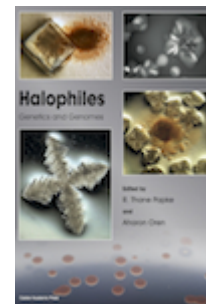


Halophiles

Genetics and Genomes



Edited by: R. Thane Papke and Aharon Oren

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Extreme halophilic environments, including salt lakes and springs, seawater evaporation facilities for the production of sea salt, and subterranean salt deposits derived from ancient oceans are distributed patchily all over the earth. The life that dominates them is microbial e.g., prokaryotes and the viruses that infect them. The best studied in these environments are the haloarchaea (family *Halobacteriaceae*), a diverse group of salt-loving organisms in the archaeal phylum Euryarchaeota. These remarkable organisms have an obligate requirement for salt concentrations between 10% and 35% NaCl for survival (sea water has ~3.5% salt). Haloarchaea have evolved several biochemical and molecular strategies to counteract the deleterious effects of their salty environments including efficient ion pumps, UV absorbing pigments, proteins that can resist the effects of osmotic stress and the denaturing effects of salts. The best studied extremely halophilic member of the Bacteria is *Salinibacter*, which is abundant in saltern crystallizer ponds worldwide. The application of modern genomic approaches to research on halophilic Archaea and Bacteria and their viruses in recent years has yielded fascinating insights into the adaptations and evolution of these unique organisms.

This book highlights current genetics and genomics research to provide a timely overview. Chapters are written by expert authors from around the world and include topics such as: ecology and evolution of *Haloquadratum walsbyi*; microdiversity of *Salinibacter ruber*; horizontal gene transfer in halobacteria; comparative genomics of haloarchaeal viruses; genomics of the halophilic bacteria *Natranaerobius thermophilus* and *Halobacillus halophilus*; the haloarchaeal cell wall; cell cycle and polyploidy in haloarchaea; cell regulation by proteolytic systems and protein conjugation.

This major new work represents a valuable source of information to all those scientists interested in halophilic microorganisms, extremophiles, microbial ecology and environmental microbiology.

Chapter 1. Ecology and Evolution of *Haloquadratum walsbyi* Through the Lens of Genomics and Metagenomics. *Lejla Pasic and Francisco Rodríguez-Valera*

Chapter 2. *Salinibacter ruber*: The Never Ending Microdiversity?. *Arantxa Peña, María Gomariz, Marianna Lucio, Pedro González-Torres, Jaime Huertas-Cepa, Manuel Martínez-García, Fernando Santos, Phillippe Schmitt-Kopplin, Toni Gabaldón, Ramon Rosselló-Móra, Josefa Antón*

Chapter 3. Horizontal Gene Transfer in Halobacteria. *Matthew S. Fullmer, J. Peter Gogarten and R. Thane Papke*

Chapter 4. Comparative Genomics of Haloarchaeal Viruses. *Elena Roine*

Chapter 5. Microbial Adaptation to Saline Environments: Lessons from the Genomes of *Natranaerobius thermophilus* and *Halobacillus halophilus*. *Noha M. Mesbah, Inga Häänelt, Baisuo Zhao and Volker Müller*

Chapter 6. Staying in Shape: The Haloarchaeal Cell Wall. *Jerry Eichler, Adi Arbiv, Chen Cohen-Rosenzweig, Lina Kaminski, Lina Kandiba, Zvia Konrad and Shai Naparstek*

Chapter 7. Cell Cycle and Polyploidy in Haloarchaea. *Karolin Zerulla, Anke Baumann and Jörg Soppa*

Chapter 8. Cell Regulation by Proteolytic Systems and Protein Conjugation. *Julie Maupin-Furlow*

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