

# *Bacillus anthracis* and Anthrax

Edited by

**Nicholas H. Bergman**

 **WILEY-BLACKWELL**

A John Wiley & Sons, Inc., Publication



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*This book is dedicated to the scientists throughout the world who have devoted their careers to studying Bacillus anthracis and other biothreat agents. Their commitment to understanding the biology of these organisms in the face of technical, financial, and political obstacles has given us the foundations of biodefense, and for this, society owes them its deep gratitude.*





# Contents

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Preface	ix	<b>9. <i>Bacillus anthracis</i> Virulence Gene Regulation</b>	<b>157</b>
Contributors	xi	<i>Jason M. Rall and Theresa M. Koehler</i>	
<b>1. Anthrax from 5000 BC to AD 2010</b>	<b>1</b>	<b>10. The Interactions between <i>Bacillus anthracis</i> and Macrophages</b>	<b>179</b>
<i>Peter C. B. Turnbull and Sean V. Shadomy</i>		<i>Susan L. Welkos, Joel A. Bozue, and Christopher K. Cote</i>	
<b>2. Outer Structures of the <i>Bacillus anthracis</i> Spore</b>	<b>17</b>	<b>11. <i>Bacillus anthracis</i> and Dendritic Cells: A Complicated Battle</b>	<b>209</b>
<i>Adam Driks and Michael Mallozzi</i>		<i>Jean-Nicolas Tournier and Anne Quesnel-Hellmann</i>	
<b>3. Anthrax Spore Germination</b>	<b>39</b>	<b>12. <i>Bacillus anthracis</i> Dissemination through Hosts</b>	<b>227</b>
<i>Nathan Fisher, Katherine A. Carr, Jonathan D. Giebel, and Philip C. Hanna</i>		<i>Ian J. Glomski</i>	
<b>4. Genetic Manipulation Methods in <i>Bacillus anthracis</i></b>	<b>53</b>	<b>13. Pathology, Diagnosis, and Treatment of Anthrax in Humans</b>	<b>251</b>
<i>Brian K. Janes and Scott Stibitz</i>		<i>Jeannette Guarner and Carlos del Rio</i>	
<b>5. The <i>Bacillus anthracis</i> Genome</b>	<b>67</b>	<b>14. Anthrax Vaccines</b>	<b>269</b>
<i>Timothy D. Read</i>		<i>Elke Saile and Conrad P. Quinn</i>	
<b>6. <i>Bacillus anthracis</i> Plasmids: Species Definition or Niche Adaptation?</b>	<b>89</b>	<b>15. Anthrax as a Weapon of War and Terrorism</b>	<b>295</b>
<i>David A. Rasko</i>		<i>Leonard A. Cole</i>	
<b>7. Iron Acquisition by <i>Bacillus anthracis</i></b>	<b>107</b>	Index	309
<i>Gleb Pishchany and Eric P. Skaar</i>			
<b>8. Anthrax Toxins</b>	<b>121</b>		
<i>Mahtab Moayeri and Stephen H. Leppla</i>			



# Preface

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Looking back over the past decade, it is clear that our understanding of *Bacillus anthracis* and anthrax has improved dramatically in recent years. Much of this is due to technical advances that were beneficial to microbiology in a very broad sense. Genome sequencing, improved animal models, and efficient methods for genetic manipulation, for instance, have made it possible to address questions in microbiology that were inaccessible only a few years ago. In addition, the attention given to *B. anthracis* because of its potential as a bioterror weapon has brought both more funding and more researchers to the study of anthrax, and this has also played a big role in accelerating research in this field.

Although the rapid progress made in anthrax research over the past few years has certainly been welcomed by the research and public health communities, it has also meant that in many areas of *B. anthracis* biology and pathogenesis, our knowledge extends well beyond what is reported in previous reference volumes. In developing this book, my aim was to address this issue, and to bring together a collection of reviews that would provide scientists and health professionals with a current and comprehensive reference on both *B. anthracis* and anthrax.

I am extremely grateful to the authors who contributed to the book—they represent some of the most accomplished researchers in the anthrax field, and their expertise and effort is clear in the chapters they have written. I am also grateful to the editorial staff at John Wiley & Sons for their advice and support, and specifically to Karen Chambers for her help in the earliest stages of this book's conception. Finally, I thank my friend and colleague Dr. Karla Passalacqua, for the many useful discussions as this book was being planned.



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# Chapter 1

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## Anthrax from 5000 BC to AD 2010

Peter C. B. Turnbull and Sean V. Shadomy

### FROM ANCIENT TIMES TO THE 19TH CENTURY

#### Historical Names of Anthrax

*Anthrax* (Latin, a carbuncle) is derived from the Greek ἀνθραξ (anthrax) meaning coal and referring to the characteristic black eschar in human cutaneous anthrax. Other older names for the disease, such as “malignant pustule” or “black bane,” and names in other languages, such as charbon (French) and carbonchio (Italian), similarly reflect these features. Yet other names reflect other manifestations of the disease in humans and/or animals or its sources of infection, such as woolsorter’s/ragpicker’s/Bradford disease and the German equivalent Hadernkrankheit (rag disease), splenic fever, Milzbrand (German, meaning “spleen fire”), Siberian plague, Lodian fever, and Pali plague in India, and many more. The many names in many languages reflect the historical and widespread recognition of the numerous features of anthrax before it was understood that they were all manifestations of a single etiological agent.

The earliest application of the name “anthrax” to the afflictions caused by *Bacillus anthracis* is uncertain. “Bloody murrain” was probably the most common term for the disease in animals in early English language texts, and carbuncle—or malignant carbuncle to distinguish it from other carbuncular manifestations—was the term used for the cutaneous infection in humans. From a book of 1766, Viljoen (1928) cites “Visit to your servant girl suffering from a considerable anthrax and found several furuncles on the back; cured same” but believes that “anthrax” at that time was a common term embracing any severe localized dermatitis and this was not a *B. anthracis* infection. According to Swiderski (2004), physicians attending George Washington diagnosed as “an anthrax” “a very large and painful tumor” which developed on his left thigh about 6 weeks after his inauguration as first president of the United States in 1789. However, that description and the description of “anthrax, or carbuncle” in the American edition of *The Surgeon’s Vade-Mecum* (1813) similarly appear unlikely to have been *B. anthracis* infections.