



Immunopharmacology and inflammation

## Cannabidiol reduces airway inflammation and fibrosis in experimental allergic asthma

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### Abstract

Asthma is characterized by chronic **lung inflammation** and **airway hyperresponsiveness**. Asthma remains a major public health problem and, at present, there are no effective interventions capable of reversing **airway remodelling**. **Cannabidiol** (CBD) is known to exert immunomodulatory effects through the activation of cannabinoid-1 and -2 (CB<sub>1</sub> and CB<sub>2</sub>) **receptors** located in the **central nervous system** and immune cells, respectively. However, as the role of CBD on airway remodelling and the mechanisms of CB<sub>1</sub> and CB<sub>2</sub> aren't fully elucidated, this study was designed to evaluate the effects of cannabidiol in this scenario. Allergic asthma was induced in Balb/c **mice** exposed to **ovalbumin**, and respiratory mechanics, **collagen** fibre content in airway and alveolar **septa**, **cytokine** levels, and CB<sub>1</sub> and CB<sub>2</sub> expression were determined. Moreover, expressions of CB<sub>1</sub> and CB<sub>2</sub> in induced sputum of asthmatic individuals and their correlation with **airway inflammation** and lung function were also evaluated. CBD treatment, regardless of dosage, decreased airway hyperresponsiveness, whereas static lung elastance only reduced with high dose. These outcomes were accompanied by decreases in **collagen** fibre content in both airway and alveolar **septa** and the expression of **markers** associated with **inflammation** in the **bronchoalveolar lavage** fluid and lung homogenate. There was a significant and inverse correlation between CB<sub>1</sub> levels and lung function in asthmatic patients. CBD treatment decreased the inflammatory and remodelling processes in the model of allergic asthma. The mechanisms of action appear to be mediated by CB<sub>1</sub>/CB<sub>2</sub> signalling, but these **receptors** may act differently on lung inflammation and remodelling.



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## Keywords

Asthma; Inflammation; Remodelling; Cannabidiol; CB<sub>1</sub>; CB<sub>2</sub>

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