

Estrogen Receptor in Chronic Obstructive Pulmonary Disease (COPD): Gender and Aging Differences

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Sex differences in the biology of different organ systems and the influence of sex hormones in modulating health and disease are increasingly relevant in clinical and research areas. Gender influences not only physiological differences, but also the social, economic, and cultural context in which men and women coexist. There is increasing clinical evidence for sex differences in incidence, morbidity, and mortality of lung diseases including allergic diseases (such as asthma), chronic obstructive pulmonary disease (COPD), pulmonary fibrosis, lung cancer, as well as pulmonary hypertension. The prevalence, morbidity, and mortality of COPD in women are increasing in the United States. Statistics say in fact that there are more women than men with COPD, a disease characterized by all-or-nothing progressive, presently irremediable, alveolar loss: primary or idiopathic pulmonary hypertension (PPH) is well known as a disease of women in the childbearing years, while asthma is increasing in prevalence and more rapidly in women. Based on experimental evidences, the idea of our study starts from sex-specific differences, which lie mainly in hormonal deficiency that occurs in women during climateric period or in a more advanced stages of life. With this aim in mind we investigated the role of estrogen receptors (ERs) in inflammatory lung injury and assessed the role of gender and aging in estrogens action. C57BL/6 mice were treated with bleomycin (BLEO, 1 mg/kg) for one week; after this treatment, measurement of fluid and collagen content in the lung, BALF analysis, myeloperoxidase (MPO) activity assay, lung histology and IHC were performed. Our results demonstrate that activation of ER in lung inflammatory cells might provide beneficial effects in adult, but not in aged, mice of both genders, suggesting a key role of the estrogens signaling pathway in the physiology and therapeutic opportunities of lung inflammation.