

Differentiating Asthma from COPD

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Cheetahs & Leopards



Cheetah

- ❖ Solid color polka dots
- ❖ Fastest (120km an hour)on planet
- ❖ (0 to 96 km in 3 seconds)
- ❖ Drinks water once in 4 days
- ❖ Hunts during day



Cheetah

- ❖ Solid color polka dots
- ❖ Fastest (120km an hour)on planet
- ❖ (0 to 96 km in 3 seconds)
- ❖ Drinks water once in 4 days
- ❖ Hunts during day



Leopard

- ❖ Uneven rosette spots
- ❖ Not fast (55 km an hour)
- ❖ Strong (can drag an animal on to a tree)
- ❖ Hunts at night



Asthma-definition (GINA-2011)

"Asthma is a chronic inflammatory disorder of airways in which many cells and cellular elements play a role.

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COPD-definition (GOLD 2007)

"A preventable and treatable disease with some significant extra-pulmonary effects that may contribute to the severity in individual patients. Its pulmonary component is characterized by airflow limitation that is not fully reversible.

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Asthma

"Asthma is a chronic inflammatory disorder of airways in which many cells and cellular elements of the airway contribute to the disease. The chronic inflammation is associated with airway responsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness and coughing particularly at night or early in the morning. These episodes are usually associated with widespread but variable air flow obstruction within the lung that is often reversible either spontaneously or with treatment"

COPD

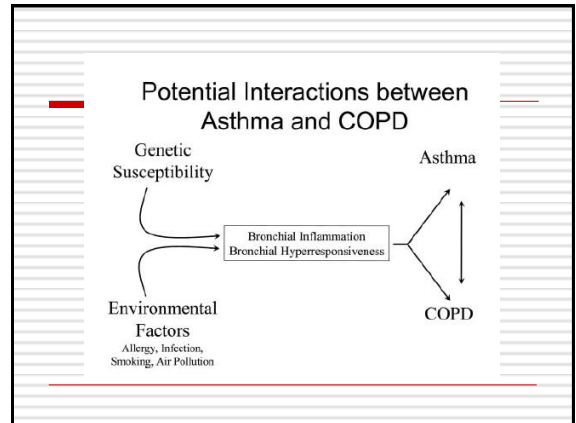
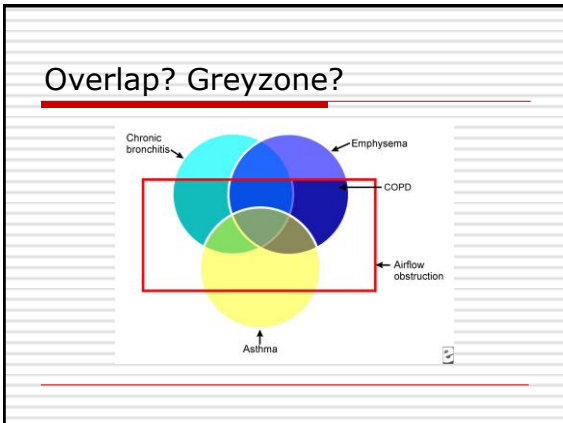
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Dutch Hypothesis (Orie et al 1961)

Orie NGM, Sluiter HJ, de Vries K, et al. The host factor in bronchitis. In: Orie NGM, Sluiter HJ, eds. Bronchitis. Assen, the Netherlands: Royal van Gorcum, 1961: 43-59

Dutch Hypothesis (Orie et al 1961)

1

Various forms of OLD have overlapping cl features- different specific clinical phenotypes

Orie NGM, Sluiter HJ, de Vries K, et al. The host factor in bronchitis. In: Orie NGM, Sluiter HJ, eds. Bronchitis. Assen, the Netherlands: Royal van Gorcum, 1961: 43-59

Dutch Hypothesis (Orie et al 1961)

2

- One form (Asthma) can evolve into another (COPD)

Orie NGM, Sluiter HJ, de Vries K, et al. The host factor in bronchitis. In: Orie NGM, Sluiter HJ, eds. Bronchitis. Assen, the Netherlands: Royal van Gorcum, 1961; 43-59

Dutch Hypothesis (Orie et al 1961)

3

- Development of OLD is based on allergy (inflammation), influenced by endogenous (genes) and exogenous factors (environ).

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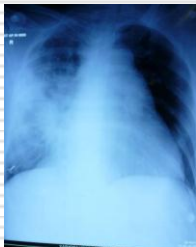
Controversial
But, not
disproven

Orie NGM, Sluiter HJ, de Vries K, et al. The host factor in bronchitis. In: Orie NGM, Sluiter HJ, eds. Bronchitis. Assen, the Netherlands: Royal van Gorcum, 1961; 43-59

Case (Mrs.K)



- 55 yr lady
- Semiconscious (ER)
- SpO2 (44%)
- Fever, Cough 3 days
- Known asthma
- Sleepy at Home (always)



Case (Mrs.K)

	Day 1	After 8 Days of BiPAP
Ph	7.30	Ph 7.52
paCO2	61.2	paCO2 49.5
paO2	30	paO2 55
HCO3	29.8	HCO3 40.4

Eur Respir J 2006; 28: 264-267
 DOI: 10.1183/09031536.06.0056106
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EDITORIAL

Asthma, COPD and bronchitis are just components of airway disease

F.E. Hargreave and K. Parameswaran

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EDITORIAL

Asthma, COPD and bronchitis are just components of airway disease

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    graph TD
        A[Other respiratory and nonrespiratory conditions] --> B[Symptoms]
        B --> C[Inflammation]
        C --> D[Chronic airflow limitation]
        C --> E[Variable airflow limitation]
        D --> F[Airway hyperresponsiveness]
        E --> F
        F --> C
    
```

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EDITORIAL

Asthma, COPD and bronchitis are just components of airway disease

F.E. Hargreave and K. Parameswaran

This point of view supports the Dutch hypothesis that was put forward in the 1960s by ORIE *et al.* [30] and reviewed recently by POSTMA and BOEZEN [31]. This suggested that the various types of airway diseases should not be considered as separate diseases but as one disease entity, the components of which are influenced by host (genetic) and environmental factors. Clinical evaluation should be of the components and causes in order to rationalise, individualise and optimise treatment. We agree, but propose that the names asthma, chronic obstructive disease and bronchitis are retained for what they are, components of airway disease.

Similarities and Differences in Asthma and COPD*

The Dutch Hypothesis

Eugene R. Bleeker, MD, FCCP

(CHEST 2004; 126:938-958)

The most common signs and symptoms of COPD are dyspnea on exertion, often accompanied by cough with sputum production and wheezing.* Many older individuals experience dyspnea on exertion

Abbreviations: BHR = bronchial hyperresponsiveness; OLD = obstructive lung disease.
 *COPD represents an intractably intractant

Asthma missed

- Symptoms mild
- "allergy"
- Spirometry-Normal
- Normal in between

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- Symptoms mild
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COPD missed

- Symptoms after 40 years
- "smoker's cough"
- Spirometry-Not done
- Large lung reserve

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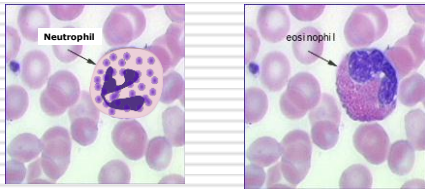
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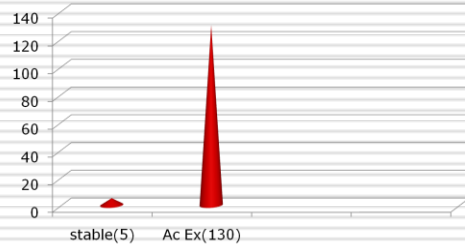
NHNE survey

- 16084 pts
- >17 years
- 25% smokers had COPD
- 44% (FEV1/FVC 50%) never diagnosed earlier

What differentiates Asthma/COPD ?

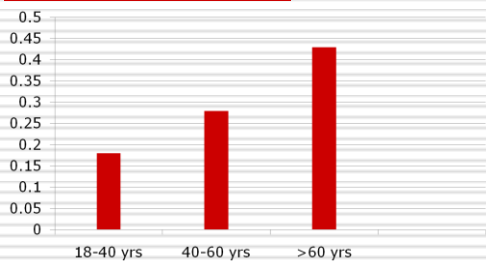


Increased Eosinophils in COPD(EG₂(+) cells/mm²)



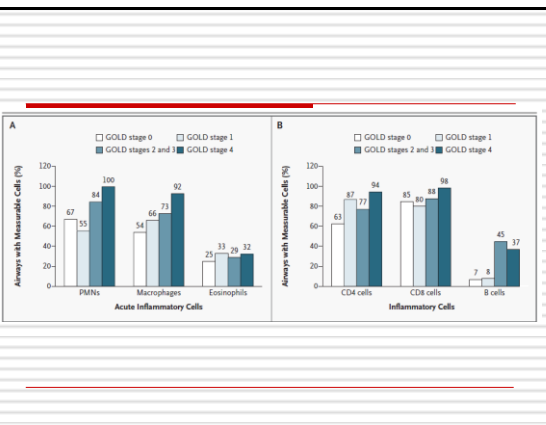
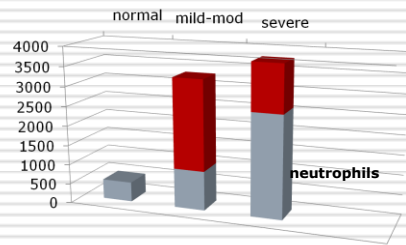
Ref:Saetta AJRCCM 1994;150:1646-1652

Asthma (with FEV₁/FVC=<0.7)



P<0.001

Increased Neutrophilic Inflammation in Asthma



AIRWAY PATHOLOGY

Can endobronchial biopsy analysis be recommended to discriminate between asthma and COPD in routine practice?

A Bourdin, I Serre, H Flamme, P Vic, D Neveu, P Aubas, P Godard, P Chanez

Thorax 2004;59:488-493. doi: 10.1136/thx.2003.016899

Table 2 Diagnostic value of endobronchial biopsies in asthma and COPD

	Sensitivity (%)	Specificity (%)	Likelihood ratio
Observer A	48 (32 to 62)	79 (68 to 91)	2.3 (0.8 to 3.8)
Observer B	36 (22 to 50)	63 (48 to 77)	0.97 (0.4 to 1.5)
Observer C	45 (30 to 60)	56 (39 to 72)	1.01 (0.5 to 1.5)

Values are presented as mean (95% confidence intervals).

We conclude that routine assessment of EBB specimens cannot currently be recommended to discriminate between asthma and COPD. Although there are criteria specific to these two disease entities, the biopsy specimens are difficult to analyse. Clearer pathological definitions are needed to enhance the diagnostic results.

Differences in Airway Inflammation in Patients with Fixed Airflow Obstruction Due to Asthma or Chronic Obstructive Pulmonary Disease

Leonardo M. Fabbri, Micaela Romagnoli, Lorenzo Corbetta, Gianluca Casoni, Kamelija Busljetic, Graziella Turato, Guido Ligabue, Adalberto Ciacca, Marina Saetta, and Alberto Papi

Research Center on Asthma and COPD, University of Ferrara, Italy; Departments of Respiratory Diseases and Radiology, University of Modena & Reggio Emilia, Modena, Italy; Department of Respiratory Medicine, University of Skopje, Macedonia; Section of Respiratory Diseases, Department of Clinical and Experimental Medicine, University of Padova, Italy

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46 patients of severe AWO
COPD-27
Asthma-19

- Detailed history
- Spirometry
- DLCO
- eNO
- Sputum
- BAL
- HRCT

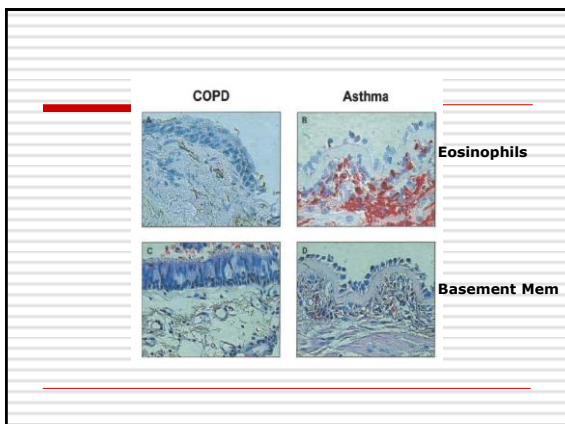
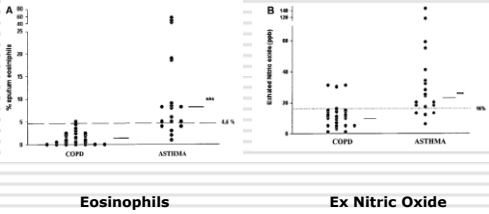


TABLE 2. INFLAMMATORY CELLS IN THE LAMINA PROPRIA OF THE AIRWAY WALL IN PATIENTS WITH FIXED AIRFLOW OBSTRUCTION

Cells (cells/mm ²)	Fixed Airflow Obstruction (n = 27)	History of COPD (n = 17)	History of Asthma (n = 10)
Macrophages	91.3 (47-102)	99.4 (65-105.6)	86 (41-97.7)
Neutrophils	109.5 (71-180)	88.5 (43-156)	157 (99-183)
Eosinophils	30 (5-57.5)	5 (2-3.3)	50 (10-280)**
Mast cells	45 (13.5-70)	40 (18.7-65)	53 (9.2-120)
CD4+	142 (65-210)	109 (18-138.2)	218 (110.7-372.2)**
CD8+	45 (25.2-102)	72.5 (36.5-145)	40 (15.2-71.5)
CD4+/CD8+	2 (0.97-7.75)	1.2 (0.22-3.15)	7 (2-21)*

Definition of abbreviation: COPD = chronic obstructive pulmonary disease.
 *Data are expressed as the medians with interquartile range shown in parentheses. Significantly different from the values for COPD patients: *p < 0.05, **p < 0.01.

Biomarkers



Eosinophils

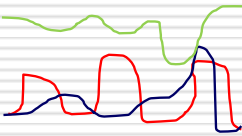
Ex Nitric Oxide

- ↑eosinophils, CD4/CD8, BM, Diffusion, eNO, response to steroids
- ↓Neutrophils, RV, H RCT emphysema score,

The results of our study suggest that, in clinical practice, patients with fixed airflow obstruction due to asthma should not be grouped under the general heading of COPD. Rather, they should be properly identified and treated (6, 54).

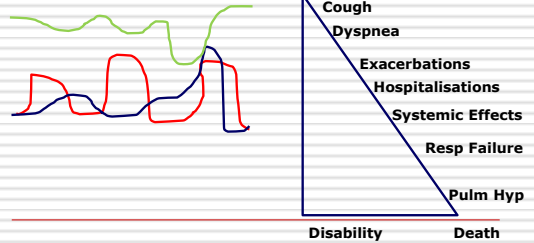
Natural History

- Asthma



Natural History

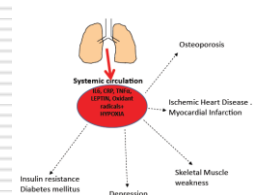
- Asthma
- COPD



COPD (the big difference!)

COPD (the big difference!)

Systemic Inflammation



Systemic Inflammation in Chronic Obstructive Pulmonary Disease

The Role of Exacerbations

Emiel F. M. Wouters¹, Karin H. Groenewegen¹, Mieke A. Dentener¹ and Janita H. J. Vernooy¹

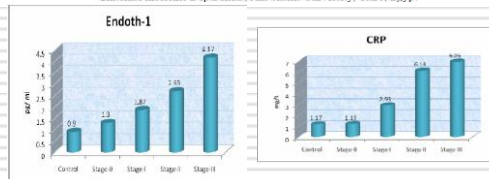
¹Department of Respiratory Medicine, University Hospital Maastricht, Maastricht, The Netherlands

- C-reactive peptide
- Copeptin
- IL-8
- IL-6
- Tumor necrosis factor- α
- Leptin
- Eosinophilic cationic protein
- Myeloperoxidase
- α_1 -Antitrypsin
- Leukotrienes E4 and B4
- Fibrinogen
- Myeloid progenitor inhibitor factor-1 (MIPF-1)
- Pulmonary and activation-regulated chemokine (PARC)
- Soluble intercellular adhesion molecule-1 (sICAM-1)
- Adiponectin (ACRP-30)

Clinical utility of biomarkers as predictors of lung function in chronic obstructive pulmonary disease

Nervana Samy¹, Abd El-Maksoud M.D¹, Abeer EL Khayyal¹ and Azza Imam²

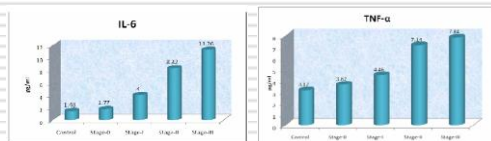
¹Biochemistry Department, National Research Center, Cairo, Egypt
²Internal medicine Department, Ain Shams University, Cairo, Egypt



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EDITORIAL

The 阴阳 of COPD: or balancing repair (yang) and inflammation (yin)

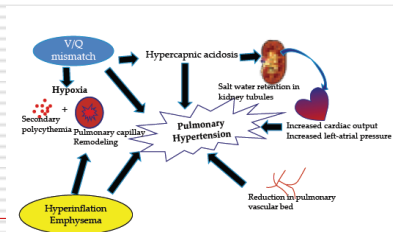
J.B. Soriano^{1,2*} and A. Agustí^{1,2,3*}

- **Yin**=female,negative,dar kness,softness,moisture, nighttime,even numbers,docile.
- **Yang**=male,positive,brigt ht,hard,dry,daytime,odd number,dominant.



COPD (the big difference!)

Pulmonary Hypertension



Diffusing Capacity (DLCO)

Asthma

COPD

□ Increased surface area=DLCO high

□ Loss of surface area=DLCO low

COPD vs Asthma-Symptoms

Asthma

- Episodic, total remission
- Usually begins in childhood

COPD

- Progressive, asymptomatic until 35 years, worsens in middle age, dyspnea & exacerbations more common
- Smoking History

COPD vs Asthma-Spirometry

Asthma

- FEV1 reversibility 12% with a SABA

COPD

- FEV1/FVC = <0.7 (with or without reversibility)

ATS/ERS Guidelines 2004

- “ Some patients with Asthma cannot be distinguished from COPD with current diagnostic tests. The management of these patients should be similar to that of Asthma ”

That's a Cheetah for sure!



*Thanks for
your
Attention!*