

Preface

Our idea to invite a group of leading researchers to contribute chapters to a volume on evolutionary genomics and proteomics grew out of the sense that a new kind of evolutionary analysis of organisms is emerging. This new kind of analysis is driven by technological developments that make genome sequencing possible at a scale not remotely possible only ten years ago, and equally make available large amounts of information on gene transcription, regulation and expression, protein structure, and protein interactions. Putting together these still-emerging technologies and the data they produce is the job of the fields of evolutionary genomics and proteomics. What makes the new science fresh is the perspective that, perhaps for the first time, the organism is in sight, but it is not going to arise as the sum of its genomic parts. Rather, if the organism resides in the genome, the trick is going to be to see how the instructions the genome encodes work together to make phenotypes, and how those instructions are written there by selection acting on individuals.

The need for an edited volume arises because the fields comprised by evolutionary genomics and proteomics are specialized and often rely on methods germane to particular kinds of questions. Equally, few broad generalizations have yet emerged. In some ways, evolutionary genomics and proteomics stands at about the same place that the neo-Darwinists did in the early part of the twentieth century—full of ideas with as yet enormous amounts of data still to come. And this—the production and interpretation of data—is likely to be the defining feature of genomic and proteomic science for some time. We are in for a period of intense empirical activity as researchers use new technologies to reveal how natural selection acting on phenotypes has molded the content and structure of genomes.

The chapters in this volume sample important pieces of the genomic and proteomic puzzle that will need to be assembled to produce a science of both the genome and the phenotype. These pieces include the determined work of understanding genes, where they come from, their regulation, the proteins they produce, and how those proteins interact in networks. The chapters include attempts to put diverse topics together and to study their links to phenotypes and to variation among them. For this sample, we are grateful to the authors of the chapters for providing summaries of their ideas.

Books, like phenotypes, don't simply arise as a sum of parts; they must be steered through a course of development. The kernel of the book was devised during a sabbatical Andrew Pomiankowski spent at the Collegium Budapest, Hungary, and during which Mark Pagel visited. We are extremely

grateful for the invitation to visit from Eörs Szathmáry, and to the Rector and staff of the Collegium for providing such a pleasant and stimulating environment in which to work. Andy Sinauer was supportive of the project from its inception and forbearing when we encountered difficulties. Laura Green's flair at copyediting holds the chapters together as one, and Kathaleen Emerson's efficiency in coordinating the book's production has been a delight. David McIntyre lent his able assistance to the editorial effort and conceptualized the cover art. Joan Gemme produced an elegant and lively book design, and turned manuscripts, tables, and figures into high quality and colorful book chapters. Joanne Delphia created the beautiful cover illustration, and Chris Small oversaw the art production. Marie Scavotto has made important contributions to the promotion of the book.

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