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by Tara Rodden Robinson



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About the Author

Tara Rodden Robinson, RN, BSN, PhD, is a native of Monroe, Louisiana, where she graduated from Ouachita Parish High School. She earned her degree in nursing at the University of Southern Mississippi and worked as a registered nurse for nearly six years (mostly in surgery) before running away from home to study birds in the Costa Rican rain forest. From the rain forests, Tara traveled to the cornfields of the Midwest to earn her PhD in biology at the University of Illinois, Urbana-Champaign. She conducted her dissertation work in the Republic of Panama, where she examined the social lives of song wrens. She received her postdoctoral training in genetics with Dr. Colin Hughes (then at the University of Miami) and through a postdoctoral fellowship at Auburn University. Dr. Robinson received a teaching award for her genetics course at Auburn and was twice included in *Who's Who Among America's Teachers* (2002 and 2005).

Currently, Tara teaches genetics via distance education on behalf of the biology program at Oregon State University. On the research side, Dr. Robinson has conducted research on birds in locations all over the map, including Oregon, Michigan, Yap (part of the Federated States of Micronesia), and the Republic of Panama. Examples of her work include using paternity analysis to uncover the mysteries of birds' social lives, examining the population genetics of endangered salmon, and using DNA to find out which species of salmon that seagoing birds like to eat.

When not traveling to exotic places with her husband, ornithologist W. Douglas Robinson, Tara enjoys hiking the Coast Range of Oregon with her two dogs in training for the Susan G. Komen 3-Day for the Cure. You can find out more about her at www.thegeneticsprofessor.com.

Dedication

For Douglas: You are my Vitamin D.

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Introduction

Genetics affects all living things. Although sometimes complicated and always diverse, all genetics comes down to basic principles of *heredity* — how traits are passed from one generation to the next — and how DNA is put together. As a science, genetics is a fast growing field because of its untapped potential — for good and for bad. Despite its complexity, genetics can be surprisingly accessible. Genetics is a bit like peeking behind a movie’s special effects to find a deceptively simple and elegant system running the whole show.

About This Book

Genetics For Dummies, 2nd Edition, is an overview of the entire field of genetics. My goal is to explain every topic so that anyone, even someone without any genetics background at all, can follow the subject and understand how it works. As in the first edition, I include many examples from the frontiers of research. I also make sure that the book has detailed coverage of some of the hottest topics that you hear about in the news: cloning, gene therapy, and forensics. And I address the practical side of genetics: how it affects your health and the world around you. In short, this book is designed to be a solid introduction to genetics basics and to provide some details on the subject.

Genetics is a fast-paced field; new discoveries are coming out all the time. You can use this book to help you get through your genetics course or for self-guided study. *Genetics For Dummies*, 2nd Edition, provides enough information for you to get a handle on the latest press coverage, understand the genetics jargon that mystery writers like to toss around, and translate information imparted to you by medical professionals. The book is filled with stories of key discoveries and “wow” developments. Although I try to keep things light and inject some humor when possible, at the same time, I make every effort to be sensitive to whatever your circumstances may be.

This book is a great guide if you know nothing at all about genetics. If you already have some background, then you’re set to dive into the details of the subject and expand your horizons.

Conventions Used in This Book

I teach genetics in a university. It would be very easy for me to use specialized language that you'd need a translator to understand, but what fun would that be? Throughout this book, I avoid jargon as much as possible, but at the same time, I use and carefully define terms that scientists actually use. After all, it may be important for you to understand some of these multisyllabic jawbreakers in the course of your studies or your, or a loved one's, medical treatment.

To help you navigate through this book, I also use the following typographical conventions:

- ✓ I use *italic* for emphasis and to highlight new words or terms that I define in the text.
- ✓ I use **boldface** to indicate keywords in bulleted lists or the action parts of numbered steps.
- ✓ I use `monofont` for Web sites and e-mail addresses. Note that some Web addresses may break across two lines of text. In such cases, I haven't inserted any hyphens to indicate a break. So if you type exactly what you see — pretending that the line break doesn't exist — you can get to your Web destination.

What You're Not to Read

Anytime you see a Technical Stuff icon (see “Icons Used in This Book” later in this introduction), you can cruise past the information it's attached to without missing a key explanation. For the serious reader (or a student intent on earning a high score), the technical bits add depth and detail to the book. You also have permission to skip the shaded gray boxes known as sidebars. Doing so doesn't affect your understanding of the subject at hand, but I pull together lots of amazing details in these boxes — from how aging affects your DNA (and vice versa) to how genetics affects your food — so I'm guessing (or at least hoping!) that the sidebars will grab your attention more often than not.

Foolish Assumptions

It's a privilege to be your guide into the amazing world of genetics. Given this responsibility, you were in my thoughts often while I was writing this book. Here's how I imagine you, my reader: