Preface

In this book, I intent to succinctly present my theory of the epigenetic mechanisms of evolution and development. By making its presentation accessible to a wide range of readership, I hope not to have sacrificed scientific rigor.

An earlier extensive substantiation of this theory and its biological ramifications in *Epigenetic Principles of Evolution* (2008, 2012) allows me to focus on the principal ideas—and present only the most representative empirical evidence in support of the theory—in this work. I have also expanded my epigenetic view of development and evolution to the world of unicellulars and marginally to the plant kingdom.

Herein, epigenetics is dealt with as a biological discipline on its own rather than as a branch, or frontier area, of genetics or any other discipline. I extend the epigenetics' object beyond the classical areas of the DNA methylation, histone acetylation, and chromatin remodeling, which in this book are considered downstream elements of signal cascades at the systemic level.

I include in epigenetics the vast areas of the nongenetic mechanisms of reproduction, growth, cell differentiation, development, and evolution. It is in this broader context that epigenetics promises to be the genetics of the twenty-first century.

As it occurs often in the study of biological phenomena, an overlap of epigenetics with the objects of the study of other disciplines is unavoidable. So, for example in studying epigenetic mechanisms of homeostasis, its object overlaps with that of physiology, and in studying mechanisms of reproduction and development, it overlaps with the disciplines of genetics and endocrinology.

At the core of my comprehensive vision of epigenetics is the concept of the epigenetic control and regulation of gene expression to include changes in the developmental mechanisms that produce evolutionary novelties without changes in genes. In this vision, epigenetics is function of the integrated control system, which, I think, represents the core of the epigenetics as the new northstar of the biological research.

The predominant genetic approach to the study of inheritance has naturally led to the use of the adjective *genetic* synonymously to *inherited*. By expanding the field of study of the phenomenon of inheritance to nongenetic mechanisms, epigenetics imposes a reconsideration of the synonymous use of these words. In our time, biological inheritance is a shared object of study where epigenetics and genetics come into a complex, but clear relationship, characterized by epigenetic control and regulation of genetic functions and structures.

My son's, Redon, help in preparing the manuscript of this book can hardly be overestimated.