**Chapter 2**

**Cellular elements**

Chen, J. *et al*. (2021). Isolation and screening of multifunctional phosphate solubilizing bacteria and its growth-promoting effect on Chinese fir seedlings. *Scientific Reports* **11**, 9081. <https://doi.org/10.1038/s41598-021-88635-4>

Glass, J. B. *et al*. (2020). Lanthanide rarity in natural waters: implications for microbial C1 metabolism. *FEMS Microbiology Letters* **367**(22), fnaa165. <https://doi.org/10.1093/femsle/fnaa165>

Ikeda, T. (2021). Bacterial biosilicification: a new insight into the global silicon cycle. *Bioscience, Biotechnology, & Biochemistry* **85**(6), 1324-1331. <https://doi.org/10.1093/bbb/zbab069>

Kato, S. *et al*. (2020). Isolation and genomic characterization of a proteobacterial methanotroph requiring lanthanides. *Microbes & Environments* **35**(1), ME19128. <https://doi.org/10.1264/jsme2.ME19128>

Lejeune, C. *et al*. (2021). Impact of phosphate availability on membrane lipid content of the model strains, *Streptomyces lividans* and *Streptomyces coelicolor*. *Frontiers in Microbiology* **12**, 216. <https://www.frontiersin.org/article/10.3389/fmicb.2021.623919>

McFarland, A. L. *et al*. (2021). Cellular Mn/Zn ratio influences phosphoglucomutase activity and capsule production in *Streptococcus pneumoniae* D39. *Journal of Bacteriology* **203**(13), e00602-20. <https://journals.asm.org/doi/abs/10.1128/JB.00602-20>

McRose, D. L. & Newman, D. K. (2021). Redox-active antibiotics enhance phosphorus bioavailability. *Science* **371**(6533), 1033-1037. <https://science.sciencemag.org/content/sci/371/6533/1033.full.pdf>

Rasul, M. *et al*. (2021). The wheat growth-promoting traits of *Ochrobactrum* and *Pantoea* species, responsible for solubilization of different P sources, are ensured by genes encoding enzymes of multiple P-releasing pathways. *Microbiological Research* **246**, 126703. <https://doi.org/10.1016/j.micres.2021.126703>

Sinn, M. *et al*. (in press). Widespread bacterial utilization of guanidine as nitrogen source. *Molecular Microbiology*. <https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14702>

Wegner, C.-E. *et al*. (2021). Extracellular and intracellular lanthanide accumulation in the methylotrophic Beijerinckiaceae bacterium RH AL1. *Applied & Environmental Microbiology* **87**(13), e03144-20. <https://journals.asm.org/doi/abs/10.1128/AEM.03144-20>

Wei, Y. & Zhang, Y. (2021). Glycyl radical enzymes and sulfonate metabolism in the microbiome. *Annual Review of Biochemistry* **90**, 817–846. <https://www.annualreviews.org/doi/abs/10.1146/annurev-biochem-080120-024103>

**Cell surface appendages**

Graham, K. J. & Burrows, L. L. (2021). More than a feeling: microscopy approaches to understanding surface-sensing mechanisms. *Journal of Bacteriology* **203**(6), e00492-20. <https://jb.asm.org/content/jb/203/6/e00492-20.full.pdf>

Grognot, M. & Taute, K. M. (2021). More than propellers: how flagella shape bacterial motility behaviors. *Current Opinion in Microbiology* **61**, 73-81. <https://doi.org/10.1016/j.mib.2021.02.005>

Hershey, D. M. (2021). Integrated control of surface adaptation by the bacterial flagellum. *Current Opinion in Microbiology* **61**, 1-7. <https://doi.org/10.1016/j.mib.2021.01.010>

Lam, T. *et al*. (in press). Competence pili in *Streptococcus pneumoniae* are highly dynamic structures that retract to promote DNA uptake. *Molecular Microbiology*. <https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14718>

McFarland, A. L. *et al*. (2021). Cellular Mn/Zn ratio influences phosphoglucomutase activity and capsule production in *Streptococcus pneumoniae* D39. *Journal of Bacteriology* **203**(13), e00602-20. <https://journals.asm.org/doi/abs/10.1128/JB.00602-20>

Montemayor, E. J. *et al*. (2021). Flagellar structures from the bacterium *Caulobacter crescentus* and implications for phage ϕCbK predation of multiflagellin bacteria. *Journal of Bacteriology* **203**(5), e00399-20. <https://jb.asm.org/content/jb/203/5/e00399-20.full.pdf>

Tan, J. *et al*. (in press). Structural basis of assembly and torque transmission of the bacterial flagellar motor. *Cell*. <https://doi.org/10.1016/j.cell.2021.03.057>

Viljoen, A. *et al*. (2021). Seeing and touching the mycomembrane at the nanoscale. *Journal of Bacteriology* **203**(10), e00547-20. <https://jb.asm.org/content/jb/203/10/e00547-20.full.pdf>

Webster, S. S. *et al*. (2021). Interaction between the type 4 pili machinery and a diguanylate cyclase fine-tune c-di-GMP levels during early biofilm formation. *Proceedings of the National Academy of Sciences of the USA* **118**(26), e2105566118. <https://www.pnas.org/content/pnas/118/26/e2105566118.full.pdf>

**S-layer and other surface structures**

Ali, S. *et al*. (2020). Slr4, a newly identified S-layer protein from marine Gammaproteobacteria, is a major biofilm matrix component. *Molecular Microbiology* **114**, 979-990. <https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14588>

Bharat, T. A. M. *et al*. (2021). Molecular logic of prokaryotic surface layer structures. *Trends in Microbiology* **29**(5), 405-415. <https://doi.org/10.1016/j.tim.2020.09.009>

Levkovich, S. A. *et al*. (2021). Two decades of studying functional amyloids in microorganisms. *Trends in Microbiology* **29**(3), 251-265. <https://doi.org/10.1016/j.tim.2020.09.005>

Levkovich, S. A. *et al*. (2021). Microbial prions: Dawn of a new era. *Trends in Biochemical Sciences* **46**(5), 391-405. <https://doi.org/10.1016/j.tibs.2020.12.006>

Liston, S. D. & Willis, L. M. (2021). Racing to build a wall: glycoconjugate assembly in Gram-positive and Gram-negative bacteria. *Current Opinion in Structural Biology* **68**, 55-65. <https://www.sciencedirect.com/science/article/pii/S0959440X20302153>

McDonald, N. D. & Boyd, E. F. (2021). Structural and biosynthetic diversity of nonulosonic acids (NulOs) that decorate surface structures in bacteria. *Trends in Microbiology* **29**(2), 142-157. <https://doi.org/10.1016/j.tim.2020.08.002>

Purdy, G. E. & Hsu, F.-F. (2021). Complete characterization of polyacyltrehaloses from *Mycobacterium tuberculosis* H37Rv biofilm cultures by multiple-stage linear ion-trap mass spectrometry reveals a new tetraacyltrehalose family. *Biochemistry* **60**(5), 381-397. <https://doi.org/10.1021/acs.biochem.0c00956>

Ravi, J. & Fioravanti, A. (2021). S-layers: The proteinaceous multifunctional armors of Gram-positive pathogens. *Frontiers in Microbiology* **12**, 685. <https://www.frontiersin.org/article/10.3389/fmicb.2021.663468>

Salinas, N. *et al*. (2020). Emerging roles of functional bacterial amyloids in gene regulation, toxicity, and immunomodulation. *Microbiology & Molecular Biology Reviews* **85**(1), e00062-20. <https://mmbr.asm.org/content/mmbr/85/1/e00062-20.full.pdf>

**Outer membrane in Gram-negative bacteria**

Avila-Calderón, E. D. *et al*. (2021). Outer membrane vesicles of Gram-negative bacteria: An outlook on biogenesis. *Frontiers in Microbiology* **12**, 345. <https://www.frontiersin.org/article/10.3389/fmicb.2021.557902>

Dhital, S. *et al*. (in press). Bacterial outer membrane vesicles and host cell death signaling. *Trends in Microbiology*. <https://doi.org/10.1016/j.tim.2021.04.003>

El Rayes, J. *et al*. (2021). Lipoproteins in Gram-negative bacteria: new insights into their biogenesis, subcellular targeting and functional roles. *Current Opinion in Microbiology* **61**, 25-34. <https://doi.org/10.1016/j.mib.2021.02.003>

Engevik, M. A. *et al*. (2021). *Fusobacterium nucleatum* secretes outer membrane vesicles and promotes intestinal inflammation. *mBio* **12**(2), e02706-20. <https://mbio.asm.org/content/mbio/12/2/e02706-20.full.pdf>

Garcia-Vello, P. *et al*. (2021). Structure of the *O*-antigen and the lipid A from the lipopolysaccharide of *Fusobacterium nucleatum* ATCC 51191. *ChemBioChem* **22**(7), 1252-1260. <https://doi.org/10.1002/cbic.202000751>

Gauthier, A. E. *et al*. (2021). Deep-sea microbes as tools to refine the rules of innate immune pattern recognition. *Science Immunology* **6**(57), eabe0531. <https://immunology.sciencemag.org/content/immunology/6/57/eabe0531.full.pdf>

Liu, B. *et al*. (2019). Structure and genetics of *Escherichia coli O* antigens. *FEMS Microbiology Reviews* **44**(6), 655-683. <https://doi.org/10.1093/femsre/fuz028>

Marchant, P. *et al*. (2021). “One for All”: Functional transfer of OMV-mediated polymyxin B resistance from *Salmonella enterica* sv. Typhi ΔtolR and ΔdegS to susceptible bacteria. *Frontiers in Microbiology* **12**, 1068. <https://www.frontiersin.org/article/10.3389/fmicb.2021.672467>

Marchetti, R. *et al*. (2021). The peculiar structure of *Acetobacter pasteurianus* CIP103108 LPS core oligosaccharide. *ChemBioChem* **22**(1), 147-150. <https://doi.org/10.1002/cbic.202000597>

Otten, E. G. *et al*. (2021). Ubiquitylation of lipopolysaccharide by RNF213 during bacterial infection. *Nature* **594**(7861), 111-116. <https://doi.org/10.1038/s41586-021-03566-4>

**Cell wall**

Du, X. *et al*. (2021). *Staphylococcus epidermidis* clones express *Staphylococcus aureus*-type wall teichoic acid to shift from a commensal to pathogen lifestyle. *Nature Microbiology* **6**(6), 757-768. <https://doi.org/10.1038/s41564-021-00913-z>

Erickson, H. P. (2021). How teichoic acids could support a periplasm in Gram-positive bacteria, and let cell division cheat turgor pressure. *Frontiers in Microbiology* **12**, 981. <https://www.frontiersin.org/article/10.3389/fmicb.2021.664704>

Liston, S. D. & Willis, L. M. (2021). Racing to build a wall: glycoconjugate assembly in Gram-positive and Gram-negative bacteria. *Current Opinion in Structural Biology* **68**, 55-65. <https://www.sciencedirect.com/science/article/pii/S0959440X20302153>

Rismondo, J. *et al*. (2021). EslB is required for cell wall biosynthesis and modification in *Listeria monocytogenes*. *Journal of Bacteriology* **203**(4), e00553-20. <https://jb.asm.org/content/jb/203/4/e00553-20.full.pdf>

Sibinelli-Sousa, S. *et al*. (2021). Targeting the achilles’ heel of bacteria: Different mechanisms to break down the peptidoglycan cell wall during bacterial warfare. *Journal of Bacteriology* **203**(7), e00478-20. <https://jb.asm.org/content/jb/203/7/e00478-20.full.pdf>

Ultee, E. *et al*. (2021). Formation of wall-less cells in *Kitasatospora viridifaciens* requires cytoskeletal protein FilP in oxygen-limiting conditions. *Molecular Microbiology* **115**(6), 1181-1190. <https://doi.org/10.1111/mmi.14662>

Wang, Y.-H. *et al*. (2021). PapA, a peptidoglycan-associated protein, interacts with OmpC and maintains cell envelope integrity. *Environmental Microbiology* **23**(2), 600-612. <https://doi.org/10.1111/1462-2920.15038>

Zaychikov, V. A. *et al*. (2021). Cell wall rhamnan in actinobacteria of the genus *Curtobacterium*. *Microbiology-Moscow* **90**(3), 343-348. <https://doi.org/10.1134/S0026261721030139>

**Periplasm**

**Cytoplasmic membrane**

Cao, Y. & Lin, H. (2021). Characterization and function of membrane vesicles in Gram-positive bacteria. *Applied Microbiology & Biotechnology* **105**(5), 795-1801. <https://doi.org/10.1007/s00253-021-11140-1>

Hennell James, R. *et al*. (2021). Structure and mechanism of the proton-driven motor that powers type 9 secretion and gliding motility. *Nature Microbiology* **6**(2), 221-233. <https://doi.org/10.1038/s41564-020-00823-6>

Lejeune, C. *et al*. (2021). Impact of phosphate availability on membrane lipid content of the model strains, *Streptomyces lividans* and *Streptomyces coelicolor*. *Frontiers in Microbiology* **12**, 216. <https://www.frontiersin.org/article/10.3389/fmicb.2021.623919>

Zlatkov, N. *et al*. (2020). Eco-evolutionary feedbacks mediated by bacterial membrane vesicles. *FEMS Microbiology Reviews* **45**(2), fuaa047. <https://doi.org/10.1093/femsre/fuaa047>

**Cytoplasm**

Bowerman, S. *et al*. (2021). Archaeal chromatin ‘slinkies’ are inherently dynamic complexes with deflected DNA wrapping pathways. *eLife* **10**, e65587. <https://doi.org/10.7554/eLife.65587>

Carr, V. R. *et al*. (2021). Probing the mobilome: discoveries in the dynamic microbiome. *Trends in Microbiology* **29**(2), 158-170. <https://doi.org/10.1016/j.tim.2020.05.003>

de Graaff, D. R. *et al*. (2021). Trehalose as an osmolyte in *Candidatus* Accumulibacter phosphatis. *Applied Microbiology & Biotechnology* **105**(1). 379-388. <https://doi.org/10.1007/s00253-020-10947-8>

Liu, L.-N. (2021). Bacterial metabolosomes: new insights into their structure and bioengineering. *Microbial Biotechnology* **14**(1), 88-93. <https://doi.org/10.1111/1751-7915.13740>

Yadav, P. *et al*. (2021). G-quadruplex structures in bacteria: Biological relevance and potential as an antimicrobial target. *Journal of Bacteriology* **203**(13), e00577-20. <https://journals.asm.org/doi/abs/10.1128/JB.00577-20>

**Prokaryotic intracellular organelles**

Asija, K. *et al*. (2021). A survey of bacterial microcompartment distribution in the human microbiome. *Frontiers in Microbiology* **12**, 1090. <https://www.frontiersin.org/article/10.3389/fmicb.2021.669024>

Dank, A. *et al*. (2021). Bacterial microcompartment-dependent 1,2-propanediol utilization of *Propionibacterium freudenreichii*. *Frontiers in Microbiology* **12**, 1127. <https://www.frontiersin.org/article/10.3389/fmicb.2021.679827>

Flechsler, J. *et al*. (2021). Functional compartmentalization and metabolic separation in a prokaryotic cell. *Proceedings of the National Academy of Sciences of the USA* **118**(25), e2022114118. <https://www.pnas.org/content/pnas/118/25/e2022114118.full.pdf>

Stewart, A. M. *et al*. (2021). Advances in the world of bacterial microcompartments. *Trends in Biochemical Sciences* **46**(5), 406-416. <https://doi.org/10.1016/j.tibs.2020.12.002>

Wilson, J. W. (2021). Manipulating microcompartment operons to study mechanism and function. *Current Opinion in Microbiology* **60**, 66-72. <https://doi.org/10.1016/j.mib.2021.01.014>

Zeng, Z. *et al*. (2021). Bacterial microcompartments coupled with extracellular electron transfer drive the anaerobic utilization of ethanolamine in *Listeria monocytogenes*. *mSystems* **6**(2), e01349-20. <https://msystems.asm.org/content/msys/6/2/e01349-20.full.pdf>