

# The impact of type 2 immunity and allergic diseases in atherosclerosis

Nieves Fernández-Gallego<sup>1</sup>, Raquel Castillo-González<sup>1</sup>, Nerea Méndez-Barbero<sup>2</sup>, Celia López Sanz<sup>3</sup>, David Obeso<sup>4</sup>, Alma Villaseñor<sup>4</sup>, Maria Escribese<sup>4</sup>, Beatriz López-Melgar<sup>3</sup>, Jorge Salamanca<sup>3</sup>, Amparo Benedicto-Buendía<sup>3</sup>, Luis Jesús Jiménez-Borreguero<sup>3</sup>, Borja Ibañez<sup>1</sup>, Joaquin Sastre<sup>2</sup>, Maria Belver<sup>3</sup>, Francisco Vega<sup>3</sup>, Carlos Blanco<sup>3</sup>, Domingo Barber Hernández<sup>4</sup>, Francisco Sánchez-Madrid<sup>1</sup>, Hortensia de la Fuente<sup>3</sup>, Pilar Martín<sup>1</sup>, Vanesa Esteban<sup>2</sup>, and Rodrigo Jimenez-Saiz<sup>3</sup>

<sup>1</sup>Fundacion Centro Nacional de Investigaciones Cardiovasculares Carlos III

<sup>2</sup>Instituto de Investigacion Sanitaria de la Fundacion Jimenez Diaz

<sup>3</sup>Hospital Universitario de la Princesa

<sup>4</sup>Universidad CEU San Pablo Facultad de Medicina

May 5, 2022

## Abstract

Allergic diseases are allergen-induced immunological disorders characterized by the development of type 2 immunity and IgE responses. The prevalence of allergic diseases has been on the rise alike cardiovascular disease (CVD), which affects arteries of different organs such as the heart, the kidney and the brain. The underlying cause of CVD is often atherosclerosis, a disease distinguished by endothelial dysfunction, fibrofatty material accumulation in the intima of the artery wall, smooth muscle cell proliferation, and Th1 inflammation. The opposed T-cell identity of allergy and atherosclerosis implies an atheroprotective role for Th2 cells by counteracting Th1 responses. Yet, the clinical association between allergic disease and CVD argues against it. Within, we review different phases of allergic pathology, basic immunological mechanisms of atherosclerosis and the clinical association between allergic diseases (particularly asthma, atopic dermatitis, allergic rhinitis and food allergy) and CVD. Then, we discuss atherogenic mechanisms of type 2 immunity and allergic inflammation including acute allergic reactions (IgE, IgG1, mast cells, macrophages and allergic mediators such as vasoactive components, growth factors and those derived from the complement, contact and coagulation systems) and late phase inflammation (Th2 cells, eosinophils, type 2 innate-like lymphoid cells, alarmins, IL-4, IL-5, IL-9, IL-13 and IL-17).

## Hosted file

20220503 Manuscript FINAL.docx available at <https://authorea.com/users/480615/articles/567965-the-impact-of-type-2-immunity-and-allergic-diseases-in-atherosclerosis>