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Nota di contenuto	Archaea: a goldmine for molecular biologists and evolutionists -- Progress and challenges in archaeal genetic manipulation -- Genetic manipulation of Haloferax species -- CRISPR interference as a tool to Repress Gene Expression in Haloferax volcanii -- Transformation Techniques for the Anaerobic Hyperthermophile Thermococcus kodakarensis -- Genetic Methods and Construction of Chromosomal Mutations in Methanogenic Archaea -- An interdomain conjugation protocol for plasmid-DNA transfer into Methanothermobacter thermautotrophicus H -- Methods for Markerless Gene Deletion and Plasmid-Based Expression in Sulfolobus acidocaldarius -- A Rapid Targeted Gene Inactivation Approach in Sulfolobus islandicus -- Transposon Insertion Mutagenesis in hyperthermophilic crenarchaeon Sulfolobus islandicus -- Reprogramming CRISPR-mediated RNA interference for silencing of essential genes in Sulfolobales -- Progress and challenges in archaeal molecular biology -- ChIP-seq Occupancy Mapping of the Archaeal Transcription Machinery -- Conversion of ribosome-protected mRNA to DNA and deep sequencing for ribosome profiling in Haloferax volcanii -- Small RNA-sequencing library preparation for the halophilic archaeon Haloferax volcanii -- Quantitative Mass Spectrometry by SILAC in Haloferax volcanii -- Proteome turnover analysis in Haloferax volcanii by a heavy isotope

multilabelling approach -- Proteomic sample preparation and data analysis in line with the Archaeal Proteome -- In vivo protein crosslinking and co-immunoprecipitation in *Haloferax volcanii* -- Proteolytic activity assays in haloarchaea -- Carotenoids from Haloarchaea: Extraction, fractionation and characterization -- Metal nanoparticles biosynthesis using the halophilic archaeon *Haloferax volcanii* -- Simplified enzymatic synthesis of 2-keto-3-deoxy-D-gluconate from D-gluconate using the gluconate dehydratase from *Thermoproteus tenax* -- Progress and Challenges in Archaeal Cellular Biology Analysis -- Methods to Analyze Motility in Eury- And Crenarchaea -- Immersed Liquid Biofilm and Honeycomb Pattern Formations in *Haloferax volcanii* -- Cost-effective and Versatile Analysis of Archaeal Surface Adhesion Under Shaking and Standing Conditions -- Cell Adhesion and Biofilm Formation Analysis -- BrdU incorporation and labelling of nascent DNA to Investigate Archaeal Replication using super-resolution imaging -- Isolation, Purification, and Characterization of Membrane Vesicles from Haloarchaea -- Archaeal Viruses: Production of Virus Particles and Vesicle-Like Viruses and Purification Using Asymmetrical Flow Field-Flow Fractionation -- Progress and Challenges in Studying the Ecophysiology of Archaea -- Reconstruction of Archaeal Genomes Assembly from Short-Read Metagenomes -- Outreach: Accessible and Insightful Scientific Learning Experiences Using the Microorganism *Haloferax volcanii*.

Sommario/riassunto

This volume provides an overview of well-established methods optimized for diverse archaeal model organisms and is a source of protocols facilitating access to the molecular and cellular biology characterization of these fascinating organisms. Chapters are divided into five parts detailing available genetic tools, molecular and cellular biology methods, strategies to study the ecophysiology of archaea, and classroom protocol. Each main thematic part is also introduced by future-oriented and authoritative primers. Written in the format of the highly successful *Methods in Molecular Biology* series, each chapter includes an introduction to the topic, lists necessary materials and reagents, includes tips on troubleshooting and known pitfalls, and step-by-step, readily reproducible protocols. *Authoritative and cutting-edge, Archaea: Methods and Protocols* aims to be a foundation for future studies and to be a source of inspiration for new investigations in the field.
