Chapter 12

Promoter and σ-factor

Burton, A. T., *et al*. (2019). Transcriptional regulation and mechanism of SigN (ZpdN), a pBS32-encoded sigma factor in *Bacillus subtilis*. *mBio* **10**(5), e01899-01819. https://mbio.asm.org/content/mbio/10/5/e01899-19.full.pdf

Donegan, N. P., *et al*. (2019). CspA regulation of *Staphylococcus aureus* carotenoid levels and σ^B activity is controlled by YjbH and Spx. *Molecular Microbiology* **112**(2), 532-551. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14273

Donohue, T. J. (2019). Shedding light on a Group IV (ECF11) alternative σ factor. *Molecular Microbiology* **112**(2), 374-384. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14280

Gaballa, A., *et al*. (2019). Cross talk between SigB and PrfA in *Listeria monocytogenes* facilitates transitions between extra- and intracellular environments. *Microbiology and Molecular Biology Reviews* **83**(4), e00034-00019.

Gu, D., *et al*. (2019). Alternative sigma factor RpoX is a part of the RpoE regulon and plays distinct roles in stress responses, motility, biofilm formation, and hemolytic activities in the marine pathogen *Vibrio alginolyticus*. *Applied and Environmental Microbiology* **85**(14): e00234-00219. https://aem.asm.org/content/aem/85/14/e00234-19.full.pdf

Helmann, J. D. (2019). Where to begin? Sigma factors and the selectivity of transcription initiation in bacteria. *Molecular Microbiology* **112**(2), 335-347. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14309

Ho, T. D. & Ellermeier, C. D. (2019). Activation of the extracytoplasmic function σ factor σ^V by lysozyme. *Molecular Microbiology* **112**(2), 410-419. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14348

Jin, L.-Q., *et al*. (2019). Promoter engineering strategies for the overproduction of valuable metabolites in microbes. *Applied Microbiology and Biotechnology* **103**(21), 8725-8736. https://doi.org/10.1007/s00253-019-10172-y

Liu, H., *et al*. (2019). The exopolysaccharide gene cluster *pea* is transcriptionally controlled by RpoS and repressed by AmrZ in *Pseudomonas putida* KT2440. *Microbiological Research* **218**, 1-11. https://doi.org/10.1016/j.micres.2018.09.004

Lobanovska, M., Tang, C. M. & Exley, R. M. (2019). Contribution of σ^{70} and σ^N factors to expression of class II *pilE* in *Neisseria meningitidis*. *Journal of Bacteriology* **201**(20), e00170-00119. https://jb.asm.org/content/jb/201/20/e00170-19.full.pdf

Lonetto, M. A., *et al*. (2019). Discovery of the extracytoplasmic function σ factors. *Molecular Microbiology* **112**(2), 348-355. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14307

Moraleda-Muñoz, A., *et al*. (2019). Metal-responsive RNA polymerase extracytoplasmic function (ECF) sigma factors. *Molecular Microbiology* **112**(2), 385-398. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14328

Otero-Asman, J. R., *et al*. (2019). Diversity of extracytoplasmic function sigma (σECF) factor-dependent signaling in *Pseudomonas*. *Molecular Microbiology* **112**(2), 356-373. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14331

Park, J.-H., Lee, J.-H. & Roe, J.-H. (2019). SigR, a hub of multilayered regulation of redox and antibiotic stress responses. *Molecular Microbiology* **112**(2), 333-739. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14341

Pinto, D., Liu, Q. & Mascher, T. (2019). ECF σ factors with regulatory extensions: the one-component systems of the σ universe. *Molecular Microbiology* **112**(2), 399-409. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14323

Tran, N. T., *et al*. (2019). Defining the regulon of genes controlled by σ^E, a key regulator of the cell envelope stress response in *Streptomyces coelicolor*. *Molecular Microbiology* **112**(2), 461-481. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14250

Wu, H., *et al*. (2019). The role of C-terminal extensions in controlling ECF σ factor activity in the widely conserved groups ECF41 and ECF42. *Molecular Microbiology* **112**(2), 498-514. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14261

Yang, B., *et al*. (in press). Control of solvent production by sigma-54 factor and the transcriptional activator AdhR in *Clostridium beijerinckii*. *Microbial Biotechnology*. https://sfamjournals.onlinelibrary.wiley.com/doi/abs/10.1111/1751-7915.13505

Zhao, H., Roistacher, D. M. & Helmann, J. D. (2019). Deciphering the essentiality and function of the anti-σ^M factors in *Bacillus subtilis*. *Molecular Microbiology* **112**(2), 482-497. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14216

Zhu, L., *et al*. (2019). σ^{54}-dependent regulator DVU2956 switches *Desulfovibrio vulgaris* from biofilm formation to planktonic growth and regulates hydrogen sulfide production. *Environmental Microbiology* **21**(10), 3564-3576. https://doi.org/10.1111/1462-2920.14679

Enzyme induction – activation, and repression

Bergkessel, M., *et al*. (2019). The dormancy-specific regulator, SutA, is intrinsically disordered and modulates transcription initiation in *Pseudomonas aeruginosa*. *Molecular Microbiology* **112**(3), 992-1009. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14337

Grand, M., *et al*. (in press). *Enterococcus faecalis* MalR acts as repressor of the maltose operons and additionally mediates their catabolite repression via direct interaction with seryl-phosphorylated-HPr. *Molecular Microbiology*. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14431

Molina, L., *et al*. (2019). Influence of the Crc global regulator on substrate uptake rates and the distribution of metabolic fluxes in *Pseudomonas putida* KT2440 growing in a complete medium. *Environmental Microbiology* **21**(11), 4446-4459. https://sfamjournals.onlinelibrary.wiley.com/doi/abs/10.1111/1462-2920.14812

Sadykov, M. R., *et al*. (2019). CidR and CcpA synergistically regulate *Staphylococcus aureus* cidABC expression. *Journal of Bacteriology* **201**(23), e00371-00319. https://jb.asm.org/content/jb/201/23/e00371-19.full.pdf

Vial, L. & Hommais F. (in press). Plasmid-chromosome cross-talks. *Environmental Microbiology*. https://sfamjournals.onlinelibrary.wiley.com/doi/abs/10.1111/1462-2920.14880

Wachter, S., *et al*. (2019). A CsrA-Binding, *trans*-acting sRNA of *Coxiella burnetii* is necessary for optimal intracellular growth and vacuole formation during early infection of host cells. *Journal of Bacteriology* **201**(22), e00524-00519. https://jb.asm.org/content/jb/201/22/e00524-19.full.pdf

Wang, X., *et al*. (2019). The carbon catabolite repressor CcpA mediates optimal competence development in *Streptococcus oligofermentans* through post-transcriptional regulation. *Molecular Microbiology* **112**(2), 552-568. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14274

Zhan, Y., *et al*. (2019). NfiR, a new regulatory noncoding RNA (ncRNA), is required in concert with the NfiS ncRNA for optimal expression of nitrogenase genes in *Pseudomonas stutzeri* A1501. *Applied and Environmental Microbiology* **85**(14), e00762-00719. https://aem.asm.org/content/aem/85/14/e00762-19.full.pdf

Attenuation

Babitzke, P., *et al*. (2019). Posttranscription initiation conirol of gene expression mediated by bacterial RNA-binding proteins. *Annual Review of Microbiology* **73**(1), 43-67. https://www.annualreviews.org/doi/abs/10.1146/annurev-micro-020518-115907

Turnbough, C. L. (2019). Regulation of bacterial gene expression by transcription attenuation. *Microbiology and Molecular Biology Reviews* **83**(3), e00019-00019. https://mmbr.asm.org/content/mmbr/83/3/e00019-19.full.pdf

Termination/antitermination

Babitzke, P., *et al*. (2019). Posttranscription initiation conirol of gene expression mediated by bacterial RNA-binding proteins. *Annual Review of Microbiology* **73**(1), 43-67. https://www.annualreviews.org/doi/abs/10.1146/annurev-micro-020518-115907

Turnbough, C. L. (2019). Regulation of bacterial gene expression by transcription attenuation. *Microbiology and Molecular Biology Reviews* **83**(3), e00019-00019. https://mmbr.asm.org/content/mmbr/83/3/e00019-19.full.pdf

Autogenous control

Turnbull, K. J., *et al*. (2019). Intramolecular interactions dominate the autoregulation of *Escherichia coli* stringent factor RelA. *Frontiers in Microbiology* **10**, 1966. https://www.frontiersin.org/article/10.3389/fmicb.2019.01966

Post-transcriptional regulation

Stability and translational efficiency of mRNA

Bechhofer, D. H. & Deutscher, M. P. (2019). Bacterial ribonucleases and their roles in RNA metabolism. *Critical Reviews in Biochemistry and Molecular Biology* **54**(3), 242-300. https://doi.org/10.1080/10409238.2019.1651816

Pursley, B. R., *et al*. (2019). The Vc2 cyclic di-GMP-dependent riboswitch of *Vibrio cholerae* regulates expression of an upstream putative small RNA by controlling RNA stability. *Journal of Bacteriology* **201**(21), e00293-00219. https://jb.asm.org/content/jb/201/21/e00293-19.full.pdf

Sharp, J. S., Rietsch, A. & Dove, S. L. (2019). RNase E promotes expression of type III secretion system genes in *Pseudomonas aeruginosa*. *Journal of Bacteriology* **201**(22): e00336-00319. https://jb.asm.org/content/jb/201/22/e00336-19.full.pdf

Steiner, P. A., *et al*. (2019). Highly variable mRNA half-life time within marine bacterial taxa and functional genes. *Environmental Microbiology* **21**(10), 3533-3966. https://onlinelibrary.wiley.com/doi/abs/10.1111/1462-2920.14737

Tejada-Arranz, A., de Crécy-Lagard, V. & de Reuse, H. (2020). Bacterial RNA degradosomes: molecular machines under tight control. *Trends in Biochemical Sciences* **45**(1), 42-57. https://doi.org/10.1016/j.tibs.2019.10.002

Vargas-Blanco, D. A., *et al*. (2019). mRNA degradation rates are coupled to metabolic status in *Mycobacterium smegmatis*. *mBio* **10**(4), e00957-00919. https://mbio.asm.org/content/mbio/10/4/e00957-19.full.pdf

Vet, S., Vandervelde, A. & Gelens, L. (2019). Excitable dynamics through toxin-induced mRNA cleavage in bacteria. *Plos One* **14**(2), e0212288. https://doi.org/10.1371/journal.pone.0212288

Modulation of translation by protein

Babitzke, P., *et al*. (2019). Posttranscription initiation control of gene expression mediated by bacterial RNA-binding proteins. *Annual Review of Microbiology* **73**(1), 43-67. https://www.annualreviews.org/doi/abs/10.1146/annurev-micro-020518-115907

Modulation of translation by sRNA

Bianco, C. M., Fröhlich, K. S. & Vanderpool, C, K. (2019). Bacterial cyclopropane fatty acid synthase mRNA is targeted by activating and repressing small RNAs. *Journal of Bacteriology* **201**(19), e00461-00419. https://jb.asm.org/content/jb/201/19/e00461-19.full.pdf

Chen, R., *et al*. (2019). Identification of a small RNA that directly controls the translation of the quorum sensing signal synthase gene *rhlI* in *Pseudomonas aeruginosa*. *Environmental Microbiology* **21**(8), 2933-2947. https://onlinelibrary.wiley.com/doi/abs/10.1111/1462-2920.14686

Diel, B., *et al*. (2019). A novel plasmid-transcribed regulatory sRNA, QfsR, controls chromosomal polycistronic gene expression in *Agrobacterium fabrum*. *Environmental Microbiology* **21**(8), 3063-3075. https://onlinelibrary.wiley.com/doi/abs/10.1111/1462-2920.14704

Gaimster, H., *et al*. (2019). A central small RNA regulatory circuit controlling bacterial denitrification and N_2O emissions. *mBio* **10**(4), e01165-01119. https://mbio.asm.org/content/mbio/10/4/e01165-19.full.pdf

Georg, J., *et al*. (in press). The power of cooperation: Experimental and computational approaches in the functional characterization of bacterial sRNAs. *Molecular Microbiology*. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14420

Girardin, R. C. & McDonough, K. A. (in press). Small RNA Mcr11 requires the transcription factor AbmR for stable expression and regulates genes involved in the central metabolism of *Mycobacterium tuberculosis*. *Molecular Microbiology*. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14436

Hill, I. T., *et al*. (2019). Loss of RNA chaperone Hfq unveils a toxic pathway in *Pseudomonas aeruginosa*. *Journal of Bacteriology* **201**(20), e00232-00219. https://jb.asm.org/content/jb/201/20/e00232-19.full.pdf

Leistra, A. N., Curtis, N. C. & Contreras, L. M. (2019). Regulatory non-coding sRNAs in bacterial metabolic pathway engineering. *Metabolic Engineering* **52**, 190-214. https://doi.org/10.1016/j.ymben.2018.11.013

Melson, E. M. & Kendall, M. M. (2019). The sRNA DicF integrates oxygen sensing to enhance enterohemorrhagic *Escherichia coli* virulence via distinctive RNA control mechanisms. *Proceedings of the National Academy of Sciences of the USA* **116**(28), 14210-14215. https://www.pnas.org/content/pnas/116/28/14210.full.pdf

Nshogozabahizi, J. C., *et al*. (2019). Applications and limitations of regulatory RNA elements in synthetic biology and biotechnology. *Journal of Applied Microbiology* **127**(4), 968-984. https://onlinelibrary.wiley.com/doi/abs/10.1111/jam.14270

Pursley, B. R., *et al*. (2019). The Vc2 cyclic di-GMP-dependent riboswitch of *Vibrio cholerae* regulates expression of an upstream putative small RNA by controlling RNA stability. *Journal of Bacteriology* **201**(21), e00293-00219. https://jb.asm.org/content/jb/201/21/e00293-19.full.pdf

Sass, A. M., *et al*. (2019). Small RNA NcS27 co-regulates utilization of carbon sources in *Burkholderia cenocepacia* J2315. *Microbiology* **165**(10), 1135-1150. https://doi.org/10.1099/mic.0.000848

Schachterle, J. K., Onsay, D. M. & Sundin, G. W. (2019). Small RNA ArcZ regulates oxidative stress response genes and regulons in *Erwinia amylovora*. *Frontiers in Microbiology* **10**, 2775. https://www.frontiersin.org/article/10.3389/fmicb.2019.02775

Thomason, M. K., *et al*. (2019). A *rhlI* 5′ UTR-derived sRNA regulates RhlR-dependent quorum sensing in *Pseudomonas aeruginosa*. *mBio* **10**(5), e02253-02219. https://mbio.asm.org/content/mbio/10/5/e02253-19.full.pdf

Vial, L. & Hommais F. (in press). Plasmid-chromosome cross-talks. *Environmental Microbiology*. https://sfamjournals.onlinelibrary.wiley.com/doi/abs/10.1111/1462-2920.14880

c-di-GMP riboswitch and other cyclic dinucleotide

Ahmad, S., *et al*. (2019). An interbacterial toxin inhibits target cell growth by synthesizing (p)ppApp. Nature **575**(7784), 674-678. https://doi.org/10.1038/s41586-019-1735-9

Fischer, J. T., Hossain, S. & Boon, E. M. (2019). NosP modulates Cyclic-di-GMP signaling in *Legionella pneumophila*. *Biochemistry* **58**(42), 4325-4334. https://doi.org/10.1021/acs.biochem.9b00618

Hughes, E. D., Byrne, B. G. & Swanson, M. S. (2019). A two-component system that modulates cyclic di-GMP metabolism promote *Legionella pneumophila* differentiation and viability in low-nutrient conditions. *Journal of Bacteriology* **201**(17), e00253-00219. https://jb.asm.org/content/jb/201/17/e00253-19.full.pdf

Latoscha, A., Wörmann, M. E. & Tschowri, N. (2019). Nucleotide second messengers in *Streptomyces*. *Microbiology* **165**(11), 1153-1165. https://doi.org/10.1099/mic.0.000846

Liu, X., *et al*. (2019). Overexpression of the diguanylate cyclase CdgD blocks developmental transitions and antibiotic biosynthesis in *Streptomyces coelicolor*. *Science China Life Sciences* **62**(11), 1492-1505. https://doi.org/10.1007/s11427-019-9549-8

Nieto, V., *et al*. (2019). Under elevated c-di-GMP in *Escherichia coli*, YcgR alters flagellar motor bias and speed sequentially, with additional negative control of the flagellar regulon via the adaptor protein RssB. *Journal of Bacteriology* **202**(1), e00578-00519. https://jb.asm.org/content/jb/202/1/e00578-19.full.pdf

Nisbett, L.-M., *et al*. (2019). NosP signaling modulates the NO/H-NOX-mediated multicomponent c-Di-GMP network and biofilm formation in *Shewanella oneidensis*. *Biochemistry* **58**(48), 4827-4841. https://doi.org/10.1021/acs.biochem.9b00706

Pursley, B. R., *et al*. (2019). The Vc2 cyclic di-GMP-dependent riboswitch of *Vibrio cholerae* regulates expression of an upstream putative small RNA by controlling RNA stability. *Journal of Bacteriology* **201**(21), e00293-00219. https://jb.asm.org/content/jb/201/21/e00293-19.full.pdf

Suchanek, V. M., *et al*. (in press). Chemotaxis and cyclic-di-GMP signalling control surface attachment of *Escherichia coli*. *Molecular Microbiology*. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14438

Valentini, M. & Filloux, A. (2019). Multiple roles of c-di-GMP aignaling in bacterial pathogenesis. *Annual Review of Microbiology* **73**(1), 387-406. https://www.annualreviews.org/doi/abs/10.1146/annurev-micro-020518-115555

Wei, Q., *et al*. (2019). Diguanylate cyclases and phosphodiesterases required for basal-level c-di-GMP in *Pseudomonas aeruginosa* as revealed by systematic phylogenetic and transcriptomic analyses. *Applied and Environmental Microbiology* **85**(21), e01194-01119. https://aem.asm.org/content/aem/85/21/e01194-19.full.pdf

Weiss, C. A., *et al*. (2019). Single-cell microscopy reveals that levels of cyclic di-GMP vary among *Bacillus subtilis* subpopulations. *Journal of Bacteriology* **201**(16), e00247-00219. https://jb.asm.org/content/jb/201/16/e00247-19.full.pdf

Wright, T. A., *et al*. (in press). Second messengers and divergent HD-GYP phosphodiesterases regulate 3’,3’-cGAMP signaling. *Molecular Microbiology*. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14412

Xiao, Y., *et al*. (2019). High c-di-GMP promotes expression of *fpr*-1 and *katE* involved in oxidative stress resistance in *Pseudomonas putida* KT2440. *Applied Microbiology and Biotechnology* **103**(21), 9077-9089. https://doi.org/10.1007/s00253-019-10178-6

Yuan, X., *et al*. (2019). A feed-forward signalling circuit controls bacterial virulence through linking cyclic di-GMP and two mechanistically distinct sRNAs, ArcZ and RsmB.

Environmental Microbiology **21**(8), 2755-2771. https://onlinelibrary.wiley.com/doi/abs/10.1111/1462-2920.14603

Metabolic regulation in archaea

Braun, F., *et al*. (2019). Cyclic nucleotides in archaea: Cyclic di-AMP in the archaeon *Haloferax volcanii* and its putative role. Microbiologyopen **8**(9), e00829. https://onlinelibrary.wiley.com/doi/abs/10.1002/mbo3.829

Getz, L. J., *et al*. (2019). Tyrosine phosphorylation as a widespread regulatory mechanism in prokaryotes. *Journal of Bacteriology* **201**(19), e00205-00219. https://jb.asm.org/content/jb/201/19/e00205-19.full.pdf

Johnsen, U., *et al*. (2019). New views on an old enzyme: allosteric regulation and evolution of archaeal pyruvate kinases. *The FEBS Journal* **286**(13), 2471-2489. https://febs.onlinelibrary.wiley.com/doi/abs/10.1111/febs.14837

Stringent response

Dasgupta, S., *et al*. (2019). Small alarmones (p)ppGpp regulate virulence associated traits and pathogenesis of *Salmonella enterica* serovar Typhi. *Cellular Microbiology* **21**(8), e13034. https://onlinelibrary.wiley.com/doi/abs/10.1111/cmi.13034

Jha, V., Dafale, N. A. & Purohit, H. J. (2019). Regulatory rewiring through global gene regulations by PhoB and alarmone (p)ppGpp under various stress conditions. *Microbiological Research* **227**, 126309. https://doi.org/10.1016/j.micres.2019.126309

Kraemer, J. A., Sanderlin, A. G. & Laub, M. T. (2019). The stringent response inhibits DNA replication initiation in *E. coli* by modulating supercoiling of *oriC*. *mBio* **10**(4), e01330-01319. https://mbio.asm.org/content/mbio/10/4/e01330-19.full.pdf

Ruwe, M., *et al*. (2019). Physiology and transcriptional analysis of (p)ppGpp-related regulatory effects in *Corynebacterium glutamicum*. *Frontiers in Microbiology* **10**, 2769. https://www.frontiersin.org/article/10.3389/fmicb.2019.02769

Sinha, A. K., *et al*. (2019). Fatty acid starvation activates RelA by depleting lysine precursor pyruvate. *Molecular Microbiology* **112**(4), 1339-1349. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14366

Turnbull, K. J., *et al*. (2019). Intramolecular interactions dominate the autoregulation of *Escherichia coli* stringent factor RelA. *Frontiers in Microbiology* **10**, 1966. https://www.frontiersin.org/article/10.3389/fmicb.2019.01966

Yin, L., *et al*. (2019). Bacterial longevity requires protein synthesis and a stringent response. *mBio* **10**(5), e02189-02119. https://mbio.asm.org/content/mbio/10/5/e02189-19.full.pdf

Nitrogen control

Watzer, B., *et al*. (2019). The signal transduction protein P_{II} controls ammonium, nitrate and urea uptake in cyanobacteria. *Frontiers in Microbiology* **10**, 1428. https://www.frontiersin.org/article/10.3389/fmicb.2019.01428

Zhu, Y., *et al*. (2019). The developmental regulator MtrA binds GlnR boxes and represses nitrogen metabolism genes in *Streptomyces coelicolor*. *Molecular Microbiology* **112**(1), 29-46. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14252

Pho system

Jha, V., Dafale, N. A. & Purohit, H. J. (2019). Regulatory rewiring through global gene regulations by PhoB and alarmone (p)ppGpp under various stress conditions. *Microbiological Research* **227**, 126309. https://doi.org/10.1016/j.micres.2019.126309

Jiang, L., *et al*. (in press). PagR mediates the precise regulation of *Salmonella* pathogenicity island 2 gene expression in response to magnesium and phosphate signals in *Salmonella Typhimurium*. *Cellular Microbiology,* e13125. https://onlinelibrary.wiley.com/doi/abs/10.1111/cmi.13125

Prunty, M. P., *et al*. (2018). The distinct PhoPR mediated responses to phosphate limitation in *Bacillus subtilis* subspecies subtilis and *spizizenii* stem from differences in wall teichoic acid composition and metabolism. *Molecular Microbiology* **109**(1), 23-40. https://doi.org/10.1111/mmi.13965

Vuppada, R. K., *et al*. (2018). Phosphate signaling through alternate conformations of the PstSCAB phosphate transporter. *BMC Microbiology* **18**(1), 8. https://doi.org/10.1186/s12866-017-1126-z

ArcB/ArcA and PrrB/PrrA systems

van der Stel, A.-X. & Wösten, M. M. S. M. (2019). Regulation of respiratory pathways in Campylobacterota: A review. *Frontiers in Microbiology* **10**, 1719. https://www.frontiersin.org/article/10.3389/fmicb.2019.01719

FNR system

Osorio, H., *et al*. (2019). Identification and unusual properties of the master regulator FNR in the extreme acidophile *Acidithiobacillus ferrooxidans*. *Frontiers in Microbiology* **10**, 1642. https://www.frontiersin.org/article/10.3389/fmicb.2019.01642

van der Stel, A.-X. & Wösten, M. M. S. M. (2019). Regulation of respiratory pathways in Campylobacterota: A review. *Frontiers in Microbiology* **10**, 1719. https://www.frontiersin.org/article/10.3389/fmicb.2019.01719

General stress

Bru, J.-L., *et al*. (2019). PQS produced by the *Pseudomonas aeruginosa* stress response repels swarms away from bacteriophage and antibiotics. *Journal of Bacteriology* **201**(23), e00383-00319. https://jb.asm.org/content/jb/201/23/e00383-19.full.pdf

Ferenci, T. (2019). Irregularities in genetic variation and mutation rates with environmental stresses. *Environmental Microbiology* **21**(11), 3979-3988. https://sfamjournals.onlinelibrary.wiley.com/doi/abs/10.1111/1462-2920.14822

Flentie, K., *et al*. (2019). Chemical disarming of isoniazid resistance in *Mycobacterium tuberculosis*. *Proceedings of the National Academy of Sciences of the USA* **116**(21), 10510-10517. https://www.pnas.org/content/pnas/116/21/10510.full.pdf

Fraikin, N., *et al*. (2019). Reassessing the role of the type II MqsRA toxin-antitoxin system in stress response and biofilm formation: *mqsA* is transcriptionally uncoupled from *mqsR*. *mBio* **10**(6), e02678-02619. https://mbio.asm.org/content/mbio/10/6/e02678-19.full.pdf

Frawley, E. R., *et al*. (2013). Iron and citrate export by a major facilitator superfamily pump regulates metabolism and stress resistance in *Salmonella* Typhimurium. *Proceedings of the National Academy of Sciences of the USA* **110**(29), 12054-12059. https://www.pnas.org/content/pnas/110/29/12054.full.pdf

Gu, D., *et al*. (2019). Alternative sigma factor RpoX is a part of the RpoE regulon and plays distinct roles in stress responses, motility, biofilm formation, and hemolytic activities in the marine pathogen *Vibrio alginolyticus*. *Applied and Environmental Microbiology* **85**(14), e00234-00219. https://aem.asm.org/content/aem/85/14/e00234-19.full.pdf

Havis, S., et al. (2019). "A universal stress protein that controls bacterial stress survival in *Micrococcus luteus*." Journal of Bacteriology **201**(24): e00497-00419. https://jb.asm.org/content/jb/201/24/e00497-19.full.pdf

Jha, V., Dafale, N. A. & Purohit, H. J. (2019). Regulatory rewiring through global gene regulations by PhoB and alarmone (p)ppGpp under various stress conditions. *Microbiological Research* **227**, 126309. https://doi.org/10.1016/j.micres.2019.126309

Park, J.-H., Lee, J.-H. & Roe, J.-H. (2019). SigR, a hub of multilayered regulation of redox and antibiotic stress responses. *Molecular Microbiology* **112**(2), 333-739. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14341

Schachterle, J. K., Onsay, D. M. & Sundin, G. W. (2019). Small RNA ArcZ regulates oxidative stress response genes and regulons in *Erwinia amylovora*. *Frontiers in Microbiology* **10**, 2775. https://www.frontiersin.org/article/10.3389/fmicb.2019.02775

Tran, N. T., *et al*. (2019). Defining the regulon of genes controlled by σ^E, a key regulator of the cell envelope stress response in *Streptomyces coelicolor*. Molecular Microbiology **112**(2), 461-481. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14250

Zeidler, S. & Müller, V. (2019). Coping with low water activities and osmotic stress in *Acinetobacter baumannii*: significance, current status and perspectives. *Environmental Microbiology* **21**(7), 2212-2230. https://onlinelibrary.wiley.com/doi/abs/10.1111/1462-2920.14565

Oxidative stress

Feng, X., *et al*. (2019). Distinct roles of *Shewanella oneidensis* thioredoxin in regulation of cellular responses to hydrogen and organic peroxides. *Applied and Environmental Microbiology* **85**(21), e01700-01719. https://aem.asm.org/content/aem/85/21/e01700-19.full.pdf

George, S. E., *et al*. (2019). Oxidative stress drives the selection of quorum sensing mutants in the *Staphylococcus aureus* population. *Proceedings of the National Academy of Sciences of the USA* **116**(38), 19145-19154. https://www.pnas.org/content/pnas/116/38/19145.full.pdf

Hicks, D. B., *et al*. (2019). Mutational loss of carotenoids in alkaliphilic *Bacillus pseudofirmus* OF4 results in sensitivity to oxidative stress and growth at high pH. *Microbiology* **165**(9), 1001-1012. https://doi.org/10.1099/mic.0.000828

Hutfilz, C. R., *et al*. (2019). Manganese is required for the rapid recovery of DNA synthesis following oxidative challenge in *Escherichia coli*. *Journal of Bacteriology* **201**(24), e00426-00419. https://jb.asm.org/content/jb/201/24/e00426-19.full.pdf

Liaw, J., *et al*. (2019). The *Campylobacter jejuni* type VI secretion system enhances the oxidative stress response and host colonization. *Frontiers in Microbiology* **10**, 2864. https://www.frontiersin.org/article/10.3389/fmicb.2019.02864

Linzner, N., *et al*. (2019). *Staphylococcus aureus* uses the bacilliredoxin (BrxAB)/bacillithiol disulfide reductase (YpdA) redox pathway to defend against oxidative stress under infections. *Frontiers in Microbiology* **10**, 1355. https://www.frontiersin.org/article/10.3389/fmicb.2019.01355

Pandey, S., Sahukhal, G. S. & Elasri, M. O. (2019). The *msaABCR* operon regulates the response to oxidative stress in *Staphylococcus aureus*. *Journal of Bacteriology* **201**(21), e00417-00419. https://jb.asm.org/content/jb/201/21/e00417-19.full.pdf

Schachterle, J. K., *et al*. (2019). Small RNA ArcZ regulates oxidative stress response genes and regulons in *Erwinia amylovora*. *Frontiers in Microbiology* **10**, 2775. https://www.frontiersin.org/article/10.3389/fmicb.2019.02775

Xiao, Y., *et al*. (2019). High c-di-GMP promotes expression of *fpr*-1 and *katE* involved in oxidative stress resistance in *Pseudomonas putida* KT2440. *Applied Microbiology and Biotechnology* **103**(21), 9077-9089. https://doi.org/10.1007/s00253-019-10178-6

Nitrosative stress responses

Tran, V., *et al*. (2019). Resilience to oxidative and nitrosative stress is mediated by the stressosome, RsbP and SigB in *Bacillus subtilis*. *Journal of Basic Microbiology* **59**(8), 834-845. https://onlinelibrary.wiley.com/doi/abs/10.1002/jobm.201900076

Heat shock

Mogk, A., Ruger-Herreros, C. & Bukau, B. (2019). Cellular functions and mechanisms of action of small heat shock proteins. *Annual Review of Microbiology* **73**, 89-110. https://www.annualreviews.org/doi/abs/10.1146/annurev-micro-020518-115515

Cold shock

Donegan, N. P., *et al*. (2019). CspA regulation of *Staphylococcus aureus* carotenoid levels and σ^B activity is controlled by YjbH and Spx. *Molecular Microbiology* **112**(2), 532-551. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14273

Quorum sensing

Ahator, S. D. & Zhang, L. (2019). Small is mighty—chemical communication systems in *Pseudomonas aeruginosa*. *Annual Review of Microbiology* **73**, 559-578.

Chen, R., *et al*. (2019). Identification of a small RNA that directly controls the translation of the quorum sensing signal synthase gene *rhlI* in *Pseudomonas aeruginosa*. *Environmental Microbiology* **21**(8), 2933-2947. https://onlinelibrary.wiley.com/doi/abs/10.1111/1462-2920.14686

George, S. E., *et al*. (2019). Oxidative stress drives the selection of quorum sensing mutants in the *Staphylococcus aureus* population. *Proceedings of the National Academy of Sciences of the USA* **116**(38), 19145-19154. https://www.pnas.org/content/pnas/116/38/19145.full.pdf

Girard, L. (2019). Quorum sensing in *Vibrio* spp.: the complexity of multiple signalling molecules in marine and aquatic environments. *Critical Reviews in Microbiology* **45**(4), 451-471. https://doi.org/10.1080/1040841X.2019.1624499

Heckler, I. & Boon, E. M. (2019). Insights into nitric oxide modulated quorum sensing pathways. *Frontiers in Microbiology* **10**(2174). https://www.frontiersin.org/article/10.3389/fmicb.2019.02174

Kaur, A., Capalash, N. & Sharma, P. (2018). Quorum sensing in thermophiles: prevalence of autoinducer-2 system. BMC Microbiology **18**(1), 62. https://doi.org/10.1186/s12866-018-1204-x

Mohanan, N., *et al*. (2019). Quorum sensing and the anaerobic regulator (ANR) control polyhydroxyalkanoate (PHA) production in *Pseudomonas chlororaphis* PA23. *FEMS Microbiology Letters* **366**(18), fnz223. https://doi.org/10.1093/femsle/fnz223

Moura-Alves, P., *et al*. (2019). Host monitoring of quorum sensing during *Pseudomonas aeruginosa* infection. *Science* **366**(6472), eaaw1629. https://science.sciencemag.org/content/sci/366/6472/eaaw1629.full.pdf

Ritzert, J. T., *et al*. (2019). The Cyclic AMP receptor protein regulates quorum sensing and global gene expression in *Yersinia pestis* during planktonic growth and growth in biofilms. *mBio* **10**(6), e02613-02619. https://mbio.asm.org/content/mbio/10/6/e02613-19.full.pdf

Sana, T. G., *et al*. (2019). Differential modulation of quorum sensing signaling through QslA in *Pseudomonas aeruginosa* strains PAO1 and PA14. *Journal of Bacteriology* **201**(21), e00362-00319. https://jb.asm.org/content/jb/201/21/e00362-19.full.pdf

Slamti, L. & Lereclus, D. (2019). The oligopeptide ABC-importers are essential communication channels in Gram-positive bacteria. *Research in Microbiology* **170**(8), 338-344. https://doi.org/10.1016/j.resmic.2019.07.004

Tan, C. H., *et al*. (2015). Community quorum sensing signalling and quenching: microbial granular biofilm assembly. *npj Biofilms and Microbiomes* **1**(1), 15006. https://doi.org/10.1038/npjbiofilms.2015.6

Thomason, M. K., *et al*. (2019). A *rhlI* 5′ UTR-derived sRNA regulates RhlR-dependent quorum sensing in *Pseudomonas aeruginosa*. *mBio* **10**(5), e02253-02219. https://mbio.asm.org/content/mbio/10/5/e02253-19.full.pdf

Tourneroche, A., *et al*. (2019). Bacterial–fungal interactions in the kelp endomicrobiota drive autoinducer-2 quorum sensing. *Frontiers in Microbiology* **10**, 1693. https://www.frontiersin.org/article/10.3389/fmicb.2019.01693

Ueno, T., Fischer, J. T. & Boon, E. M. (2019). Nitric oxide enters quorum sensing via the H-NOX signaling pathway in *Vibrio parahaemolyticus*. *Frontiers in Microbiology* **10**, 2108. https://www.frontiersin.org/article/10.3389/fmicb.2019.02108

Ye, T., *et al*. (2019). *Acinetobacter lactucae* strain QL-1, a novel quorum quenching candidate against bacterial pathogen *Xanthomonas campestris* pv. campestris. *Frontiers in Microbiology* **10**, 2867. https://www.frontiersin.org/article/10.3389/fmicb.2019.02867

Zaytseva, Y. V., *et al*. (2019). Plant-microbial interactions involving quorum sensing regulation. *Microbiology-Moscow* **88**(5), 523-533. https://doi.org/10.1134/S0026261719040131

Osmotic stress

Bremer, E. & Krämer, R. (2019). Responses of microorganisms to osmotic stress. *Annual Review of Microbiology* **73**, 313-334. https://www.annualreviews.org/doi/abs/10.1146/annurev-micro-020518-115504

Zeidler, S. & Müller, V. (2019). Coping with low water activities and osmotic stress in *Acinetobacter baumannii*: significance, current status and perspectives. *Environmental Microbiology* **21**(7), 2212-2230. https://onlinelibrary.wiley.com/doi/abs/10.1111/1462-2920.14565

Two-component systems

Buschiazzo, A. & Trajtenberg, F. (2019). Two-component sensing and regulation: How do histidine kinases talk with response regulators at the molecular level? *Annual Review of Microbiology* **73**, 507-528. https://www.annualreviews.org/doi/abs/10.1146/annurev-micro-091018-054627

Crosby, H. A., *et al*. (in press). The *Staphylococcus aureus* ArlRS two-component system regulates virulence factor expression through MgrA. *Molecular Microbiology*. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14404

Francis, V. I. & Porter, S. L. (2019). Multikinase networks: Two-component signaling networks integrating multiple stimuli. *Annual Review of Microbiology* **73**, 199-223. https://www.annualreviews.org/doi/abs/10.1146/annurev-micro-020518-115846

Gao, R., Bouillet, S. & Stock, A. M. (2019). Structural basis of response regulator function. *Annual Review of Microbiology* **73**, 175-197. https://www.annualreviews.org/doi/abs/10.1146/annurev-micro-020518-115931

Hughes, E. D., Byrne, B. G. & Swanson, M. S. (2019). A two-component system that modulates cyclic di-GMP metabolism promote *Legionella pneumophila* differentiation and viability in low-nutrient conditions. *Journal of Bacteriology* **201**(17), e00253-00219. https://jb.asm.org/content/jb/201/17/e00253-19.full.pdf

McLean, T. C., *et al*. (2019). Sensing and responding to diverse extracellular signals: an updated analysis of the sensor kinases and response regulators of *Streptomyces* species. *Microbiology* **165**(9), 929-952. https://doi.org/10.1099/mic.0.000817

Ni, H., *et al*. (2019). Study on a two-component signal transduction system RimA1A2 that negatively regulates oxytetracycline biosynthesis in *Streptomyces rimosus* M4018. *Bioresources and Bioprocessing* **6**(1), 3. https://doi.org/10.1186/s40643-019-0238-8

Párraga Solórzano, P. K., *et al*. (2019). Disruption of glycolysis by nutritional immunity activates a two-component system that coordinates a metabolic and antihost response by *Staphylococcus aureus*. *mBio* **10**(4), e01321-01319. https://mbio.asm.org/content/mbio/10/4/e01321-19.full.pdf

Singh, M., Chaudhary, S. & Sareen, D. (in press). Roseocin, a novel two-component lantibiotic from an actinomycete. *Molecular Microbiology*. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14419

Xi, D., *et al*. (in press). Small RNA *coaR* contributes to intestinal colonization in *Vibrio cholerae* via the two-component system EnvZ/OmpR. *Environmental Microbiology*. https://sfamjournals.onlinelibrary.wiley.com/doi/abs/10.1111/1462-2920.14906

Zhong, C., *et al*. (2019). The PolS-PolR two-component system regulates genes involved in poly-P metabolism and phosphate transport in *Microlunatus phosphovorus*. *Frontiers in Microbiology* **10**, 2127. https://www.frontiersin.org/article/10.3389/fmicb.2019.02127

Chemotaxis

Bru, J.-L., *et al*. (2019). PQS produced by the *Pseudomonas aeruginosa* stress response repels swarms away from bacteriophage and antibiotics. *Journal of Bacteriology* **201**(23), e00383-00319. https://jb.asm.org/content/jb/201/23/e00383-19.full.pdf

Lobanovska, M., Tang, C. M. & Exley, R. M. (2019). Contribution of σ^{70} and σ^{N} factors to expression of class II *pilE* in *Neisseria meningitidis*. Journal of Bacteriology **201**(20), e00170-00119. https://jb.asm.org/content/jb/201/20/e00170-19.full.pdf

Park, S., *et al*. (2019). Polar landmark protein HubP recruits flagella assembly protein FapA under glucose limitation in *Vibrio vulnificus*. *Molecular Microbiology* **112**(1), 266-279. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14268

Piñas, G. E. & Parkinson, J. S. (2019). Identification of a kinase-sctive CheA conformation in *Escherichia coli* chemoreceptor signaling complexes. *Journal of Bacteriology* **201**(23), e00543-00519. https://jb.asm.org/content/jb/201/23/e00543-19.full.pdf

Suchanek, V. M., *et al*. (in press). Chemotaxis and cyclic-di-GMP signalling control surface attachment of *Escherichia coli*. *Molecular Microbiology*. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14438

Xiao, Y., *et al*. (2020). A crosstalk between c-di-GMP and cAMP in regulating transcription of GcsA, a diguanylate cyclase involved in swimming motility in *Pseudomonas putida*. *Environmental Microbiology* **22**(1), 142-157. https://sfamjournals.onlinelibrary.wiley.com/doi/abs/10.1111/1462-2920.14832

Adaptive mutation

Enzyme activity modulation and metabolic flux

Burckhardt, R. M., Buckner, B. A. & Escalante-Semerena, J. C. (2019). "*taphylococcus aureus* modulates the activity of acetyl-Coenzyme A synthetase (Acs) by sirtuin-dependent reversible lysine acetylation. Molecular Microbiology **112**(2), 588-604. https://onlinelibrary.wiley.com/doi/abs/10.1111/mmi.14276

Christensen, D. G., *et al*. (2019). Post-translational protein acetylation: An elegant mechanism for bacteria to dynamically regulate metabolic functions. *Frontiers in Microbiology* **10**, 1604. https://www.frontiersin.org/article/10.3389/fmicb.2019.01604

Getz, L. J., *et al*. (2019). Tyrosine phosphorylation as a widespread regulatory mechanism in prokaryotes. *Journal of Bacteriology* **201**(19), e00205-00219. https://jb.asm.org/content/jb/201/19/e00205-19.full.pdf

Johnsen, U., *et al*. (2019). New views on an old enzyme: allosteric regulation and evolution of archaeal pyruvate kinases. *The FEBS Journal* **286**(13), 2471-2489. https://febs.onlinelibrary.wiley.com/doi/abs/10.1111/febs.14837

Li, Y., *et al*. (in press). Acetylome analysis of lysine acetylation in the plant pathogenic bacterium *Brenneria nigrifluens*. *Microbiologyopen*. e952. https://jb.asm.org/content/jb/201/20/e00232-19.full.pdf

Macek, B., *et al*. (2019). Protein post-translational modifications in bacteria. *Nature Reviews Microbiology* **17**(11), 651-664. https://doi.org/10.1038/s41579-019-0243-0

Mashruwala, A. A., *et al*. (2019). The ClpCP complex modulates respiratory metabolism in *Staphylococcus aureus* and is regulated in a SrrAB-dependent manner. *Journal of Bacteriology* **201**(15), e00188-00119. https://jb.asm.org/content/jb/201/15/e00188-19.full.pdf

VanDrisse, C. M. & Escalante-Semerena, J. C. (2019). Protein acetylation in bacteria. *Annual Review of Microbiology* **73**(1), 111-132. https://www.annualreviews.org/doi/abs/10.1146/annurev-micro-020518-115526

Metabolic regulation and growth

Kraemer, J. A., Sanderlin, A. G. & Laub, M. T. (2019). The stringent response inhibits DNA replication initiation in *E. coli* by modulating supercoiling of *oriC*. *mBio* **10**(4), e01330-01319. https://mbio.asm.org/content/mbio/10/4/e01330-19.full.pdf

Secondary metabolites and fermentation

Félix, F. K. d. C., *et al*. (2019). L-lysine production improvement: a review of the state of the art and patent landscape focusing on strain development and fermentation technologies. *Critical Reviews in Biotechnology* **39**(8), 1031-1055. https://doi.org/10.1080/07388551.2019.1663149

Jin, L.-Q., *et al*. (2019). Promoter engineering strategies for the overproduction of valuable metabolites in microbes. *Applied Microbiology and Biotechnology* **103**(21), 8725-8736. https://doi.org/10.1007/s00253-019-10172-y

Ni, H., *et al*. (2019). Study on a two-component signal transduction system RimA1A2 that negatively regulates oxytetracycline biosynthesis in *Streptomyces rimosus* M4018. *Bioresources and Bioprocessing* **6**(1), 3. https://doi.org/10.1186/s40643-019-0238-8

Severi, E. & Thomas, G. H. (2019). Antibiotic export: transporters involved in the final step of natural product production. *Microbiology* **165**(8), 805-818. https://doi.org/10.1099/mic.0.000794