

Preface

The standard dogma back in the twentieth century was that the human genome was 99 % “junk DNA”, and that most of the non-coding sequences across the genome did not hold much interest. However, many scientists across the world relentlessly confronted such plain hypothesis. As an old friend and colleague at the University of Salamanca used to say, “if it exists, it can’t be without a meaning”. As a recent outcome from such dissatisfaction accepting the existence of boring “junk DNA”, a worldwide consortium of scientists just published in September of 2012 the first results of the ENCODE project [1], an encyclopedia of DNA elements, including protein, RNA, and regulatory elements that have a functional impact in the circumstances in which genes are active. This roadmap of the genome can be explored by readers through the *Nature* ENCODE portal (<http://www.nature.com/encode/#/threads>), and for many it has been considered, among other things, a tremendously interesting repository of epigenetic information. We wrote this *Briefs* with the idea in mind that this is the time for clinical researchers and allergologists to connect with the ENCODE goals and use them as a first GPS to better understand asthma and allergy.

Therefore, this *Springer Briefs* is intended as an introductory text for a broad spectrum of students, clinicians, and scientists who want to get a quick overall understanding of the increasing evidences of crosstalk between the fields of allergy and epigenetics. The most relevant immunological aspects of allergy and its pathophysiology are treated early in this book. Then, the variety of epigenetic elements (i.e. DNA, RNA and protein) that may have a critical impact in gene regulation are discussed, including a concise description of the major current technologies to study them. Finally, we review several hypotheses and recently published data, which support the increasing interest on the profound impact that environment and epigenetics have in the pathogenesis of complex diseases like asthma and allergy.

The fruitful collision of three perspectives is the origin of this book. On one side, Marién Pascual, Ph.D, conducted the *epigenetic perspective*. She got interested in epigenetics and allergic diseases early in her career at the Allergy Department of the University Hospital of Salamanca (University of Salamanca, Spain). This interest was further cultivated when she joined the group of

Dr. John Greally (Albert Einstein College of Medicine, New York, USA), a lab devoted to the study of DNA methylation. An intense collaboration between both groups culminated in several papers about epigenetics and allergy. Then, here comes the second perspective, the *editorial perspective* that made Meredith Clinton, Assistant Editor at Springer, believe that a volume on the role of epigenomics in asthma and allergy would be a fantastic addition to the Springer book program and the community at large. Finally, Sergio Roa, Ph.D, got onboard this project to bring his *immunological perspective* to the project. Such collaboration responded to many years as colleagues at the Albert Einstein College of Medicine in New York and numerous discussions about the role of DNA methylation in B cell biology. Inspired by Marién's passion for epigenetics and new technologies, and encouraged by Dr. Sandeep N. Wontakal and Dr. Richard Chahwan from the Einstein Relativity Club, Sergio has tried to bring into this monograph his AID-biased perspective and illustrations of the immune response.

We would like to give great thanks to all those people in Salamanca (especially to Dr. María Isidoro-García, Dr. Ignacio Dávila, and Dr. Félix Lorente), in New York (especially to Dr. Masako Suzuki, Dr. John Greally, and Dr. Matthew D. Scharff) and Pamplona (especially to Dr. Felipe Prósper and Dr. José Ángel Martínez-Climent), as well as to our family and friends, who supported and advised us on how to make this project better. We want also to give thanks to Dr. Esteban Pascual Pablo, MD, who carefully reviewed the manuscript.

Our deepest hope is that the ideas that we discuss in this book have the chance to inspire and fuel the interest of the reader to pursue new ways of exploring epigenetics and allergy, as another step, even if it is small, toward a better understanding and treatment of allergic disease.

Marién Pascual
Sergio Roa

Reference

1. Bernstein BE, Birney E, Dunham I, Green ED, Gunter C, Snyder M. An integrated encyclopedia of DNA elements in the human genome. *Nature*. 2012;489(7414):57–74. doi:[10.1038/nature11247](https://doi.org/10.1038/nature11247).

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Pascual, M.; Roa Gómez, S.

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