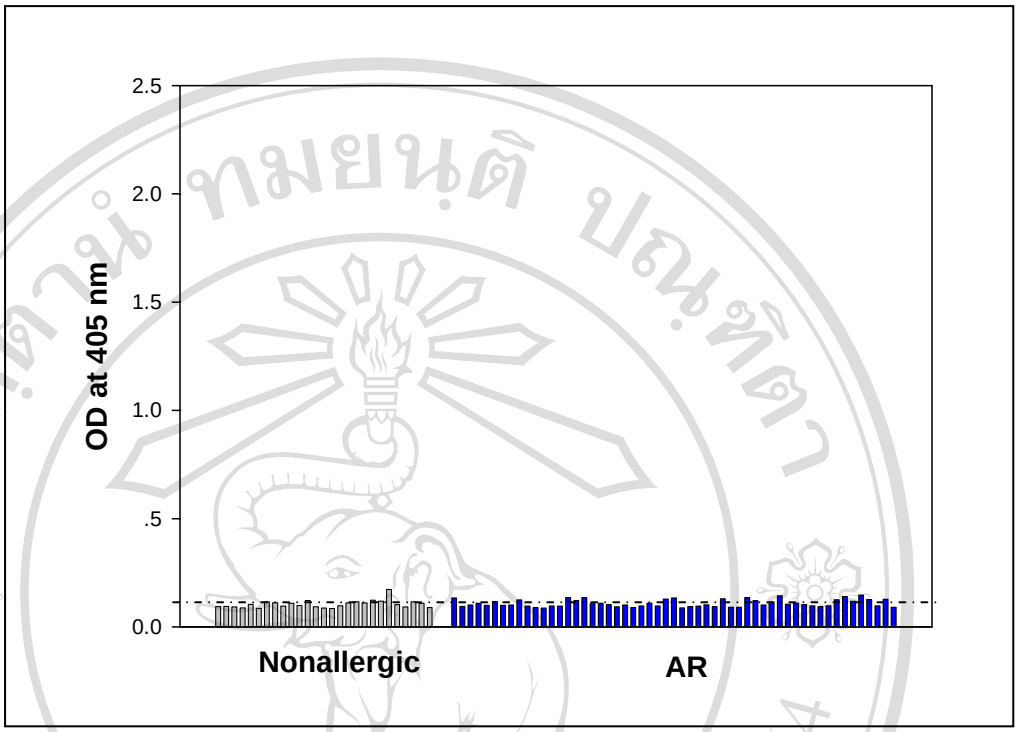

Figure 9. The optical density of indirect ELISA by using r Blot 1 as an antigen. Fifty-five sera of AR (black bar) and 29 sera of nonallergic subjects (striated bar) were tested. Each bar represents an individual serum. Dot-line indicated the cut-off value which was calculated by mean OD + 3SD of nonallergic group (0.159).

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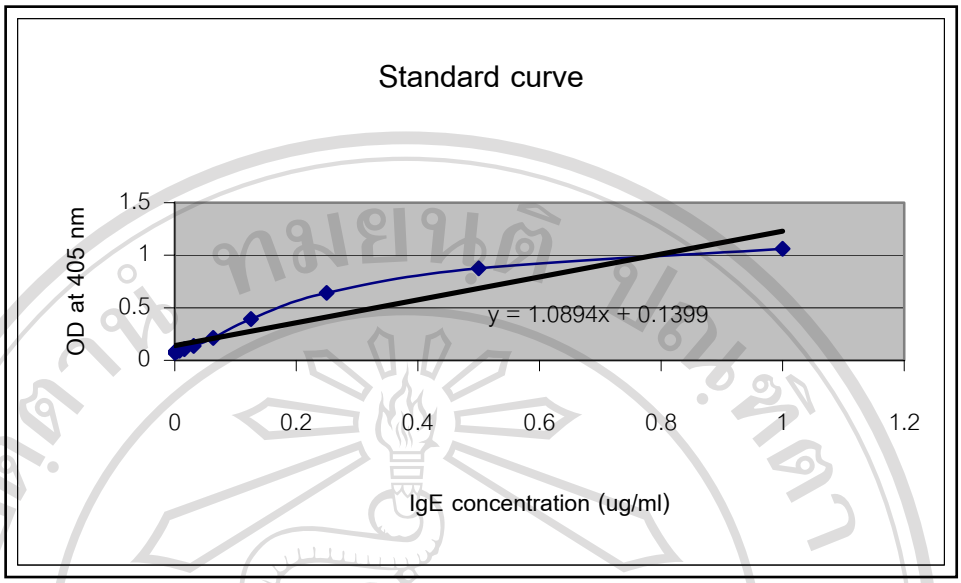

Figure 10. Standard curve of human IgE concentration. The standard curve was plotted by coordinates of OD versus standard IgE concentrations and transformed to linear-scale curve.

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Table 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.

No.	Der p 1		Der f 1		Blo t 1	
	OD	ng/ml	OD	ng/ml	OD	ng/ml
P1	0.549	375.528	0.715	527.905	0.134	0.000
P2	0.142	1.928	0.113	0.000	0.095	0.000
P3	0.118	0.000	0.114	0.000	0.101	0.000
P4	0.156	14.779	0.091	0.000	0.110	0.000
P5	0.126	0.000	0.093	0.000	0.100	0.000
P6	0.143	2.846	0.401	239.673	0.117	0.000
P7	0.113	0.000	0.099	0.000	0.100	0.000
P8	0.101	0.000	0.088	0.000	0.101	0.000
P9	0.145	4.681	0.177	34.055	0.125	0.000
P10	0.110	0.000	0.101	0.000	0.096	0.000
P11	0.097	0.000	0.093	0.000	0.089	0.000
P12	0.176	33.138	0.184	40.481	0.087	0.000
P13	0.125	0.000	0.111	0.000	0.097	0.000
P14	0.110	0.000	0.099	0.000	0.096	0.000
P15	0.133	0.000	0.094	0.000	0.135	0.000
P16	0.114	0.000	0.102	0.000	0.121	0.000
P17	0.371	212.135	0.453	287.406	0.135	0.000
P18	0.108	0.000	0.084	0.000	0.107	0.000
P19	0.100	0.000	0.087	0.000	0.109	0.000
P20	0.111	0.000	0.090	0.000	0.103	0.000
P21	0.101	0.000	0.087	0.000	0.093	0.000
P22	0.102	0.000	0.088	0.000	0.101	0.000
P23	0.990	780.338	0.096	0.000	0.089	0.000
P24	0.108	0.000	0.098	0.000	0.097	0.000
P25	0.118	0.000	0.114	0.000	0.110	0.000
P26	0.111	0.000	0.096	0.000	0.097	0.000
P27	0.112	0.000	0.095	0.000	0.129	0.000
P28	0.458	291.996	0.528	356.251	0.134	0.000
P29	0.117	0.000	0.091	0.000	0.088	0.000
P30	0.117	0.000	0.088	0.000	0.094	0.000
P31	0.147	6.517	0.124	0.000	0.096	0.000
P32	0.268	117.588	0.226	79.034	0.102	0.000
P33	0.100	0.000	0.116	0.000	0.094	0.000
P34	0.098	0.000	0.117	0.000	0.130	0.000
P35	0.090	0.000	0.082	0.000	0.091	0.000
P36	0.106	0.000	0.093	0.000	0.091	0.000
P37	0.117	0.000	0.133	0.000	0.135	0.000
P38	0.175	32.220	0.119	0.000	0.121	0.000
P39	0.236	88.214	0.089	0.000	0.101	0.000
P40	0.163	21.204	0.093	0.000	0.115	0.000
P41	0.166	23.598	0.097	0.000	0.144	3.764
P42	0.435	270.883	0.565	390.215	0.105	0.000
P43	0.245	96.475	0.196	51.496	0.110	0.000

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Table 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 (continued).

No.	Der p 1		Der f 1		Blo t 1	
	OD	ng/ml	OD	ng/ml	OD	ng/ml
P44	0.337	180.925	0.471	303.929	0.103	0.000
P45	0.109	0.000	0.092	0.000	0.098	0.000
P46	0.105	0.000	0.120	0.000	0.094	0.000
P47	0.179	35.891	0.199	54.250	0.098	0.000
P48	2.208	1898.384	2.347	2025.978	0.126	0.000
P49	1.039	825.317	1.070	0.000	0.141	1.010
P50	0.111	0.000	0.097	0.000	0.118	0.000
P51	0.129	0.000	0.129	0.000	0.147	6.517
P52	0.151	10.189	0.148	7.435	0.127	0.000
P53	0.142	1.928	0.096	0.000	0.098	0.000
P54	0.361	202.956	0.238	90.050	0.128	0.000
P55	0.141	1.010	0.124	0.000	0.091	0.000
mean	0.233	100.558	0.217	81.603	0.109	0.205
SD	0.330	297.898	0.345	290.320	0.017	1.012

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Table 9. The optical density and concentration of anti house dust mite antibody specific to Der p 1, Der f1 and Blo t 1 antigen in nonallergic healthy subjects

	Der p 1		Der f 1		Blo t 1	
No.	OD	ng/ml	OD	ng/ml	OD	ng/ml
C1	0.098	0.000	0.091	0.000	0.094	0.000
C2	0.095	0.000	0.085	0.000	0.095	0.000
C3	0.101	0.000	0.122	0.000	0.092	0.000
C4	0.093	0.000	0.089	0.000	0.088	0.000
C5	0.099	0.000	0.086	0.000	0.104	0.000
C6	0.099	0.000	0.079	0.000	0.086	0.000
C7	0.117	0.000	0.088	0.000	0.116	0.000
C8	0.095	0.000	0.089	0.000	0.112	0.000
C9	0.119	0.000	0.088	0.000	0.096	0.000
C10	0.107	0.000	0.096	0.000	0.110	0.000
C11	0.300	146.962	0.101	0.000	0.102	0.000
C12	0.108	0.000	0.095	0.000	0.099	0.000
C13	0.115	0.000	0.086	0.000	0.122	0.000
C14	0.077	125.849	0.087	0.000	0.146	5.599
C15	0.112	0.000	0.083	0.000	0.093	0.000
C16	0.082	0.000	0.078	0.000	0.087	0.000
C17	0.117	0.000	0.081	0.000	0.085	0.000
C18	0.101	0.000	0.089	0.000	0.098	0.000
C19	0.098	0.000	0.085	0.000	0.111	0.000
C20	0.099	0.000	0.107	0.000	0.116	0.000
C21	0.126	0.000	0.103	0.000	0.111	0.000
C22	0.111	0.000	0.114	0.000	0.123	0.000
C23	0.129	0.000	0.177	34.055	0.119	0.000
C24	0.110	0.000	0.122	0.000	0.173	30.384
C25	0.106	0.000	0.090	0.000	0.103	0.000
C26	0.099	0.000	0.087	0.000	0.092	0.000
C27	0.106	0.000	0.086	0.000	0.116	0.000
C28	0.103	0.000	0.087	0.000	0.109	0.000
C29	0.107	0.000	0.082	0.000	0.089	0.000
Mean	0.111	9.407	0.095	1.174	0.106	1.241
SD	0.038	35.289	0.020	6.324	0.019	5.701

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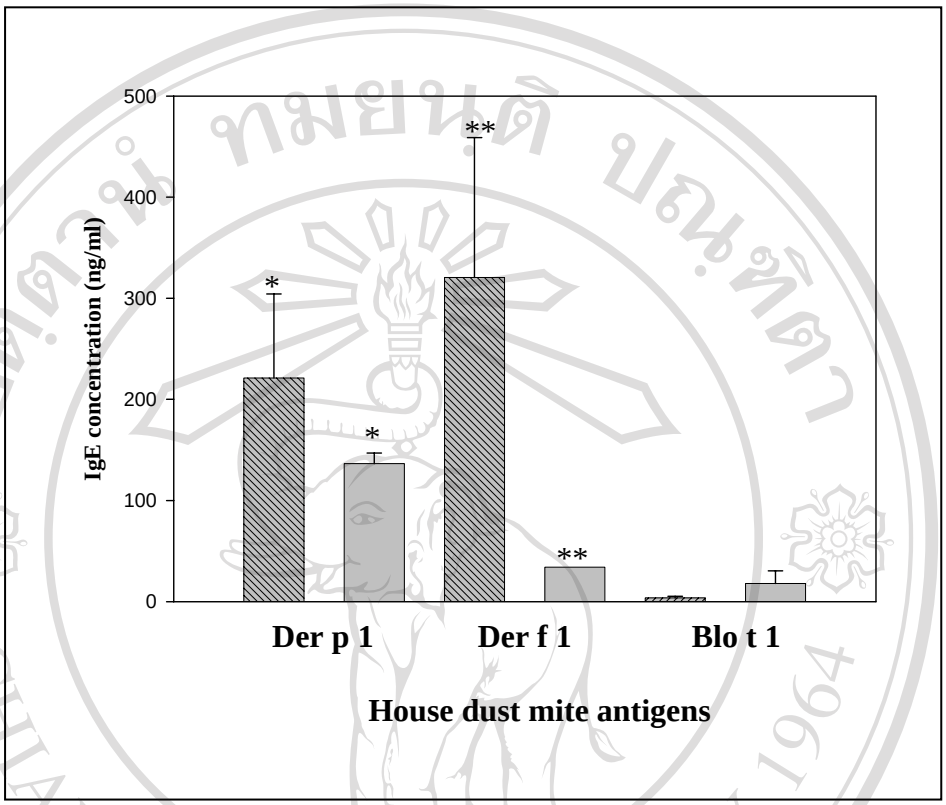

Figure 11. The specific IgE concentration against various house dust mite antigens. The average IgE concentration specific to Der p 1 and Der f 1 of AR was significantly higher than nonallergic group (*, ** $p < 0.05$). The data shown were mean ± SD of amount IgE from patients who positive to specific IgE to Der p 1, Der f 1 and Blo t 1 of AR group (fine line box) and nonallergic group (gray box).

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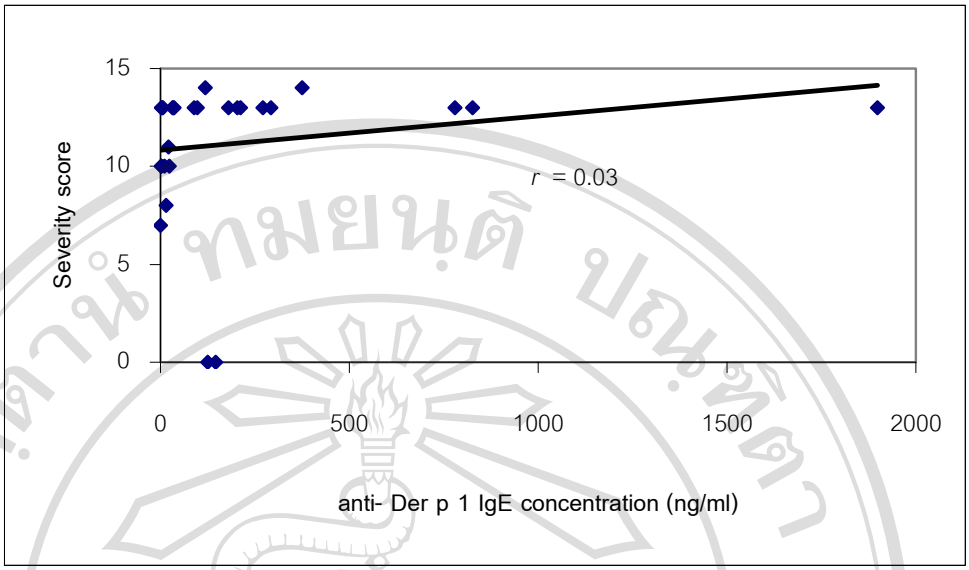

Figure 12. The relationship between anti-Der p 1 IgE concentration and the severity scores of subjects who positive for anti Der p 1 IgE. The correlation between anti-Der p 1 IgE concentration and the severity score was low (r = 0.03).

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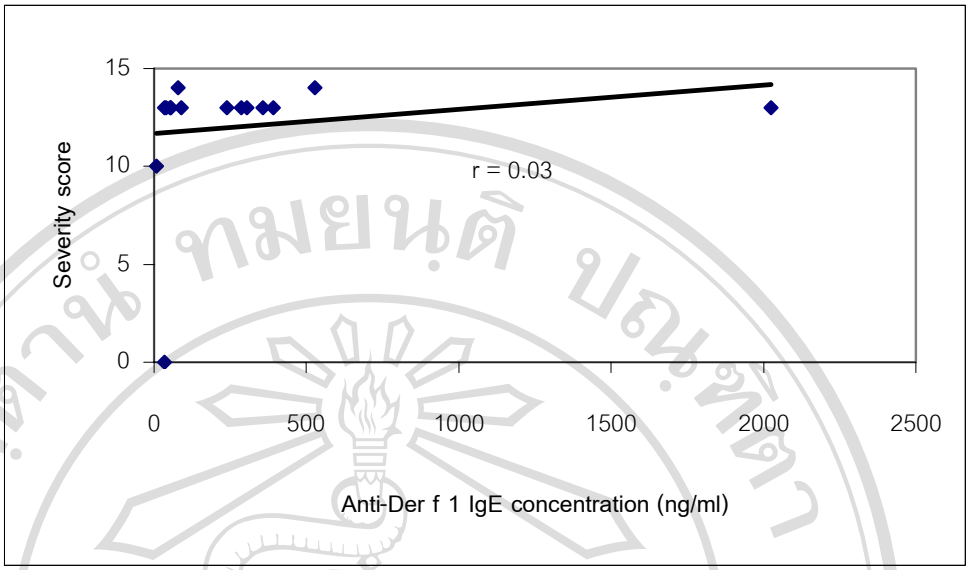

Figure 13. The relationship between anti-Der f 1 IgE concentration and the severity scores of the subjects who positive for anti Der f 1 IgE. The correlation of anti-Der f 1 IgE concentration with the severity score was low (r = 0.03).

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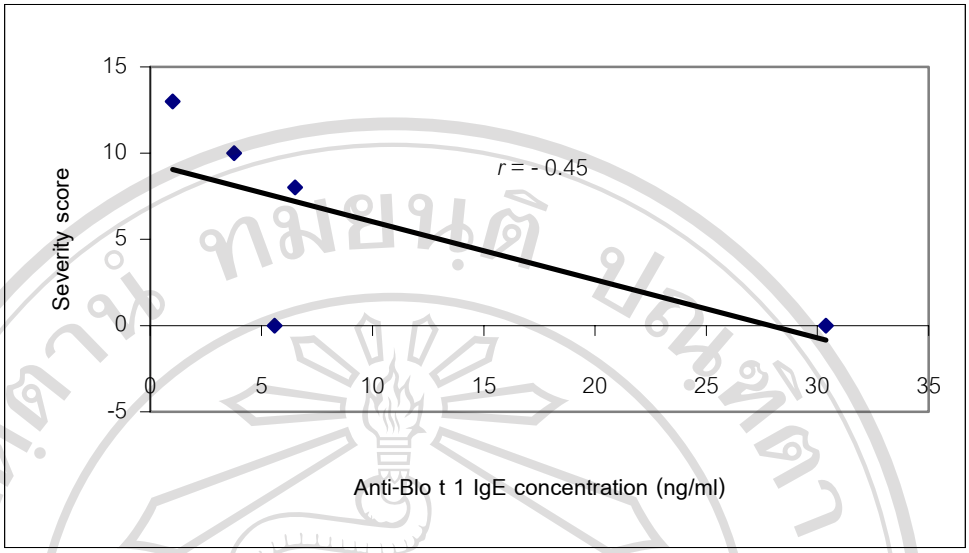

Figure 14. The relationship of anti-Blo t 1 IgE concentration and the severity scores of subjects who positive for anti Blo t 1 IgE. The correlation of anti-Blo t 1 IgE concentration with the severity score was low (r = 0.45).

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