

## **Welcome to Biotech Nation: My Unexpected Odyssey into the Land of Small Molecules, Lean Genes, and Big Ideas**

By Moira A. Gunn, PH.D.

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Today, one third of the world's economy is driven by biotechnology.<sup>1</sup> From pharmaceuticals to stem cells and alternative fuel sources to genetically modified food, the impact of biotechnology on modern society is both pervasive and clear. Along with the extensive amounts of information and development that the biotech field has provided, a host of legal, ethical and economic controversies has followed. Biotech advances in reproductive technology, for example, have been rife with ethical controversies. Is it a positive or negative development that individuals undergoing in vitro fertilization can now use pre-implantation genetic screening to examine embryos for chromosomal abnormalities, which may result in the termination of atypical embryos? Does this type of genetic screening give would-be parents too much control over nature and an embryo's characteristics? Is the genetic screening process merely a gateway to genetically engineered children or an important development that gives parents the ability to make an informed decision about possibly raising a very sick child? Such questions inundate the field of biotechnology, touching topics that are as versatile as genetics and intellectual property. While many questions about biotech advances remain, it is undisputed that biotech developments have globally impacted society and will continue to do so in the future.

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<sup>1</sup> How to Change the World, *Ten Questions with Moira Gunn: How Does an Internet Babe Make the Leap to Biotech*, <http://blog.guykawaski.com/2007/07/ten-questions-1.html> (July 30, 2007).

In *Welcome to Biotech Nation: My Unexpected Odyssey into the Land of Small Molecules, Lean Genes, and Big Ideas*, Dr. Moira A. Gunn<sup>2</sup> addresses the current issues and controversies in the biotech industry and simultaneously chronicles her descent “down the Biotech rabbit hole.”<sup>3</sup> Part biography and part science writing, the book presents information about biotech topics and also narrates the story of *BioTech Nation*, a radio program recently developed by Gunn, which is currently aired on National Public Radio. While Gunn has hosted National Public Radio’s *TechNation* for several years, which focuses on developments in the technology industry, biotech was new to Gunn. *Welcome to BioTech Nation* recounts her transition from the technology world to the biotech world and relays the insights that she has gained along the way. The book has an anecdotal tone, and woven among the chapters are Gunn’s personal experiences, observations of the industry, and excerpts of interviews with biotech executives and scientists about biotech advances in health care, pharmaceuticals, agriculture, information technology and food production.

While the book addresses the controversies inherent to the biotech world, Gunn shies from drawing specific conclusions or “taking sides” with respect to the debates. Instead, she presents the pros and cons of various biotech developments and introduces the reader to the issues, provoking him or her to draw his or her own conclusions. She effectively conveys the beneficial effects of biotech innovations while illuminating the tensions that co-exist with such benefits. The premise of the book, in addition to chronicling Gunn’s personal experiences, simply seems to be that biotechnology matters in big way and is also laden with debate.

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<sup>2</sup> Dr. Gunn is an engineer, journalist and former NASA computer scientist. She has recently been named a Science Laureate for her contributions to science journalism.

<sup>3</sup> MOIRA A. GUNN PH.D., *WELCOME TO BIOTECH NATION: MY UNEXPECTED ODYSSEY INTO THE LAND OF SMALL MOLECULES, LEAN GENES AND BIG IDEAS* (8 Amacom American Management Association 2007).

Gunn begins *Welcome to Biotech Nation* with a chapter on genetically modified foods, playfully named “The Genetically Modified Food Fight,”<sup>4</sup> which is exemplary of the basic style and analysis that Gunn employs throughout the book. In this chapter and a few that follow, Gunn describes the economic, social and health benefits of genetically modified agriculture and food while noting the lack of scientific testing of genetically modified foods and absence of federal laws regulating the process. Although Gunn’s opinions on sub-issues of this debate are readily discernible, it remains unclear whether she thinks, overall, that the genetic modification of food and agriculture is a positive or negative development.

Gunn conveys, for example, the important economic and social benefits of genetically modified agriculture by recalling an interview with an African village chief in which he discussed the village’s use of genetically modified corn seeds. The seeds, which had been altered to kill a corn borer, yielded a corn crop that was four to five times larger than the crop the farmers had yielded from traditional seeds. As a result of the new seeds, the villagers were able to feed themselves and also established a trading network with neighboring villages, creating a profitable corn enterprise.

Gunn describes additional benefits of genetically modified agriculture by recounting an interview with a Chinese scientist in which he discussed the process of injecting supplementary nutrients into seeds. The scientist illuminated the significant health benefits that the nutrient injection process has brought to certain populations. For instance, it is now possible incorporate Vitamin A, which affects eyesight and blindness, into crops like rice. As a result of biotech, millions of Chinese citizens are now able to access a vitamin source that was previously unavailable to them.

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<sup>4</sup> *Id.* at 25.

Gunn offsets these economic, social and health benefits, though, with an analysis of the United States' minimal regulation of genetically modified food and agriculture. With respect to scientific testing, Gunn writes, "I'm not arguing that GM [genetically modified] food is unsafe. I'm just saying that from a strictly scientific viewpoint, GM food was not extensively tested [before introduction to U.S. supermarkets]." <sup>5</sup> In addition to questioning the lack of federal testing, Gunn emphasizes the absence of federal food labeling laws. Virtually every packaged food sold in American grocery stores contains some form of genetically modified ingredients. <sup>6</sup> Why, she wonders, given the Food and Drug Administration's other nutritional labeling mandates, does food packaging neglect to state that the product contains genetically modified ingredients? According to Gunn, it is because genetically modified foods were not yet on the market when the Nutrition Labeling and Education Act was passed in 1990, so these foods were not contemplated by the Act. <sup>7</sup> In contrast to the United States' no-label policy, Gunn discusses China's genetically modified food labeling policy, which she argues increases consumer choice and gives those opposed to genetically modified foods greater freedom to determine which foods they want to consume.

Gunn chronicles a number of issues in a similar fashion, pointing out the pros and cons of biotech developments, revealing her opinions, in some respects, while refraining from concluding on the issue in totality. In the remaining chapters Gunn covers topics such as stem cell research, prenatal genetic testing, technological screening devices for diabetes and prostate cancer, viral therapy, and the production of ethanol as an alternative fuel source. In a departure from her generally unbiased presentation of the biotech debates, in one chapter Gunn details in

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<sup>5</sup> *Id.* at 34.

<sup>6</sup> *Id.* at 31.

<sup>7</sup> *Id.* at 36.

the conflict between American pharmaceutical companies and foreign patent law, and reveals a slightly more partial view.

In this chapter, Gunn focuses particularly on the Indian pharmaceutical industry and a well known Indian company called Cipla. Gunn describes “BigPharma’s” abhorrence of Indian patent law as it failed to protect a drug’s “ingredients,” and only protected the “process” by which the drug was made.<sup>8</sup> Companies like Cipla, under Indian patent law, were able to take a drug that a United States pharmaceutical company had developed and reverse engineer it. Cipla then manufactured and sold the product as a generic drug at a lower cost. As a result of this low cost scheme, India provided drugs for a majority of the underdeveloped third world countries, particularly those suffering from epidemics like AIDS. Recently, though, as Gunn points out, India came into line with global intellectual property standards, and India now protects a drug’s “ingredients” as intellectual property of the drug’s original manufacturer. Thus, Cipla no longer can reverse engineer drugs and sell them at a low cost, and poor nations have to pay increased amounts for drugs.

In her discussion of Cipla, Gunn notes “Big Pharma’s” attempts to charge as high a price as they can, and in contrast writes of Cipla’s policy “you [companies like Cipla] make a reasonable profit, and you do good....You don’t maximize your profits...just because you can.”<sup>9</sup> While Gunn’s opinion seems clearer in this chapter than in others, she does note that intellectual property laws are on the side of American pharmaceutical companies. Companies have a right to protect their research, recoup expenses and make a reasonable profit.<sup>10</sup> In this way, the chapter remains consistent with the rest of the book’s tone, and Gunn continues to provoke readers to

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<sup>8</sup> *Id.* at 94.

<sup>9</sup> *Id.* at 97.

<sup>10</sup> *Id.* at 100.

weigh realities. How does one balance the rights of drug researchers and innovators with the lives of people who depend on the innovations?

Overall, *Welcome to Biotech Nation* provides a thought-provoking, readable overview of biotechnology and an inside-look at the industry, its companies and the people involved. Insiders to the biotech field may find Gunn's stories about the industry and its people particularly amusing or relatable. Those desiring a detailed, technical and in-depth analysis of biotech developments, though, will likely be disappointed as the book is anecdotal, personal and probably too basic for a person with significant knowledge of biotechnology. Readers who are looking for a persuasive argument about a particular biotech controversy may also be dissatisfied with Gunn's impartial, balanced overview of the debates. The informal and creative style of the book, though, makes it particularly accessible and informative for people who have little to no scientific background and who simply want to know more about biotech. These individuals will likely find the book to be rewarding, intriguing and well worth their time.