



Eosinophilic (IL-5R and IL-4R) and Neutrophilic (CXCR1 and IL-17R) Cytokines and Receptor Expression in Asthmatic Patients with Fixed Airflow Limitation (FAL)

Tanapoom Pattamametin MD¹, Putthapoom lumjiaktase PhD,² Apichaya puanpetch PhD³ Theerasuk Kawamatawong MD, FCCP¹

Background

The inflammatory cytokines play roles in asthma. The fixed airflow limitation (FAL) is associated with severe asthma, Nevertheless, assessment of T2 cytokine receptor expression on inflammatory cells and clinical outcomes of Thai asthmatic patients with FAL have never been studied.

Objectives

The study is aimed to compare the differential T2 and non-T2 cytokines receptor expression in T2 and non-T2 inflammatory cells. The expression of those cytokine receptors expression and the associated clinical presentation and treatment outcome in asthmatic patients with and without FAL.

Material and methods

The cross-sectional study was conducted at chest clinic Ramathibodi hospital, from 2020 to 2022. Spirometry, asthma control score (ACT score) and treatment were recorded. Eosinophils, neutrophils, ILC2, Th2, Th17 were measured by flow cytometry. Receptor expression on inflammatory cells (IL-4R, IL-5R, CXCR1, IL-17R) was measured.

Results

A total of 87 asthmatic patients with FAL (n =36) and without FAL (n = 44) were enrolled, and healthy subjects (n=7). The characteristic and flow cytometry results are in the table 1

Table 1 The asthma patients with and without FAL and healthy subject characteristics

Variables	Asthma without FAL (N=44)	Asthma with FAL limitation (N=36)	Healthy subject (N=7)	P-value
Age	61.25 (49-74.75)	63.72 (52-72)	36 (30-41)	<0.01
ACT score	21.93 (20-25)	22.81 (21-25)	N/A	
BMI	23.9 (21.46-26.15)	25.01 (20.68-28.04)	23.9 (21.27-25.77)	0.521
FEV ₁ %	86% (79-91)	57.9% (52-65)	94.6% (92-97)	<0.01
Percent Eosinophil	3.18 (1.5-3.9)	4.14 (1.7-5.0)	1.98 (0.8-2.9)	0.157
Percent neutrophil	53.58 (45-63)	49.3 (43-55)	53.2 (41-62)	0.381
Absolute Neutrophil	4081 (2569-5650)	4246 (2958-4928)	4940 (2385-8291)	0.765
Absolute Eosinophil	223 (97-320)	356 (109-415)	167(79-155)	0.138
% IL5 R	65.8 (56-81)	66.2 (56-80)	70 (51-86)	0.874
% IL 4R	5.7 (2.5-7.5)	7.06 (1.9-8.1)	3.4 (2.3-4.6)	0.533
% IL 17 R	76.8 (66-95)	78 (75-95)	44.4 (5-77.3)	0.018
% CXCR 1	99.5 (99-100)	99.5 (99-100)	95.7(96-100)	0.710
Absolute Th	687 (536-827)	922 (588-1173)	959 (718-1023)	0.012
Absolute ILC2	112 (58-148)	152 (72-203)	140 (33-216)	0.192
Absolute Th2	197 (11.5-335.75)	447 (9-994)	595 (0-1022)	0.293
% ILC2	16 (9-21)	16.29 (10-24)	13.7 (3-30)	0.396
% Th2	28.46 (1.8-53)	42.9 (1-92)	55.54 (0.04-99)	0.533
Absolute T reg	30116 (107-11351)	51521 (2296-77490)	56231 (4920-86592)	0.017
Absolute Th 17	280,685 (351-252537)	1,040,564 (14022-2047212)	865,254 (344646-1521202)	0.001
% Treg	3.4 (1.98-4.2)	3.6 (1.3-5.14)	4.5 (1.2-6.7)	0.571
% Th 17	44 (7.3-83.12)	60.8 (16.18-95.94)	87 (84.76-98.45)	0.015

Conclusions

Increased T2 inflammatory cells and cytokines is not established in this asthma cohort regarding to FAL. The expression of non-T2 inflammatory cytokine is noted in asthma. Expression of IL-17 receptors is potential underlying pathobiology of asthma with FAL.

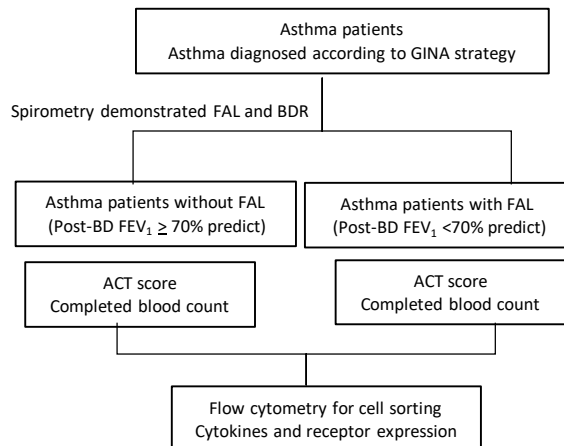


Figure 1 Patient flow and classification

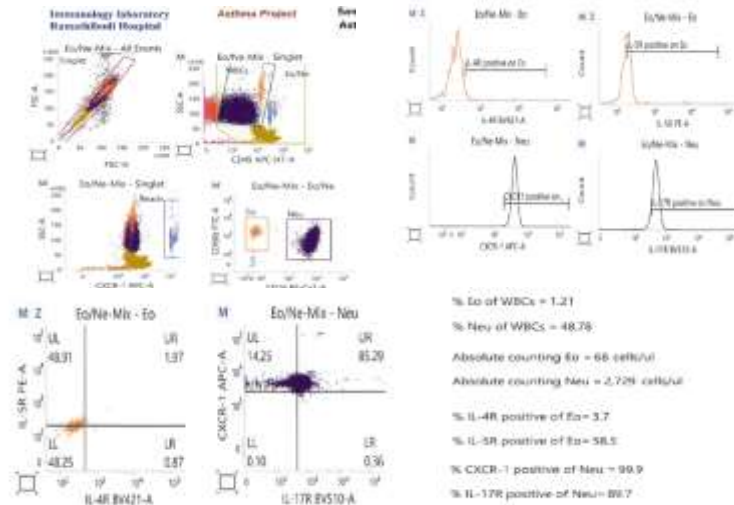


Figure 2 % expression of cytokine receptors on cells by flow cytometry