Supplementary information S1 (table) | **Survey of the regulation of bacterial antibiotics.**

We report cases where there is a strong candidate for the regulator of the antibiotic. The examples are divided into categories based upon the condition and regulator associated with the induction of the antibiotic. Note that the role of any one regulator is typically evidenced by gene deletion or over-expression, which are both potentially subject to confounding pleiotropic effects [1]. For toxins that are activated towards stationary phase in batch culture, inference of the regulators is particularly important and we use this to distinguish between stress response regulation and quorum associated regulation. Sometimes both are important e.g. bacilysin. We include two interesting sets of examples where regulators are not known, which are halocins (stationary phase associated toxins in Archea) and the pH based quorum-like regulation of lactic acid bacteria. However, examples where the regulator is not known are excluded from the statistics in the paper. Finally, the table does not include cases where a specific nutrient source affects toxin production or where certain non-stressful temperatures produced more induction than others as these are often difficult to interpret (see main text).

Condition	Species	Regulator	Antibiotic[c,d]	Effect of condition	Bacteriocin?	Notes and references
Stringent Response	*Bacillus subtilis*	ppGpp	Bacilysin (1)	+	N	2
	Escherichia coli	ppGpp	Colicin K (2)	+	Y	3
	Escherichia coli	ppGpp	Microcin J (3)	+	Y	4
	Pseudomonas aeruginosa	ppGpp	Pyocyanin (4)	-	N	5, ppGpp reduces toxin but pushes release later: stationary phase regulation?
	Streptomyces coelicolor	ppGpp	Actinorhodin, CDA (calcium-dependent antibiotic), Undecylprodigiosin (7)	+	N	6-8
	Streptomyces hygroscopicus	ppGpp?	Bialaphos (8)	+	N	9, inference of ppGpp role is correlative.
	Streptomyces antibioticus	ppGpp	Actinomycin (9)	+	N	10
	Streptomyces lavendulae	ppGpp	Formycin (10)	+	N	11
	Streptomyces griseus	ppGpp	Streptomycin (11)	+	N	12
	Streptomyces tendae	ppGpp	Nikkomycin (12)	+	N	13
	Streptomyces clavuligerus	ppGpp	Cephamycin C	+	N	14
	Streptomyces clavuligerus	ppGpp	Cephamycin C (13)	-	N	15, conflicts with 14, we use 15 to be conservative (also, see 16).
General stress responses and other nutrient	*Bacillus subtilis*	σH	Subtilin (14)	+	Y	17,18
	Bacillus subtilis	Spo0A	Sporulation killing factor (15)	+	Y	19, role in fratricide rather

limitation responses[a]						than competition?
	Bacillus subtilis	AbrB/ Spo0A	Subtilosin (16)	+	Y	20
	Bacillus subtilis	AbrB/ Spo0A	TasA (17)	+	N	21
	Bacillus subtilis	CodY	Bacilysin (18)	+	N	2
	Escherichia coli	IHF	Microcin B (19)	+	Y	4, 22
	Escherichia coli	σS	Microcin C (20)	+	Y	4
	Escherichia coli	IHF/LRP	Microcin J (21)	+	Y	4
	Various Halobacteriaceae (Archaea)	Unknown[b]	Halocin A4, C8, G1, H2, H3, H4, H5, H6, H7, R1, S8	+	Y	23, role for quorum regulation?
	Haloferax mediterranei M2a	Unknown[b]	H1	-	Y	23
	Pseudomonas fluorescens	σS	Pyrrolnitrin (22)	+	N	24
	Pseudomonas fluorescens	σS	Pyoluteorin and 2,4-diacetylphloroglucinol (24)	-	N	24
	Pseudomonas aeruginosa	σS	Pyocyanin (25)	-	N	25
	Streptococcus pneumonia	CodY	Putative bacteriocin (26)	+	Y	26
	Streptococcus gordonii	CcpA	H2O2 (27)	+	N	27
	Streptomyces coelicolor	σB	Undecylprodigiosin (28)	+	N	28,29
	Streptomyces coelicolor	σB	Actinorhodin (29)	-	N	28,29
	Streptomyces coelicolor	σL	Actinorhodin (30)	+	N	29
Envelope stress	*Bacillus subtilis*	σW	Probable bacteriocin (31)	+	Y	30
	Streptomyces coelicolor	σE	Actinorhodin, CDA, undecylprodigiosin (34)	+	N	6
DNA damage	*Clostridium perfringens*	UviA	bacteriocin BCN5(35)	+	Y	31,32
	Escherichia coli	LexA /RecA	Colicin A, B, D157, E1, E2, E3, E6, E7, Js, N, S4, U,Y, Ia, Ib, 5, 10, K (53)	+	Y	33-36
	Hafnia alvei	LexA	Alveicins A, B (55)	+	Y	37
	Klebsiella pneumoniae	LexA	Klebicins B, C (57)	+	Y	38,39
	Klebsiella oxytoca	LexA	Klebicins B, D (58)	+	Y	38,39
	Pectobacterium carotovorum	RdgB/RecA	Carotovoricin (Ctv) and pectin lyase (Pnl) (60)	+	Y	40
	Pectobacterium carotovorum	RdgB/RecA	Carocin D (61)	+	Y	41
	Pseudomonas aeruginosa	RecA	Pyocin R1, R2, R3, F1, F2, F3, S1, S2, S3, S4, S5, AP41 (73)	+	Y	42,43
	Pseudomonas putida	RecA	Lectin-like putidacin A (74)	+	Y	44

	Serratia marcescens	LexA/ RegC	Bacteriocin 28B (75)	+	Y	45
	Yersinia pestis	LexA	Pesticin (76)	+	Y	46
Oxidative stress	*Escherichia coli*	LexA/ RecA?	Colicin	+	Y	47
	Pseudomonas aeruginosa	RecA?	Pyocin S2, S3, S5, R2, F2	+	Y	48
	Streptococcus mutans	VicRK	Mutacin I, Mutacin IV, V and VI (80)	+	Y	49-52
	Streptomyces coelicolor	SoxR	Actinorhodin (81)	+	Y	53
Heat stress	*Escherichia coli*	σ32	Colicin A (82)	+	Y	54
	Pseudomonas fluorescens	Lon	pyoluteorin (83)	-	N	55
Osmotic stress	*Escherichia coli*	OmpR	Microcin B (84)	+	Y	4
	Streptomyces coelicolor	σB/ *OsaB*	Actinorhodin (85)	-	N	56
Quorum sensing	*Bacillus subtilis*	Spo0K	Bacilysin	+	N	57
	Burkholderia Thailandensis	LuxI/LuxR	Unnamed Antibiotic	+	N	58
	Chromobacterium violaceum	LuxI/LuxR	Violacein	+	N	59
	Enterococcus faecium CTC492	EntK/EntR	Enterocin A, enterocin B	+	Y	60
	Erwinia carotovora	LuxI/LuxR	Carbapenem	+	N	61
	Streptomyces coelicolor, S. griseus and others	γ-butyrolactone receptor systems	Various antibiotics	+	N	62,63
	Lactobacillus plantarum C11	*plnABCD*	Multiple bacteriocins	+	Y	64
	Lactobacillus Sake	*sppIPKR*	Sakacin P	+	Y	65,66
	Streptococcus mutans	ComCDE	Mutacin IV	+	Y	67
	Streptococcus mutans	LuxS (AI2), CiaXRH	Mutacin I	+	Y	68,69
	Streptococcus pneumonia	BlpSRH	Blp bacteriocins	+	Y	70
	Streptococcus pyogenes	SalKR	SalA1	+	Y	71
	Streptococcus thermophilus	BlpHSt-BlpRSt	Blp bacteriocins	+	Y	72
Toxin autoinduction	*Bacillus sp. strain HIL Y-85,54728*	MrsR2/MrsK2	Mersacidin	+	Y	73
	Bacillus subtilis	SpaK	Subtilin	+	N	17
	Carnobacterium piscicola LV17B	*CbnK, CbnR*	Carnobacteriocin B2 carnobacteriocin BM1	+	Y	74
	Lactococcus lactis	NisK	Nisin	+	Y	75

	Streptococcus salivarius 20P3	SalKR two component	Salivaricin A (SalA)	+	Y	71
	Enterococcus faecalis	CylR1, CylR2	Cytolysin	+	N	76
Quorum: other	*Pseudomonas aeruginosa*	*nagR* operon	Pyocyanin	+	N	77, Peptidoglycan is inducer.
Low pH	*Lactococcus lactis*	Unknown	Nisin	+	Y	78
	Lactobacillus Sake	Unknown	Lactocin S	+	Y	79
	Pediococcus acidilactici	Unknown	Pediocin	+	Y	78
	Lactococcus lactis	Unknown	Lacticin 481	+	Y	80
Constitutive	*Lactococcus lactis*		Lacticin 3147		Y	81
	Enterococcus faecium BFE 900		enterocin B		Y	82

Footnotes:

a) Often also known as "stationary phase regulators" but can activate under continuous exponential or linear growth when there is a continuous supply of nutrients[83], particularly in biofilms where cell density is high[84].

b) These are not included in the count of links as the regulators are unknown.

c) Antibiotics that are regulated by more than one condition are coloured by species.

d) The numbers in parenthesis after the antibiotic count up the number of distinct links between a stress response regulator and an antibiotic.

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