

Inflammation, Autoimmunity and Exacerbations: A Promising Area for New Studies in COPD

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Abstract

Chronic obstructive pulmonary disease (COPD) is an inflammatory airway disease whose incidence and mortality increases every year. COPD is characterized by irreversible airflow limitation based on obstructive bronchiolitis and emphysema. It is associated with an abnormal inflammatory response of the lung to toxic particles or gases, such as cigarette smoke. Recently, an increasing body of evidence has been accumulated for a link between inflammation and autoimmunity in the development of COPD. The idea that autoimmunity could contribute to the development of COPD provides a new angle to understand the pathogenesis of the disease. However, the non-physiological stress caused by environmental factors such as cigarette smoking is linked to the inflammatory process and autoimmunity, and all these factors may contribute to the occurrence of exacerbation in COPD. It will be demonstrated some evidences that support this paradigm and the need to invest in research in this area.

Globally, the COPD burden is projected to increase in coming decades because of continued exposure to COPD risk factors and aging of the population [1] and the COPD load is designed to increase in coming decades because of continued exposure to COPD risk factors, especially regarding the use of cigarettes, and aging of the population [6].

COPD has as a consequence high prevalence and chronicity; it causes high use of resources with frequent visits to the clinic, frequent hospitalizations due to acute exacerbations, and requiring greater demand for oxygen therapy and medication [7], which demands a greater economic cost for the health sector.

Exacerbations of COPD are episodes of worsening of symptoms, are associated with increased airway and systemic inflammation. They are triggered mainly by bacteria and viruses, which infect the airway and increase airway inflammation [8,9]. Exacerbations associated with infections occur mainly due to a defective response of the immune system in patients with COPD, being aggravated more by the use of the cigarette [10]. Although circumstantial results of a role for autoimmunity in patients with COPD caused by cigarette use have been identified, there is growing evidence that both cellular and antibody-mediated autoimmunity also has an important role in the progression of COPD.

Inflammation and autoimmunity a possible link with the heat shock protein (HSP)

According to all the evidences found in important studies, observes a great highlight for two fundamental mechanisms for the occurrence of exacerbations in COPD, inflammation and autoimmunity. COPD is responsible for persistent airflow limitation that is usually progressive and caused by an increased inflammatory response in the airways [1]. inflammatory mediators, such as TNF- α , IFN- γ , IL-8, lipid mediators, reactive oxygen and nitrogen species, are involved in airway inflammation in COPD [12,13] being responsible for inducing parenchymal destruction and consequently small airway fibrosis, leading to dyspnea and limitation of physical activity [14].

The disease paradigm suggests that an imbalance of the inflammatory process versus action of the immune system in the

Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a chronic, irreversible and debilitating disease, characterized by persistent airflow limitation that is usually progressive and caused by an increased inflammatory response in the airways and the lung to noxious particles or gases. COPD is a major cause of morbidity and mortality worldwide, affecting millions of people every year. The major risk factor for COPD is smoking. However, additional risk factors include genetic predisposition, exposure to second-hand smoke, chemicals, air pollution, heredity and history of childhood respiratory infections [1]

COPD affects more than 5 percent of the population and is associated with high morbidity and mortality [2]. It is the third leading cause of death in the world today [3], killing more than 120,000 individuals each year [4]. More than 3 million people died of COPD in 2012 [1]. In the U.S., COPD results in 15.4 million physician visits, 1.5 million emergency department visits, and 726,000 hospitalizations each year [5].

