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ASTHMA: DEFINITIONS AND PATH PHYSIOLOGY

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Abstract

Asthma is a common condition due to chronic inflammation of the lower respiratory tract. Chronic lower airway inflammation is known to be more common in individuals that also have inflammatory disorders of the upper airway. The scientific understanding of asthma continues to improve and it is important for providers who treat upper or lower airway inflammation to be familiar with asthma's definition and path physiology. Articles were selected based on literature reviews through PubMed and personal knowledge of the author. The search selection was not standardization. Asthma is a heterogenic condition that is underdiagnosed and undertreated despite that the skills needed to diagnose it are readily attainable and effective treatments are available. Providers need a working understanding of asthma in order to be proficient at managing their patients with chronic nasal or sinus inflammation. This article provides a primer focusing on the current con asthma in terms of definition, possible etiologies, inflammatory profile, patho physiology, subtypes, and overlapping conditions. Asthma is a chronic inflammatory disorder arising from not fully understood heterogenic gene environment interactions. It features variable airway obstruction and bronchial hyper responsiveness. Clinically, asthmatics exhibit recurrent episodes of wheeze, cough, chest tightness, and shortness of breath.

Keywords: *Asthma; Patho Physiology, Genetics, Phenol-Types, Definitions*

DEFINE

Asthma is a condition in which your airways narrow and swell and may produce extra mucus. This can make breathing difficult and trigger coughing, a whistling sound (wheezing) when you breathe out and shortness of breath.

ASTHMA ETIOLOGY

The cause of asthma is not known, but risk factors have been identified and gene-environment interactions are important. Genetics are known to play a role, with asthma with heritability ranging between 35% and 95%. Large genetic studies have identified hundreds of genetic variants associated with an increased risk of asthma. Epigenetic variations in how the genetic code is translated have also been shown to have a role in the development of asthma. Respiratory infections, especially viral infections early in life, increase the risk of developing asthma, particularly if the symptoms are severe. Airborne environmental exposures increase the risk of asthma, including tobacco smoke, pollutants, and ozone. Atopic conditions and sensitization to inhalant allergens are also associated with developing asthma. Other factors have been theorized to play a role in asthma development, including effects of the microbiome, vitamin D, chemical exposure, dietary changes, stress, and metabolites. Current asthma understanding entails a broad amount of genetic diversity, which is variably translated and environmentally influenced via epigenetic and transcriptional factors, leading to less diverse histro pathological features with resulting cardinal asthmatic symptoms.

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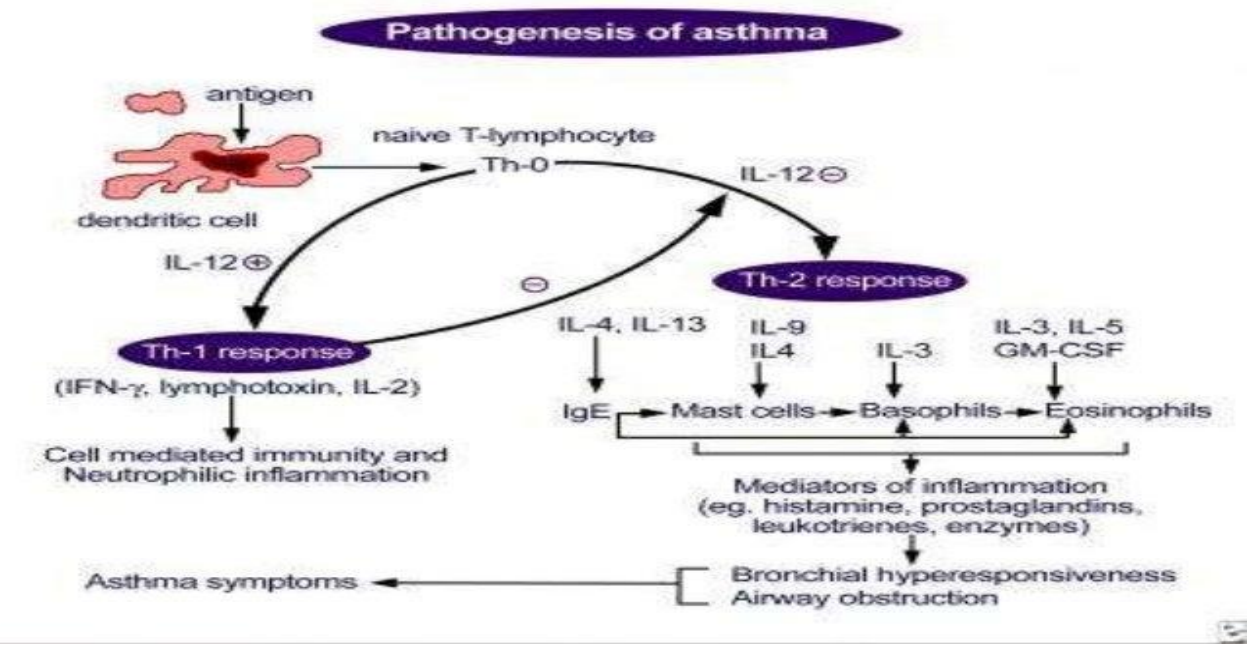
PATHOPHYSIOLOGY OF ASTHMA

- Inflammation in asthma is characterized by eosinophils, CD4+ T-lymphocytes, macrophages and mast cells
- Prominent pathological features of asthma include:
  - airway hyper-responsiveness
  - episodic bronchospasm in the large airways
  - vasodilation and angiogenesis
- Severe asthma can be classified into two sub-types: eosinophil (+) and eosinophil (-)
- Neutrophils are found in severe, corticosteroid- dependent asthma



CONCLUSION

Asthma is a heterogenic and complex disease originating from a variety of gene-environment interactions. Most asthma exhibits type 2 inflammations, which are often seen in allergic conditions and also as an immune response to parasites. Type 2 inflammation is mediated by respiratory epithelium and type 2 T-helper lymphocytes. Inflammation of the bronchi leads to increased mucus production, increased bronchoconstriction, and collagen deposition narrowing the airways. Asthma is often episodic, with a variety of environmental triggers that vary among asthmatics. Triggers include viruses, allergens, irritants (smoke), exercise, and temperature changes. The inflammation causes obstruction primarily of the bronchial airways with symptoms of shortness of breath, wheezing, chest tightness, and cough. The broncho constriction in asthma is often reversible with an inhaled β2 agonist. Reversibility often helps differentiate asthma from other pulmonary conditions. There are proven methods to diagnose and treat most asthmatics, making knowledge of asthma important for physicians who treat inflammatory disorders of the upper or lower airways.

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