**Chapter 3**

**General**

Blair, J. M. A. *et al*. (2022). The role of bacterial transport systems in the removal of host antimicrobial peptides in Gram-negative bacteria. *FEMS Microbiology Reviews* **46**(6), fuac032. <https://doi.org/10.1093/femsre/fuac032>

Schubert, C. *et al*. (2022). C4-dicarboxylate metabolons: interaction of C4-dicarboxylate transporters of *Escherichia coli* with cytosolic enzymes. *FEMS Microbiology Letters* **369**(1), fnac078. <https://doi.org/10.1093/femsle/fnac078>

**Active transport**

Alexander, S. *et al*. (2018). DcuA of aerobically grown *Escherichia coli* serves as a nitrogen shuttle (L-aspartate/fumarate) for nitrogen uptake. *Molecular Microbiology* **109**(6), 801-811. <https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14074>

Rivera-Lugo, R. *et al*. (2023). Distinct energy-coupling factor transporter subunits enable flavin acquisition and extracytosolic trafficking for extracellular electron transfer in *Listeria monocytogenes*. *mBio* **14**(1), e03085-22. <https://journals.asm.org/doi/abs/10.1128/mbio.03085-22>

**ATP-binding cassette (ABC) pathway**

Li, C.-Y. *et al*. (2023). Ubiquitous occurrence of a dimethylsulfoniopropionate ABC transporter in abundant marine bacteria. *The ISME Journal* **17**(4), 579-587. <https://doi.org/10.1038/s41396-023-01375-3>

Okada, U. & Murakami, S. (2022). Structural and functional characteristics of the tripartite ABC transporter. *Microbiology* **168**(11), 0.001257. <https://doi.org/10.1099/mic.0.001257>

Orelle, C. *et al*. (2023). Waste or die: The price to pay to stay alive. *Trends in Microbiology* **31**(3), 233-241. <https://doi.org/10.1016/j.tim.2022.09.005>

**Tripartite ATP-independent periplasmic (TRAP) transporters**

**Group translocation**

Joo, Y. *et al*. (2023). A retro-aldol reaction prompted the evolvability of a phosphotransferase system for the utilization of a rare sugar. *Microbiology Spectrum* **11**(2), e03660-22. <https://journals.asm.org/doi/abs/10.1128/spectrum.03660-22>

Min, H. & Seok, Y.-J. (2022). Phosphotransferase system sugars immediately induce mutations of Cra in an *Escherichia coli* *ptsH* mutant. *Environmental Microbiology* **24**(11), 5425-5436.

**Iron uptake and siderophores**

Braun, V. *et al*. (2022). Transcription regulation of iron carrier transport genes by ECF sigma factors through signaling from the cell surface into the cytoplasm. *FEMS Microbiology Reviews* **46**(4), fuac010. <https://doi.org/10.1093/femsre/fuac010>

Chan, D. C. K. & Burrows, L. L. (2023). *Pseudomonas aeruginosa* FpvB is a high-affinity transporter for xenosiderophores ferrichrome and ferrioxamine B. *mBio* **14**(1), e03149-22. <https://journals.asm.org/doi/abs/10.1128/mbio.03149-22>

Chan, D. C. K. *et al*. (2023). Interactions of TonB-dependent transporter FoxA with siderophores and antibiotics that affect binding, uptake, and signal transduction. *Proceedings of the National Academy of Sciences of the USA* **120**(16), e2221253120. <https://www.pnas.org/doi/abs/10.1073/pnas.2221253120>

Grosse, C. *et al*. (2023). Two new siderophores produced by *Pseudomonas* sp. NCIMB 10586: The anti-oomycete non-ribosomal peptide synthetase-dependent mupirochelin and the NRPS-independent triabactin. *Frontiers in Microbiology* **14**, 1143861. <https://www.frontiersin.org/articles/10.3389/fmicb.2023.1143861>

Jeong, G.-J. *et al*. (2023). *Pseudomonas aeruginosa* virulence attenuation by inhibiting siderophore functions. *Applied Microbiology & Biotechnology* **107**(4), 1019-1038. <https://doi.org/10.1007/s00253-022-12347-6>

Juma, P. O. *et al*. (2022). Siderophore for lanthanide and iron uptake for methylotrophy and plant growth promotion in *Methylobacterium aquaticum* strain 22A. *Frontiers in Microbiology* **13**, 921635. <https://www.frontiersin.org/articles/10.3389/fmicb.2022.921635>

Kawashima, K. *et al*. (2023). Iron delivery through membrane vesicles in *Corynebacterium glutamicum*. *Microbiology Spectrum* **11**(3), e01222-23. <https://journals.asm.org/doi/abs/10.1128/spectrum.01222-23>

Schalk, I. J. & Perraud, Q. (2023). *Pseudomonas aeruginosa* and its multiple strategies to access iron. *Environmental Microbiology* **25**(4), 811-831. <https://doi.org/10.1111/1462-2920.16328>

Sun, X. *et al*. (2022). High bacterial diversity and siderophore-producing bacteria collectively suppress *Fusarium oxysporum* in maize/faba bean intercropping. *Frontiers in Microbiology* **13**, 972587. <https://www.frontiersin.org/articles/10.3389/fmicb.2022.972587>

**TonB-dependent active transport across the outer membrane in Gram-negative bacteria**

Braun, V. *et al*. (2023). Energization of outer membrane transport by the ExbB ExbD molecular motor. *Journal of Bacteriology* **205**(6), e00035-23. <https://journals.asm.org/doi/abs/10.1128/jb.00035-23>

Chan, D. C. K. *et al*. (2023). Interactions of TonB-dependent transporter FoxA with siderophores and antibiotics that affect binding, uptake, and signal transduction. *Proceedings of the National Academy of Sciences of the USA* **120**(16), e2221253120. <https://www.pnas.org/doi/abs/10.1073/pnas.2221253120>

Shiina, W. *et al*. (2023). Identification of a TonB-dependent receptor involved in lanthanide switch by the characterization of laboratory-adapted *Methylosinus trichosporium* OB3b. *Applied & Environmental Microbiology* **89**(1), e01413-22. <https://journals.asm.org/doi/abs/10.1128/aem.01413-22>

**Multidrug efflux pump**

Athar, M. *et al*. (2023). Tripartite efflux pumps of the RND superfamily: what did we learn from computational studies? *Microbiology* **169**(3), 0.001307. <https://www.microbiologyresearch.org/content/journal/micro/10.1099/mic.0.001307>

Gaurav, A. *et al*. (2023). Role of bacterial efflux pumps in antibiotic resistance, virulence, and strategies to discover novel efflux pump inhibitors. *Microbiology* **169**(5), 0.001333. <https://doi.org/10.1099/mic.0.001333>

**Protein translocation**

Kreitz, J. *et al*. (2023). Programmable protein delivery with a bacterial contractile injection system. *Nature* **616**(7956), 357-364. <https://doi.org/10.1038/s41586-023-05870-7>

Maphosa, S. *et al*. (2023). Bacterial secretion system functions: evidence of interactions and downstream implications. *Microbiology* **169**(4), 0.001326. <https://www.microbiologyresearch.org/content/journal/micro/10.1099/mic.0.001326>

**General secretion pathway (GSP)**

Grasso, S. *et al*. (2023). Signal peptide efficiency: From high-throughput data to prediction and explanation. *ACS Synthetic Biology* **12**(2), 390-404. <https://doi.org/10.1021/acssynbio.2c00328>

**Twin-arginine translocation (TAT) pathway**

Severi, E. *et al*. (2023). Characterization of a TatA/TatB binding site on the TatC component of the *Escherichia coli* twin arginine translocase. *Microbiology* **169**(2), 0.001298. <https://doi.org/10.1099/mic.0.001298>

**Protein translocation through the ABC pathway**

**Protein translocation through the cell wall in Gram-positive bacteria**

Uppu, D. S. *et al*. (2023). Contribution of extracellular membrane vesicles to the secretome of *Staphylococcus aureus*. *mBio* **14**(1), e03571-22. <https://journals.asm.org/doi/abs/10.1128/mbio.03571-22>

**Protein translocation in Gram-negative bacteria**

Doyle, M. T. & Bernstein, H. D. (2022). Function of the Omp85 superfamily of outer membrane protein assembly factors and polypeptide transporters. *Annual Review of Microbiology* **76**, 259-279. <https://www.annualreviews.org/doi/abs/10.1146/annurev-micro-033021-023719>

Godlee, C. & Holden, D. W. (2023). Transmembrane substrates of type three secretion system injectisomes. *Microbiology* **169**(1), 0.001292. <https://doi.org/10.1099/mic.0.001292>

Hodges, F. J. *et al*. (2023). Redefining the bacterial Type I protein secretion system. *Advances in Microbial Physiology* **82**,155-204. <https://doi.org/10.1016/bs.ampbs.2022.10.003>

Kim, S.-Y. *et al*. (2023). Export of diverse and bioactive small proteins through a type I secretion system. *Applied & Environmental Microbiology* **89**(5), e00335-23. <https://journals.asm.org/doi/abs/10.1128/aem.00335-23>

Meir, A. *et al*. (in press). Substrate recruitment mechanism by gram-negative type III, IV, and VI bacterial injectisomes. *Trends in Microbiology*. <https://doi.org/10.1016/j.tim.2023.03.005>

Paillat, M. *et al*. (2023). A journey with type IX secretion system effectors: selection, transport, processing and activities. *Microbiology* **169**(4), 0.001320. <https://doi.org/10.1099/mic.0.001320>

Shaliutina-Loginova, A. *et al*. (2023). Bacterial type II secretion system and its mitochondrial counterpart. *mBio* **14**(2), e03145-22. <https://journals.asm.org/doi/abs/10.1128/mbio.03145-22>

Teulet, A. *et al*. (2022). The versatile roles of type III secretion systems in rhizobia-legume symbioses. *Annual Review of Microbiology* **76**, 45-65. <https://www.annualreviews.org/doi/abs/10.1146/annurev-micro-041020-032624>

Wangthaisong, P. *et al*. (2023). The type IV secretion system (T4SS) mediates symbiosis between *Bradyrhizobium* sp. SUTN9-2 and legumes. *Applied & Environmental Microbiology* **89**(6), e00040-23. <https://journals.asm.org/doi/abs/10.1128/aem.00040-23>

**Type VI secretion system**

Bernal, P. *et al*. (2023). Transcriptional organization and regulation of the *Pseudomonas putida* K1 type VI secretion system gene cluster. *Microbiology* **169**(1), 0.001295. <https://doi.org/10.1099/mic.0.001295>

Guckes, K. R. & Miyashiro, T. I. (2023). The type-VI secretion system of the beneficial symbiont *Vibrio fischeri*. *Microbiology* **169**(2), 0.001302. <https://doi.org/10.1099/mic.0.001302>

Singh, R. P. & Kumari, K. (2023). Bacterial type VI secretion system (T6SS): an evolved molecular weapon with diverse functionality. *Biotechnology Letters* **45**(3), 309-331. <https://doi.org/10.1007/s10529-023-03354-2>

Suria, A. M. *et al*. (2022). Prevalence and diversity of type VI secretion systems in a model beneficial symbiosis. *Frontiers in Microbiology* **13**, 988044. <https://www.frontiersin.org/articles/10.3389/fmicb.2022.988044>

**Type VII secretion system**

**Export of polysaccharides and components of surface structures**

Falchi, F. A. *et al*. (2023). Suppressor mutations in LptF bypass essentiality of LptC by forming a six-protein transenvelope bridge that efficiently transports lipopolysaccharide. *mBio* **14**(1), e02202-22. <https://journals.asm.org/doi/abs/10.1128/mbio.02202-22>

Kumar, S. *et al*. (2023). Chloride ions are required for *Thermosipho africanus* MurJ function. *mBio* **14**(1), e00089-23. <https://journals.asm.org/doi/abs/10.1128/mbio.00089-23>

Roney, I. J. & Rudner, D. Z. (2023). Two broadly conserved families of polyprenyl-phosphate transporters. *Nature* **613**(7945), 729-734. <https://doi.org/10.1038/s41586-022-05587-z>

Sit, B. *et al*. (2023). Undecaprenyl phosphate translocases confer conditional microbial fitness. *Nature* **613**(7945), 721-728. <https://doi.org/10.1038/s41586-022-05569-1>

Watkins, D. W. *et al*. (2022). A bacterial secretosome for regulated envelope biogenesis and quality control? *Microbiology* **168**(10), 0.001255. <https://doi.org/10.1099/mic.0.001255>

**Protein secretion in Archaea**

**Metallochaperones**

Mihelj, P. *et al*. (2023). Functional characterization of the Co2+ transporter AitP in *Sinorhizobium meliloti*: A new player in Fe2+ homeostasis. *Applied & Environmental Microbiology* **89**(3), e01901-22.

White, N. *et al*. (2022). Lithium-sensing riboswitch classes regulate expression of bacterial cation transporter genes. *Scientific Reports* **12**, 19145. <https://doi.org/10.1038/s41598-022-20695-6>