Bacterial Spores

Current Research and Applications

Edited by

Ernesto Abel-Santos

Department of Chemistry University of Nevada Las Vegas, NV USA

caister.com/spores

Copyright © 2012

Caister Academic Press Norfolk, UK

www.caister.com

British Library Cataloguing-in-Publication Data A catalogue record for this book is available from the British Library

ISBN: 978-1-908230-00-3

Description or mention of instrumentation, software, or other products in this book does not imply endorsement by the author or publisher. The author and publisher do not assume responsibility for the validity of any products or procedures mentioned or described in this book or for the consequences of their use.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the publisher. No claim to original U.S. Government works.

Cover design adapted from Figure 5.4

Printed and bound in Great Britain

Contents

	Contributors	V
1	Historical Notes and Introduction to Bacterial Spores Mark Torred, Elias Benjelloun, Eramelle Dibala, Ernesto Abel-Santos and Christian Ross	1
2	Gene Regulation of Sporulation in <i>Bacillus subtilis</i> Eduardo A. Robleto, Holly A. Martin, Amber M. Pepper and Mario Pedraza-Reyes	9
3	Fruiting Body Development in <i>Myxococcus xanthus</i> : A Multicellular Developmental Programme that Leads to Sporulation Krista M. Giglio and Anthony G. Garza	19
4	Streptomyces Sporulation Julia P. Swiercz and Marie A. Elliot	39
5	The Structure and Composition of the Outer Layers of the Bacterial Spore Arthur I. Aronson	57
6	Mechanisms of Bacterial Spore Survival Mario Pedraza-Reyes, Norma Ramírez-Ramírez, Luz E. Vidales-Rodríguez and Eduardo A. Robleto	73
7	Initiation of Germination in <i>Bacillus</i> and <i>Clostridium</i> Spores Graham Christie	89
8	Germination of <i>Bacillus anthracis</i> Spores Jonathan D. Giebel, Katherine A. Carr and Philip C. Hanna	107
9	Degradation of Spore Peptidoglycan During Germination David L. Popham, Jared D. Heffron and Emily A. Lambert	121
10	Water and Cations Flux During Sporulation and Germination Daniela Bassi, Fabrizio Cappa and Pier Sandro Cocconcelli	143
11	The Spore as an Infectious Agent: Anthrax Disease as a Paradigm James M. Vergis, Christy L. Ventura, Louise D. Teel and Alison D. O'Brien	169

iv | Contents

caister.com/spores

12	Heterogeneity in Bacterial Spore Populations Peter Setlow, Jintao Liu and James R. Faeder	199
13	Detection of Bacterial Spores: Prospects and Challenges Sainath Rao Shilpakala, Chintamani D. Atreya and Krishna Mohan V. Ketha	215
14	Properties and Detection Methods of <i>Bacilli</i> Spores in Food and in Medical Settings Olga Tarasenko, Pierre Alusta, Sergey Kazakov and Kalle Levon	237
15	Expression of Recombinant Proteins using <i>Bacillus subtilis</i> Spores Luis Carlos de Souza Ferreira and Wolfgang Schumann	263
	Index	273
	Colour plate	A1

caister.com/spores



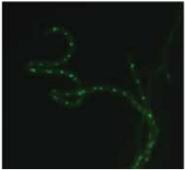




Plate 4.3 (A) Localization of ParA and ParB within the developing aerial hyphae. The ParA helix (left) is visualized using immunofluorescence; ParB (centre) is translationally fused to GFP, and in the merged image (right), the cell wall is stained with wheatgerm agglutin (WGA) Alexa Fluor 350 and false coloured grey (images courtesy of Dr Dagmara Jakimowicz).