Two-component systems are signalling pathways that regulate many bacterial characteristics such as virulence, pathogenicity, symbiosis, motility, nutrient uptake, secondary metabolite production, metabolic regulation, cell division, and many more. These systems regulate physiological processes in response to environmental or cellular parameters and enable adaptation to changing conditions. They are also potential targets for antimicrobial drug design. In recent years significant advances have been made in the understanding of the role of two-component systems and molecular studies have uncovered basic mechanisms of signalling.

In this book, expert authors from around the world present the current knowledge on two-component systems in bacteria and critically evaluate the vast amount of exciting new information that has been brought to light in recent years. The eighteen chapters cover various topics including the structure-function analysis of two-component systems, the sensing mechanisms, essential or atypical two-component systems and signaling networks, two-component systems in stress responses, two-component systems in developmental processes, and two-component systems in virulence and symbiosis. The aim of this book is to provide a comprehensive overview of the area for graduate students, academic scientists and researchers in the pharmaceutical industry. This major reference work is essential reading for everyone working on bacterial regulation or antimicrobial drug design and a recommended volume for all microbiology libraries.

Chapter 1. Classification and Organisation of Two-component Systems. David E. Whitworth
Chapter 2. Structural Basis of Signal Transduction and Specificity in Two-components Systems. Patricia Casino, Marisa Lópe-redondo and Alberto Marina
Chapter 6. Deviations from the Rule: Orphan and Atypical Response Regulators. Dagmar Beier
Chapter 7. Essential Two-component Systems of Gram-positive Bacteria. Hendrik Szurmant
Chapter 8. Molecular Mechanism of Bacterial Two-component Signal Transduction Networks via Connectors. Yoko Eguchi, Eiji Ishii and Ryutaro Utsumi
Chapter 11. Two-component Signaling in the Gram-positive Envelope Stress Response: Intramembrane-sensing Histidine Kinases and Accessory Membrane Proteins. Karen Schrecke, Anna Staro&o324; and Thorsten Mascher
Chapter 12. The CpxAR Two-component System Regulates a Complex Envelope Stress Response in Gram Negative Bacteria. Stefanie Vogt, Nicole Acosta, Julia Wang, Junshu Wang and Tracy Raivio
Chapter 14. Two-component Systems Involved in Regulation of Motility and Development in Myxococcus xanthus. Daniela Keilberg, Stuart Huntley and Lotte Sagaard-Andersen
Chapter 15. Two-component Systems in Streptomyces. Juan-Francisco Martín, Alberto Sola-Landa and Antonio Rodríguez-García

Order from:
MALDI-TOF Mass Spectrometry in Microbiology
Edited by: Markus Kostrzewa and Sören Schubert (Published: 2016)

Aspergillus and Penicillium in the Post-genomic Era
Edited by: Ronald P. de Vries, Isabelle Benoit Gelber and Mikael Rørdam Andersen (Published: 2016)

The Bacteriocins: Current Knowledge and Future Prospects
Edited by: Robert L. Dorit, Sandra M. Roy and Margaret A. Riley (Published: 2016)

Omics in Plant Disease Resistance
Edited by: Vijai Bhadauria (Published: 2016)

Acidophiles: Life in Extremely Acidic Environments
Edited by: Raquel Quatrini and D. Barrie Johnson (Published: 2016)

Climate Change and Microbial Ecology: Current Research and Future Trends
Edited by: Jürgen Marxsen (Published: 2016)

Biofilms in Bioremediation: Current Research and Emerging Technologies
Edited by: Gavin Lear (Published: 2016)

Microalgae: Current Research and Applications
Edited by: Maria-Nefeli Tsaloglou (Published: 2016)

Gas Plasma Sterilization in Microbiology: Theory, Applications, Pitfalls and New Perspectives
Edited by: Hideharu Shintani and Akikazu Sakudo (Published: 2016)

Virus Evolution: Current Research and Future Directions
Edited by: Scott C. Weaver, Mark Denison, Marilyn Roossinck and Marco Vignuzzi (Published: 2016)

Arboviruses: Molecular Biology, Evolution and Control
Edited by: Nikos Vasilakis and Duane J. Gubler (Published: 2016)

Shigella: Molecular and Cellular Biology
Edited by: William D. Picking and Wendy L. Picking (Published: 2016)

Aquatic Biofilms: Ecology, Water Quality and Wastewater Treatment
Edited by: Anna M. Romani, Helena Guasch and M. Dolors Balaguer (Published: 2016)

Alphaviruses: Current Biology
Edited by: Suresh Mahalingam, Lara Herrero and Belinda Herring (Published: 2016)

Thermophilic Microorganisms
Edited by: Fu-Li Li (Published: 2015)

Flow Cytometry in Microbiology: Technology and Applications
Edited by: Martin G. Wilkinson (Published: 2015)
“an impressive group of experts” (ProtoView)

Probiotics and Prebiotics: Current Research and Future Trends
Edited by: Koen Venema and Ana Paula do Carmo (Published: 2015)

Epigenetics: Current Research and Emerging Trends
Edited by: Brian P. Chadwick (Published: 2015)
"this is one text you don't want to miss" (Epigenie); "up-to-date information" (ChemMedChem)

Corynebacterium glutamicum: From Systems Biology to Biotechnological Applications
Edited by: Andreas Burkovski (Published: 2015)
"Without question a valuable book" (BIOSpektrum)

Advanced Vaccine Research Methods for the Decade of Vaccines
Edited by: Fabio Bagnoli and Rino Rappuoli (Published: 2015)
Two-component signal transduction systems enable bacteria to sense, respond, and adapt to changes in their environment or in their intracellular state. Each two-component system consists of a sensor protein-histidine kinase (HK) and a response regulator (RR). In the prototypical two-component pathway, the sensor HK phosphorylates its own conserved His residue in response to a signal(s) in the environment. Subsequently, the phosphoryl group of HK is transferred onto a specific Asp residue on the RR. The activated RR can then effect changes in cellular physiology, often by regulating gene expression. Two-Component Systems in Bacteria. Book Â· August 2012 with 728 Reads. Publisher: 978-1-908230-08-9. Â Two Component Systems and Phosphorelays (TCS/PR) are environmental signal transduction cascades in prokaryotes and, less frequently, in eukaryotes. The internal domain organization of proteins and the topology of TCS/PR cascades play an important role in shaping the responses of the circuits. It is thus important to maintain updated censuses of TCS/PR proteins in order to identify the various topologies used by nature and enable a systematic study of the dynamics associated with those topologies.