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Medicine and Evolution

Current Applications, Future Prospects

Edited by
Sarah Elton
Paul O'Higgins

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Dedicated to the memory of Nick Norgan

Foreword

The dawn of Darwinian medicine has turned out to be an awkward metaphor. Instead of the start of a long day, however good, the application of evolutionary thinking to medicine is proving to be more like the birth of an organism that is fast growing up. While one could argue about whether we are now at the toddler stage or gangly adolescence, the field clearly remains young. That vigour is on display in this volume. Old ideas, such as the thrifty genotype, are presented not as museum pieces, but active hypotheses that began as intriguing but incorrect hunches and now are maturing to become heuristic perspectives that spur new research important to human health. Common beliefs, such as the role decreased parasite load plays in increasing vulnerability to certain diseases, are examined from novel viewpoints. Generalizations about the ancestral environment are here replaced by anthropologically sophisticated perspectives on the variations in human environments and human adaptability. Long-standing questions about the public health significance of protein requirements, reasons for early pregnancy loss, and optimal mother-infant sleeping arrangements are examined with new data. And fresh ideas about syndromes as diverse as delusions and polycystic ovary syndrome emerge, increasingly with a consideration of the relevant evidence.

This is all very interesting, as doctors so often tell me. However, as doctors predictably ask, is it useful? Should doctors learn the relevant principles of evolutionary biology in the same way they learn biochemistry, anatomy, or physiology? Some answers are here in the chapters on practical applications and medical education. Bentley, in her innovative seminar, discovered what happens when practitioners and researchers are given an opportunity to think more deeply about the implications of evolution for their work; they come up with good ideas and see their own projects in a new light. The chapter on education reviews the rather sorry state of evolutionary teaching in medicine, but from the perspective of insiders who recognize why evolution is not taught. The chapters in this book, taken together, make a strong case for evolution in medical education. The benefits include a better ability to assess advice on specific questions such as diet and recommended daily allowances, and how best to house mothers and neonates in maternity wards. In addition, and perhaps even more importantly, an evolutionary

perspective emphasizes that diseases arise not from broken parts in a poorly designed machine, but from the inevitable compromises of an evolved body interacting with novel environments. As it spreads, this more accurate view of the body and disease will change medicine fundamentally.

Darwinian medicine is developing rapidly, in part because of the insights that a new perspective brings to old problems. Its development has also been nurtured by its many interfaces with related disciplines. I hope this book will stimulate readers to want to know more about this field, and I recommend http://EvolutionAndMedicine.org as a useful first port of call to keep abreast of new findings and learn about upcoming meetings.

Randolph M. Nesse
University of Michigan–Ann Arbor

Preface

This volume arose out of the Society for the Study of Human Biology and Biosocial Society Symposium "Medicine and Evolution," held in York, UK, on December 11–12, 2006. As anthropologists working at the recently opened Hull York Medical School (HYMS), one of a number of institutions established in answer to the UK need for more doctors, we were keen to explore how we might link our research and teaching interests in new and exciting ways. The symposium provided an opportunity to expose our colleagues and students to the opportunities offered by an overarching evolutionary view. Given the constraints of modern medical education, we cannot expect to witness a radical infusion of evolutionary thinking in medical schools, but we hope this volume will at least suggest some avenues worthy of exploration and stimulate interest among medical students and practitioners. The York symposium was energised by interaction between the speakers, who for the most part were anthropologists and evolutionary biologists, and the discussants, most of whom were practising clinicians. The resulting conversations were enormously important in shaping this volume.

A great many people have helped us in the preparation of this volume. First and foremost we extend our thanks to those who attended the symposium in York and whose participation made for a highly enjoyable and stimulating meeting. We are especially grateful to the colleagues who contributed chapters for this volume, as well as to those who gave up their time to review the contributions. We gratefully acknowledge the financial assistance of the Society for the Study of Human Biology, the Biosocial Society, and the Hull York Medical School toward symposium costs, and the York Medical Society for generously allowing us to use its superb meeting rooms in the centre of York. Jackie Houlton, Richard Nicholson, and Nadine Webster of HYMS were constant sources of help in arranging and running the symposium as well as preparing the subsequent volume. Barbara Norwitz, Amy Rodriguez, and Pat Roberson of Taylor & Francis have generously and patiently given advice over the past year. Finally, we thank John Russell for his continued support.

Sarah Elton and Paul O'Higgins
York, UK

The Editors

Sarah Elton is senior lecturer in anatomy at Hull York Medical School. She is a biological anthropologist with a research focus on the environmental factors that influence variation and adaptation, with special interest in Old World primates. She uses evolutionary approaches to teach concepts in the core medical curriculum as well as providing elective modules on evolution for medical students.

Paul O'Higgins is chair of anatomy at Hull York Medical School. He is a qualified clinician working in biological anthropology and morphology. His research interests concern human and primate evolution and variation. He has extensive experience of teaching health professionals at undergraduate and postgraduate levels and frequently bases his teaching on the evolutionary principles underlying normal and disordered structure and function.

Contributors

Robert Aunger
Hygiene Centre
London School of Hygiene and Tropical Medicine
London, United Kingdom

Jack Baker
Bureau of Business and Economic Research
University of New Mexico
Albuquerque, New Mexico

Helen Ball
Parent Infant Sleep Lab and Medical Anthropology Research Group
Department of Anthropology
Durham University
Durham, United Kingdom

Gillian R. Bentley
Department of Anthropology and Wolfson Research Institute
Durham University
Durham, United Kingdom

M. Christopher Dean
Department of Cell Anatomy and Developmental Biology
University College, London
London, United Kingdom

Sarah Elton
Functional Morphology and Evolution Unit
Hull York Medical School
University of Hull
Hull, United Kingdom

M. Anderson Frey
Department of Anthropology
University of New Mexico
Albuquerque, New Mexico

Edward H. Hagen
Department of Anthropology
Washington State University
Vancouver, Washington

Kim Hill
School of Human Evolution and Social Change
Arizona State University
Tempe, Arizona

A. Magdalena Hurtado
School of Human Evolution and Social Change
Arizona State University
Tempe, Arizona

Inés Hurtado
Department of Anthropology
University of New Mexico
Albuquerque, New Mexico
and
Instituto Venezolana de Investigaciones Cientificas
Venezuela

Jonathan Marks
Department of Sociology and Anthropology
University of North Carolina at Charlottle
Charlotte, North Carolina

Alejandra Núñez-de la Mora
Medical Anthropology Research Group
Department of Anthropology
Durham University
Durham, United Kingdom

Paul O'Higgins
Functional Morphology and Evolution Unit
Hull York Medical School
University of York
York, United Kingdom

Tessa M. Pollard
Medical Anthropology Research Group
Department of Anthropology
Durham University
Durham, United Kingdom

Laurence Shaw
London Bridge Fertility Gynaecology and Genetics Centre
London, United Kingdom

Stanley J. Ulijaszek
Institute of Social and Cultural Anthropology
University of Oxford
Oxford, United Kingdom

Nigel C. Unwin
Institute of Health and Society
University of Newcastle
Newcastle-upon-Tyne, United Kingdom

Virginia J. Vitzthum
Anthropology Department and the Kinsey Institute
Indiana University
Bloomington, Indiana
and
Institute for Primary and Preventative Health Care
Binghamton University
Binghamton, New York

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Introduction

Sarah Elton
Functional Morphology and Evolution Unit, Hull York Medical School, University of Hull

Paul O'Higgins
Functional Morphology and Evolution Unit, Hull York Medical School, University of York

There is increasing interest in examining aspects of health and disease in the context of evolutionary theory,[1–3] and the past decade has witnessed the rise of evolutionary or Darwinian medicine as an entity distinct from anthropology, evolutionary biology, or evolutionary psychology. Nonetheless, evolutionary concepts are often viewed as being tangential to medical teaching and practise, which tend to emphasise technical and proximate factors together with the treatment of the individual. Williams and Nesse[4] recognised early on that it would not be easy to persuade clinicians of the relevance of evolutionary medicine, regardless of the benefits brought by the approach. To this end, one major aim of this volume is that contributors should, where possible, indicate how their research and scholarship informs practical applications in clinical settings, health promotion, or medical education.

The next eight chapters of this volume address topics that will be familiar to most students of evolutionary medicine: nutrition (Chapters 2, 3), Type 2 diabetes (Chapter 4), fertility and childbirth (Chapters 5, 6, 7), immune regulation (Chapter 8), and psychiatry (Chapter 9). In contrast to Chapters 2 to 9, which focus on evolutionary insights into particular aspects of health and disease and that have a long history of anthropological investigation, Chapters 10 to 13 consider in much broader ways how evolutionary medicine might be "useful" for medical practise or education.

In Chapters 2 and 3 Elton and Ulijaszek, respectively, examine Stone Age diets from different perspectives. Elton, in Chapter 2, draws on examples from palaeoenvironmental studies, environmental archaeology, and modern human and primate ecology to critique the concept of the environment of evolutionary adaptedness. In doing so, she concludes that given the inherent flexibility of the human diet, there is no obvious benefit to employing a dietary regimen based on Stone Age principles, and points to alternative