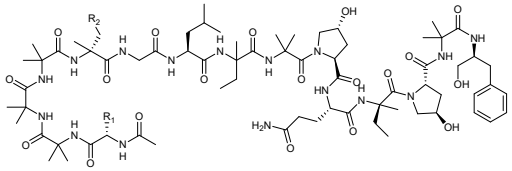
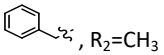
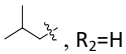
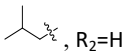
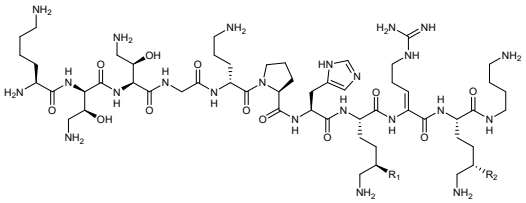
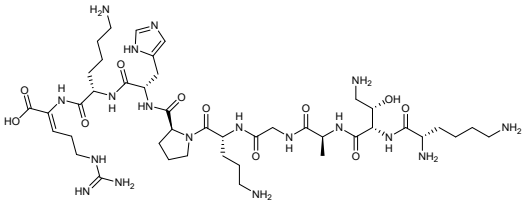
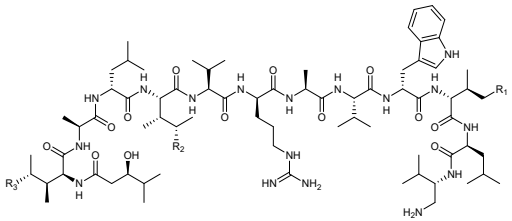
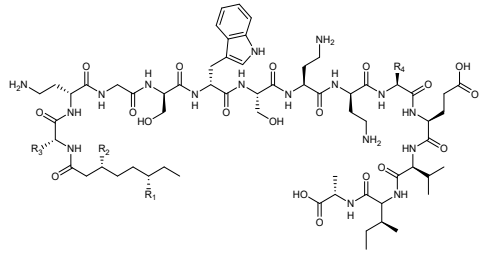
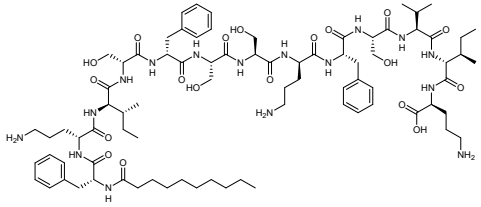
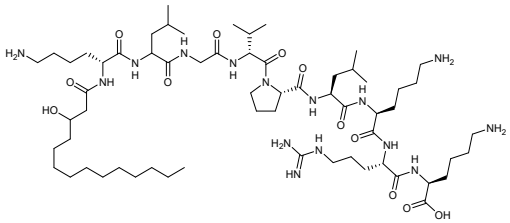
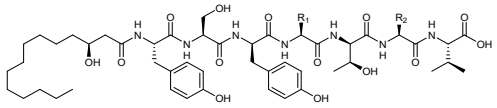
Medium-sized peptides from microbial sources with potential for antibacterial drug development

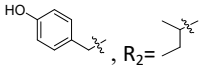
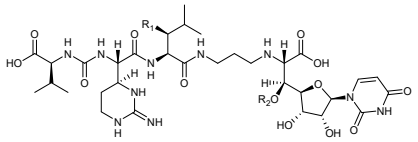
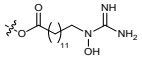
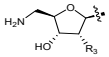
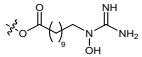
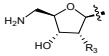
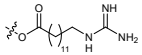
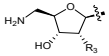
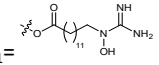
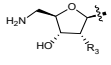
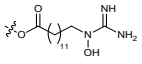
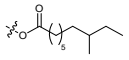
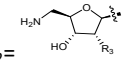
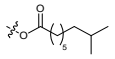
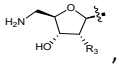
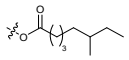
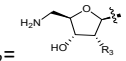
Table S1 Detailed information for all medium-sized antimicrobial peptides

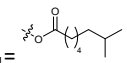
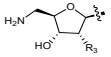
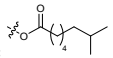
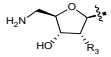
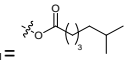
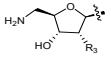
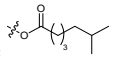
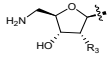
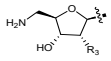
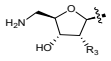
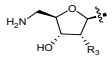
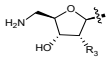
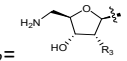
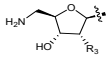
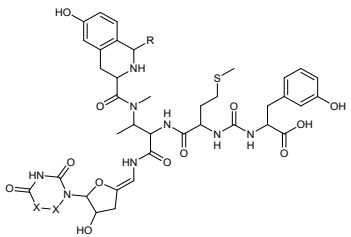
1.Linear peptides

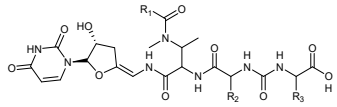
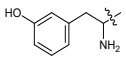
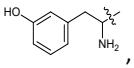
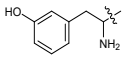
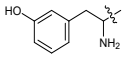
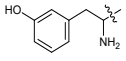
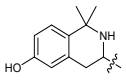
No.	Name	Structure	Strain No.	Source	Antimicrobial spectrum	Target	Ref.
1	Emerimicin V		*Acremonium tubakii* W. Gams	Soil sample (Salt Lake City, USA)	*E. faecalis* (64 μg/mL), VRE (64 μg/mL), MRSA (32 μg/mL)	-	1
2	Emerimicin VI				MRSA (64μg/mL)		
3	Emerimicin VII				Inactive		
4	Emerimicin VIII	**1** R_1=  , R_2=CH_3 **4** R_1=  , R_2=H					
5	Emerimicin IX	**2** R_1=  , R_2=H **5** R_1=  , R_2=H					
6	Emerimicin X	**3** R_1=  , R_2=CH_3 **6** R_1=  , R_2=H					
7	NOSO-95A		*Xenorhabdus nematophila* K102 (CNCM I-4530)	-	*E. aerogenes, E. cloacae, E. coli, K. pneumoniae, P. mirabilis, S. marcescens, S. aureus, E. faecalis* (4-16μg/mL)	bacterial ribosomes	2-4
8	NOSO-95B						

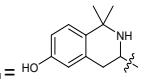
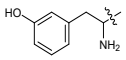
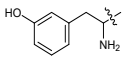
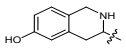
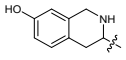
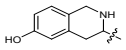
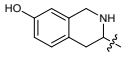
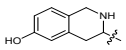
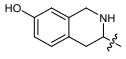
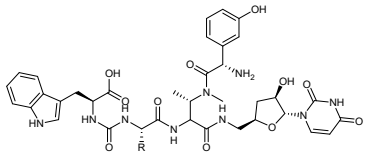
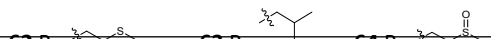
9	NOSO-95C	**7** R_1=R_2=OH **8** R_1=OH, R_2=H **9** R_1=H, R_2=OH					
10	NOSO-95179		semi-synthesis	-			
11	Aquimarin A		*Aquimarina* sp. Aq135	-	*E. faecalis, S. aureus, A. baumannii, M. tuberculosis, P. agglomerans* (1-8 µm)	-	5
12	Aquimarin B						
13	Aquimarin C						
14	Aquimarin D						
15	Aquimarin G	**11** R_1=H, R_2=R_3=Cl **12** R_1=CH_3, R_2=R_3=Cl **13** R_1=R_2=R_3=H	**14** R_1=CH_3, R_2=R_3=H **15** R_1=R_2=H, R_3=Cl **16** R_1=CH_3, R_2=H, R_3=Cl				
16	Aquimarin H				N/A		
17	Tridecaptin A_1		*Paenibacillus terrae* NRRL B-30644	-	Gram-negative bacteria (3.13-50 µg/mL)	bacterial cell membranes	6-10

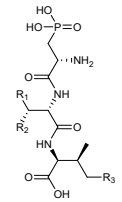
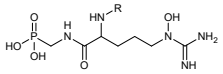
18	Tridecaptin B_1		*Paenibacillus polymyxa* NRRL B-30509				
19	Octyl-Tridecaptin A_1	**17** R_1= CH_3, R_2=OH, R_3=$CH(CH_3)_2$, R_4=Bn **18** R_1= CH_3, R_2=H, R_3=H, R_4= $CH((S)\text{-}CH_3)C_2H_5$ **19** R_1= H, R_2=H, R_3=$CH(CH_3)_2$, R_4=Bn	total synthesis				
20	Syn-BNP 1		*Paenibacillus mucilaginosus* K02	-	*E. faecium*, MRSA, *A. baumannii, B. subtilis, L. rhamnosus, Strep. Sanguinis, Strep. Mitis* (4-64 µg/mL)	-	10
21	Syn-BNP 2		*Xenorhabdus nematophila*	-	*C. albicans, S. pombe, S. cerevisiae, C. albidus, C. neoformans, S. chartarum* (4-32 µg/mL)		
22	Humimycin A	 **22** R_1=  , R_2= 	*Rhodococcus equi*	Human microbiome	*S. aureus, S. epidermidis, S. mitis, S. mutans, S. delphini, S. intermedius, S. pseudintermedius, S. pneumoniae, S. sanguinis, R.*	lipid II flippase (MurJ)	11

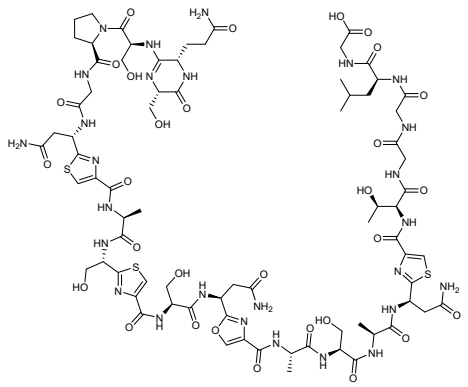
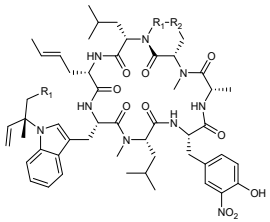
23	Humimycin B	**23** R_1=  , R_2=	*Rhodococcus erythropolis*		*mucilaginosa, R. dentocariosa* (4-32 µg/mL)	
24	Muraymycin A1		*Streptomyces* sp.	-	*Staphylococcal* (2-16 µg/mL), *Enterococcal* (16->64 µg/mL) and Gram-negative bacteria (8- >64 µg/mL)	Polyprenyl-phosphate N-acetyl hexose-mine 1-phosphate transferase	12
25	Muraymycin A2					
26	Muraymycin A3	**24** R_1=  , R_2=  , R_3=OCH_3				
27	Muraymycin A4	**25** R_1=  , R_2=  , R_3=OCH_3				
28	Muraymycin A5	**26** R_1=  , R_2=  , R_3=OCH_3				
29	Muraymycin B1	**27** R_1=  , R_2=  , R_3=OH				
30	Muraymycin B2	**28** R_1=  , R_2=H				
31	Muraymycin B3	**29** R_1=  , R_2=  , R_3=OCH_3				
32	Muraymycin B4	**30** R_1=  , R_2=  , R_3=OCH_3				
33	Muraymycin B5	**31** R_1=  , R_2=  , R_3=OCH_3				

34	Muraymycin B6	**32** R_1=  , R_2=  , R_3=OCH_3					
35	Muraymycin B7	**33** R_1=  , R_2=  , R_3=OH					
36	Muraymycin C1	**34** R_1=  , R_2=  , R_3=OCH_3					
37	Muraymycin C2	**35** R_1=  , R_2=  , R_3=OH					
38	Muraymycin C3	**36** R_1=OH, R_2=  , R_3=OCH_3					
39	Muraymycin C4	**37** R_1=OH, R_2=  , R_3=OH					
40	Muraymycin D1	**38** R_1=OH, R_2=  , R_3=H **39** R_1=OH, R_2=H					
41	Muraymycin D2	**40** R_1=H, R_2=  , R_3=OCH_3					
42	Muraymycin D3	**41** R_1=H, R_2=  , R_3=OH **42** R_1=H, R_2=  , R_3=H					
43	Napsamycin A		*Streptomyces* sp. HIL Y-82	Soil sample (Andaman Islands, India)	*Pseudomonas aeruginosa* (6.25-50 mcg/ml)	ransloc-ase I (MurX, known as MraY in	13

44	Napsamycin B				other bacteria)	
45	Napsamycin C	**43** R=H, X-X= CH=CH **44** R=CH_3, X-X= CH=CH **45** R=H, X-X= CH_2-CH_2 **46** R= CH_3, X-X= CH_2-CH_2				
46	Napsamycin D					
47	Sansanmycin A					
48	Sansanmycin B	**47** R_1=  , R_2=  , R_3= 				
49	Sansanmycin C	**48** R_1=  , R_2=  , R_3= 				
50	Sansanmycin D	**49** R_1=  , R_2=  , R_3= 	*Streptomyces* sp. SS	Soil sample	*P. aeruginosa* (16 μg/mL), *M. tuberculosis* (2-16 μg/mL)	14-19
51	Sansanmycin E	**50** R_1=  , R_2=  , R_3= 				
52	Sansanmycin F	**51** R_1=  , R_2=  , R_3= 				
53	Sansanmycin G	**52** R_1=  , R_2= , R_3= 				
54	Sansanmycin H					

55	Sansanmycin I	**53** R_1=  , R_2=  , R_3= 				
56	Sansanmycin J	**54** R_1=  , R_2=  , R_3= 				
57	Sansanmycin K	**55** R_1=  , R_2=  , R_3= 				
58	Sansanmycin L	**56** R_1=  , R_2=  , R_3= 				
59	Sansanmycin M	**57** R_1=  , R_2=  , R_3= 				
60	Sansanmycin N	**58** R_1=  , R_2=  , R_3= 				
61	Sansanmycin O	**59** R_1=  , R_2=  , R_3= 				
		60 R_1=  , R_2=  , R_3= 				
		61 R_1=  , R_2=  , R_3= 				
62	Dihydrosansan-mycin A		total synthesis	-	*P. aeruginosa* (12.5-100 µm), *M. tuberculosis* (0.3-18.5 µm)	ransloc-ase I (MurX, known as MraY in other bacteria)	20
63	Dihydrosansan-mycin B						

64	Dihydrosansan-mycin C							
65	Phosphonoala-mide A		**65** R_1=R_2=R_3=H **66** R_1=CH_3, R_2=OH, R_3=H **67** R_1=R_2=H, R_3=CH_3 **68** R_1=R_2=CH_3, R_3=H	*Streptomyces* sp. NRRL B-2790	-	*E. coli*, *B. subtilis*, *B. cereus*, *B. megaterium* (6.25-200 µm) N/A	-	21
66	Phosphonoala-mide B							
67	Phosphonoala-mide C							
68	Phosphonoala-mide D							
69	Argolapho A		**69** R=  **70** R=H	*S. monomycini* NRRL B-24309	-	*E. coli*, *S. aureus*, *S. enterica* (no MIC values)	UDP-N-acetylmuramyl-L-alanine synthetase	22
70	Argolapho B							

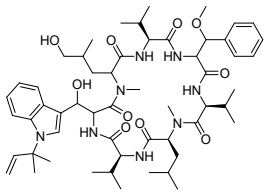
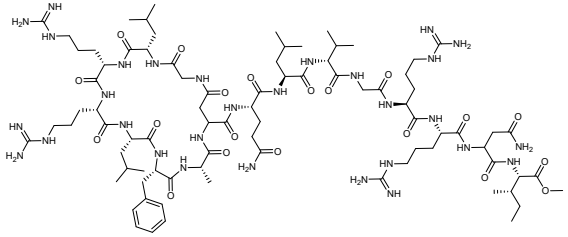
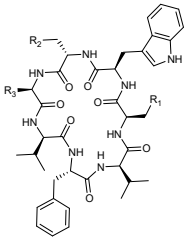
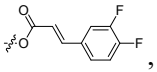
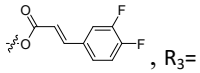
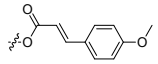
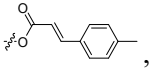
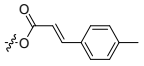
71	Klebsazolicin		*K. pneumoni-aesubs* ATCC 11296	-	*E. coli* (32->1024 μg/mL), *K. pneumoniae* (128 μg/mL), *Yersinia pseudotuberculosis* (64 μg/mL)	ribosomes	23
2.Cyclic oligopeptides							
72	Ilamycin B_1		*Streptomyces atratus* SCSIO ZH16	marine-derived sample (South China Sea)	*M. tuberculosis* (2.4 μm)	tyrosine hydrolytic protein C1 (ClpC1)	24-25
73	Ilamycin B_2						
74	Ilamycin C_1						
75	Ilamycin C_2						
76	Ilamycin D				*M. tuberculosis* (0.0098-9.6 μm), *M. smegmatis* (0.12-30.7 μm)		
77	Ilamycin E_1						

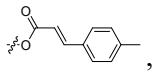
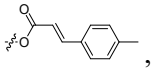
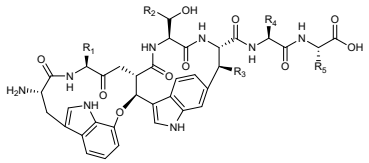
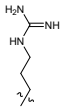
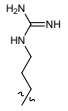
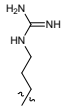
	R_1	R_2	R_3	R_4
72	H			NO_2
73	H			NO_2
74				NO_2

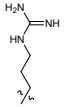
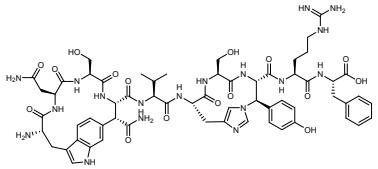
78	Ilamycin E_2	**75**			NO_2				
79	Ilamycin F	**76**	H			NO_2			
80	Ilamycin G	**77**				NO_2			
81	Ilamycin H	**78**				NO_2			
82	Ilamycin I	**79**	H			NO_2			
83	Ilamycin J	**80**	H			NO_2			
84	Ilamycin K	**81**	H			NO_2	*Streptomyces atratus* SCSIO ZH16 ΔilaR	-	*M. tuberculosis* (0.0096-10 μm)
85	Ilamycin L	**82**	H			NO_2			
86	Ilamycin M	**83**				NO_2			
87	Ilamycin N	**84**				NO_2			
88	Ilamycin O	**85**	H			NO_2			
89	Ilamycin P	**86**	H			NO_2			
90	Ilamycin Q								

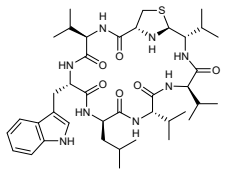
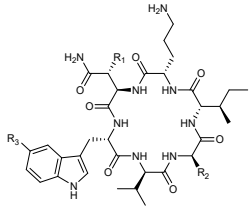
		87	H			NHCHO			
91	Ilamycin R								
		88	H			H			
92	Rufomycin NBZ1	**89**				NO_2			
93	Rufomycin NBZ2	**90**	H			NO_2			
94	Rufomycin NBZ3	**91**				NO_2			
95	Rufomycin NBZ4	**92**	H			NO_2	*S. atratus* MJM3502	-	*M. tuberculosis* (0.030->10 µm), *M. abscessus* (0.54- >10 µm)	26
96	Rufomycin NBZ5	**93**	H			NO_2				
97	Rufomycin NBZ6	**94**	H			NO_2				
98	Rufomycin NBZ7	**95**	H			H				
99	Rufomycin NBZ8	**96**	H			NO_2				
100	RufomycinSS 1	**97**	H			NO_2	semi-synthesis	-	*M. tuberculosis* (12-4300 nM)	27
101	RufomycinSS 2	**98**				NO_2				
102	RufomycinSS 3	**99**				NO_2				

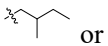
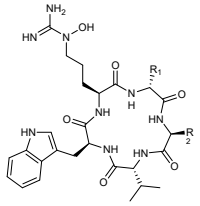
103	RufomycinSS 8	**100**			NO_2
104	RufomycinSS 9	**101**			NO_2
105	RufomycinSS 10	**102**			NO_2
106	RufomycinSS 11	**103**			NO_2
107	RufomycinSS 12	**104**			NO_2
108	RufomycinSS 13	**105**			NO_2
109	Rufomycin 6	**106**			NO_2
110	Rufomycin 7	**107**			NO_2
		108			NO_2
		109			NO_2
		110			NO_2

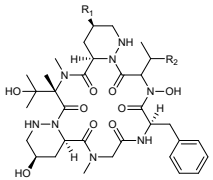
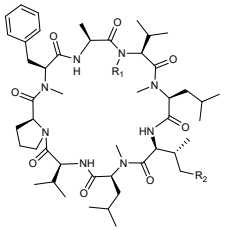
111	Metamarin		heterologous expression in Streptomyces albus J1074（cosmids DFD0097_w371, DFD1080_w495）	soil sample	*M. tuberculosis* (0.16-0.63 μg/mL)	ATPase of ClpC1	28
112	Lassomycin		*Lentzea kentuckyensis* IS009804	soil sample	*M. tuberculosis* (0.78-3.1 μg/mL), *M. avium subsp. paratuberculosis* (0.125-0.25 μg/mL), *M. smegmatis* (0.78-2 μg/mL)	ATPase of ClpC1	29
113	Asperversiamide A	 **113** R_1=OH, R_2=OH, R_3=CH_3 **114** R_1=OH, R_2=H, R_3=CH_3 **115** R_1=H, R_2=OH, R_3=CH_3 **116** R_1=OH, R_2=OH, R_3=H **117** R_1=H, R_2=H, R_3=CH_3	**118** R_1=  , R_2=  , R_3=CH_3 **119** R_1=  ,R_2=H, R_3=CH_3 **120** R_1=  , R_2=  , R_3=CH_3	*Aspergillus versicolor* CHNSCLM-0063	coral-derived fungus	*M. marinum* (23.4-87.5 μm), *M. tuberculosis* (100 μm)	-	30
114	Asperversiamide B						
115	Asperversiamide C						
116	Asperheptatide A				———		
117	Asperheptatide B				*M. tuberculosis* (12.5-100 μm)		31
118	Asperversiamide A_2						
119	Asperversiamide A_6						

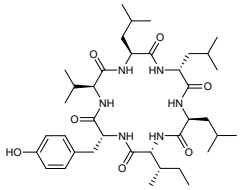
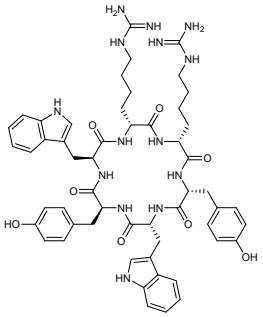
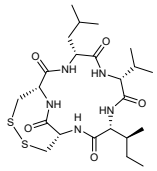
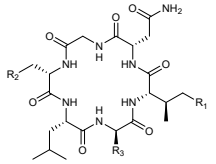
120	Asperversia-mide A_{15}			**121** R_1=  , R_2=  , R_3= CH_3					
121	Asperversia-mide A_{16}								
122	Darobactin A						*Photorhabdus khanii* HGB1456		bacterial insertase BamA
123	Darobactin B						*Photorhabdus asymbiotica* ATCC43949		
124	Darobactin C		R_1	R_2	R_3	R_4	R_5		
		122		H				*Yersinia pestis* Angola	- Gram-negetive bacteria (0.5-64 μm) - 32-35
		123		CH_3					
125	Darobactin D	**124**		H				*Yersinia enterocolitica* subsp. enterocolitica strain NCTC13629	
126	Darobactin E	**125**		H				*Yersinia bercovieri* stain SCPM-O-B-7607	

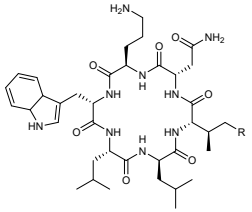
		126		H							
127	Darobactin F	**127**		H				*P. thracensis* DSM15199			
		128		H							
128	Darobactin 9	**129**		CH_3				Biosynthetic Engineering			
129	Darobactin 22										
130	Dynobactin A						*Photorhabdus australis*	-	Gram-negetive bacteria (2-64 µg/ml)	-	36

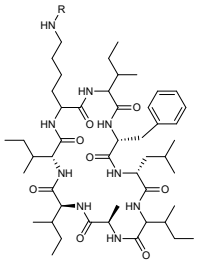
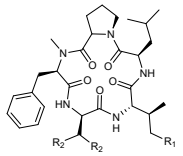
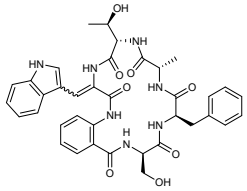
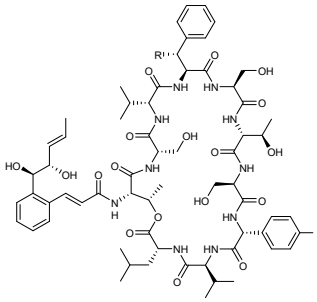
131	Lugdunin					*Staphylococcus lugdunensis* IVK28	Human microbiome	MRSA, GISA, VRE, *L. monocytogenes, S. pneumoniae, B. subtilis* (1.5-12 μg/ml)	cell membranes	37
132	Nicrophorusamide A					*Microbacterium* sp. UTG9	a gut bacterium (the carrion beetle Nicrophorus concolor)	*S. aureus, E. faecalis, E. faecium, S. enterica* (8-128 μg/ml)		38-41
133	Nicrophorusamide B							Inactive		36
			R_1	R_2	R_3	R_4				
134	Ulleungmycin A	**132**	OH		Cl	CH_3	*Streptomyces* sp. KCB13F003	-	*S. aureus,* MRSA, QRSA, *B. subtilis, S. pneumoniae, E. faecalis* (8-16 μg/ml)	39
		133	H		Cl	CH_3				
135	Noursamycin A	**134**	OH		Cl	CH_3	*Streptomyces noursei* NTR-SR4	-	*B. subtillis, S. typhimurium, M. luteus, M. phlei* (4-16 μg/ml)	40
136	Noursamycin C	**135**	OH		Cl	CH_3			Inactive	

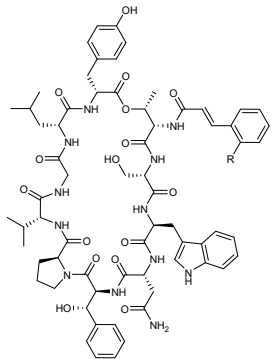
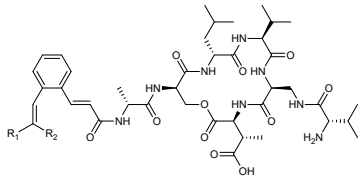
137	Noursamycin D	**136**	OH	 or 	Cl	CH_3	*Streptomyces noursei* NBRC 15452			41
138	Noursamycin E	**137**	OH		Cl	H				
		138	OH		Cl	H				
139	Dechlorocura-comycin	**139**	OH		H	CH_3				
140	Pentamino-mycin A						*Streptomyces* sp. RK88-1441	-	N/A	- 42-45
141	Pentamino-mycin B								*A. baumannii* (16-32 µg/ml)	
142	Pentamino-mycin C	**140** R_1=  , R_2= 							*M. luteus, B. subtilis, S. aureus, A. baumannii* (16 µg/ml)	
143	Pentamino-mycin D	**141** R_1=  , R_2= 					*Streptomyces cacaoi* subsp. *cacaoi* NBRC 12748	-	N/A	
144	Pentamino-mycin E	**142** R_1=  , R_2= 								
		143 R_1=  , R_2= 								
145	Pentamino-	**144** R_1=  , R_2= 					*Streptomyces*	-	Inactive	

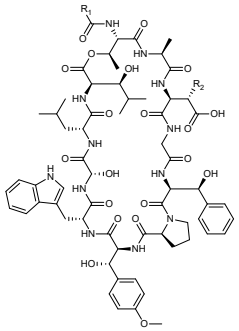
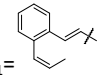
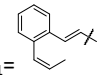
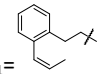
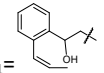
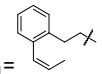
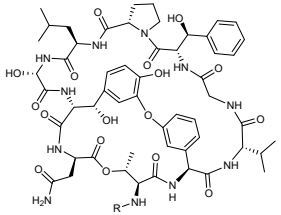
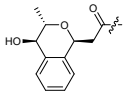
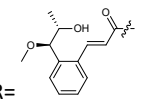
	mycin F	**145** R_1=  , R_2= 	*cacaoi* subsp. *cacaoi* CA-170360				
146	Pentamino-mycin G	**146** R_1=  , R_2= 					
147	Pentamino-mycin H	**147** R_1=  , R_2= 					
148	Pargamicin A		**148** R_1=H, R_2=Et	*Amycolatopsis* sp. ML1-hF4	soil sample (Shinagawa, Tokyo, Japan)	*E. faecalis*, VRE, *S. aureus*, MREA, *M. luteus, E. faecium, B. subtilis, B. cereus, C. bovis* (0.5-64 µg/ml)	-	46-47
149	Pargamicin B		**149** R_1=H, R_2=Me					
150	Pargamicin C		**150** R_1=OH, R_2=Et					
151	Pargamicin D		**151** R_1= =O, R_2=Et					
152	Broomeana-mide A		**152** R_1=CH_3, R_2= CH_3	*Sphaerostilbella broomeana* TFC201724	wood-inhabiting fungi (the foothills of Himalayas)	*C. neoformans* (8 µg/ml), *C. albicans* (64 µg/ml)	-	48
153	Broomeana-mide B		**153** R_1= CH_3, R_2=H **154** R_1=H, R_2= CH_3			N/A		

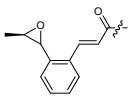
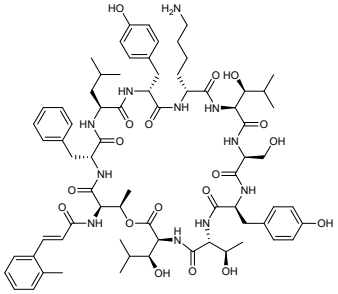
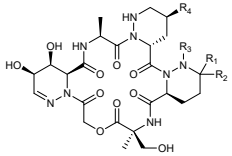
154	Broomeana-mide C						
155	Thermoactinoa-mide A		*Thermoactinomyces vulgaris* strain ISCAR 2354	A sample from coastal hot spring (Snæfellsness peninsula in West Iceland)	*S. aureus* (35 µm)	-	49
156	Photoditritide	 **156**	 **157**	*Photorhabdus temperata* Meg1	-	*M. luteus, T. brucei rhodesiense, E. coli, P. falciparum* (3.0-27µm)	-	50
157	Malformin E			*Aspergillus tamarii* FR02	the roots of Ficus carica	*B. subtilis, S. aureus, P. aeruginosa, E. coli, P. chrysogenum, C. albicans, F. solani* (0.45-7.24 µm)	-	51
158	Desotamides A	 R_1 R_2 R_3		*Streptomyces* sp. NRRL 21611	soil sample (DeSoto Falls, GA)	*S. aureus, B. subtilis*, *S. pneumiae,* MRSE (clinical isolate shhs-E1) (12.5-32 µg/ml)	-	52-54
159	Desotamides B							

160	Desotamides C	**158**	Me		$CH_2CH(CH_3)_2$	*Streptomyces scopuliridis* SCSIO ZJ46	a sediment sample collected in the South China Sea at a depth of 3536 m	Inactive		
161	Desotamides D	**159**	H		$CH_2CH(CH_3)_2$					
162	Desotamides E	**160**	Me		$CH_2CH(CH_3)_2$	*Streptomyces* nov. sp. (MST-115088)	Soil sample from semiarid terrain (Wollogorang Station, Queensland)	*B. subtilis* (3.5-5.2 μm)		
163	Desotamides F	**161**	Me		$CH_2CH(CH_3)_2$			*B. subtilis* (1.0-1.2μm), *S. aureus* (5.5-6.8 μm)		
		162	Me		$CH(CH_3)_2$					
		163	Me		$CH(CH_3)C_2H_5$					
164	Wollamides A				**164** R=Me	*Streptomyces* nov. sp. (MST-115088)	Soil sample from semiarid terrain (Wollogorang Station, Queensland)	*B. subtilis* (1.8-2.0 μm), *M. bovis* (2.8 μm)	-	54
165	Wollamides B				**165** R=H			*B. subtilis* (1.9-2.2 μm), *S. aureus* (0.6-0.9 μm), *M. bovis* (3.1 μm)		

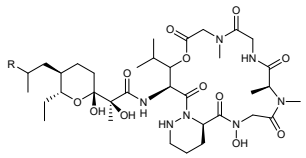
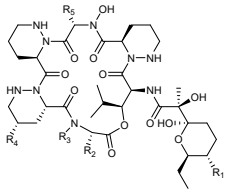
166	Surugamide A		**166** R=H	*Streptomyces* sp. JAMM992	Deep-sea sediment sample collected from Kinko Bay (−106 m), Japan	*S. aureus* (10μm)	-	55-56
167	Acyl-surugamide A		**167** R= 	*Streptomyces albus* J1074	-	*S. aureus, B. subtilis, S. cerevisiae, S. pombe* (3.5-32.5 μm)		
168	Ellisiiamide A		**168** R_1=CH_3, R_2= CH_3 **169** R_1=H, R_2=$CH(CH_3)_2$ **170** R_1= CH_3, R_2=$CH(CH_3)CH_2CH_3$	*Xylaria ellisii sp. nov.*	a leaf and stem endophyte of *Vaccinium angustifolium* (Nova Scotia, New Brunswick, and Ontario, Canada)	*E. coli* (100 μg/ml)	-	57
169	Ellisiiamide B					inactive		
170	Ellisiiamide C							
171	Sclerotide A		**171** Z **172** E	*Aspergillus sclerotiorum* PT06-1	Marine sample (Putian Sea Salt Field, Fujian, China)	*C. albicans* (7 μm)	-	58
172	Sclerotide B					*C. albicans* (3.5 μm), *P. aeruginosa* (35.3 μm)		
3 Cyclic depsipeptides								
173	Atrovimycin A		**173** R=OH **174** R=H	*Streptomyces atrovirens* LQ13	soil sample (Xinjiang Uygur Autonomous Region of China.)	*Fusarium. oxysporum* f. sp. *Cucumerinum* (9.3 μm), *M. tuberculosis* (2.5 μg/ml)	-	59

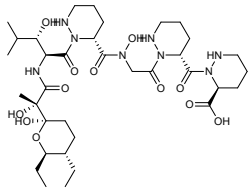
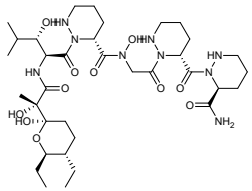
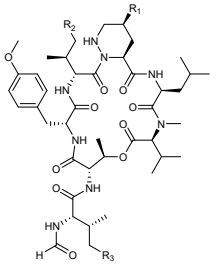
174	Atrovimycin B							
175	Atratumycin A		**175** R=	*Streptomyces atratus* SCSIO ZH16	sediment sample	*M. tuberculosis* (3.8-14.6 μm)	-	60-61
176	AtratumycinB		**176** R= 	*Streptomyces atratus* SCSIO ZH16 NS-80S	engineered strain of *S. atratus* SCSIO ZH16			
177	Atratumycin C		**177** R= 					
178	Coprisamide A		**178** R_1=H, R_2= 	*Streptomyces* sp. SNU533	A sample from gut of the dung beetle *Copris tripartitus* (Jeju Island, Republic of Korea)	inactive	-	62
179	Coprisamide B		**179** R_1=  , R_2=H					
180	Coprisamide C		**180** R_1=H, R_2= 	*Micromonospora* sp. UTJ3	Sample from the carrion beetle *Silpha perforata*	*M. tuberculosis* (82.8 μg/ml)		63

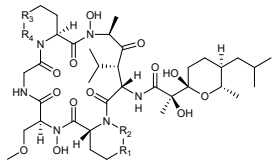
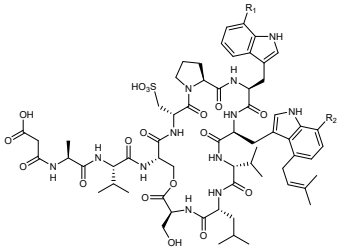
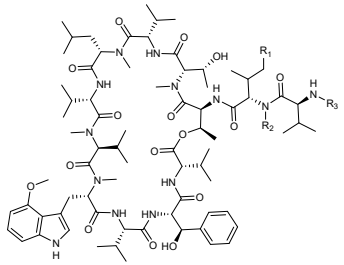
181	Coprisamide D		**181** R_1=  R_2=H			inactive		
182	Skyllamycin A		**182** R_1=  R_2= CH_3	*Streptomyces* sp. KY 11784	soil sample (Sakai-shi, Osaka, Japan)	*S. aureus* (140 µm), *B. subtilis* (105 µm)	-	64-67
183	Skyllamycin B		**183** R_1=  R_2=H	*Streptomyces* sp. Acta 2897	Sandy soil sample (Warkworth, UK)	N/A		
184	Skyllamycin C		**184** R_1=  R_2=H	*Streptomyces* sp. strain 1675	sediment sample from Westport Jetty, WA, USA			
185	Skyllamycin D		**185** R_1=  R_2=CH_3	*Streptomyces anulatus* strain ATCC 11523	A sample from the New Zealand lichen *Pseudocyphellaria dissimilis*	*B. subtilis* (8-32 µg/ml), *S. aureus* (16-64 µg/ml)		
186	Skyllamycin E		**186** R_1=  R_2=CH_3					
187	Nyuzenamide A		**187** R=  **188** R= 	*Streptomyces* sp. N11-34	deep sea derived sample (Toyama, Japan)	*G. cingulate* (3.1 µg/ml), *T. rubrum* (6.3 µg/ml)	-	68-69

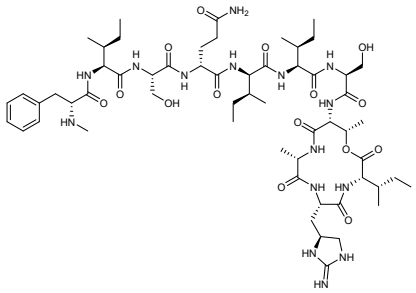
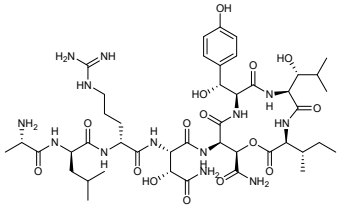
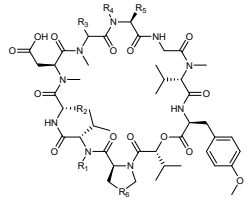
188	Nyuzenamide B	**189** R= 					
189	Nyuzenamide C		*Streptomyces* sp. DM14	river sediment sample (Dumulmeori, Republic of Korea)	inactive		
190	Cinnapeptin		*Streptomyces ghanaensis*	-	*B. subtilis, S. hominis, S. agalactiae, S. mutans, S. pombe* (5.7-11.4 µm)	-	70
191	Svetamycin A		*Streptomyces* sp. DSM 14386	Bought from DSMZ-German Collection of Microorganisms and Cell Cultures, Braunschweig, Germany.	*M. smegmatis* (32 µg/ml), MRSA (64 µg/ml)	-	71
192	Svetamycin B				N/A		
193	Svetamycin C				*M. smegmatis* (8 µg/ml), MRSA (16µg/ml), *M. tuberculosis* (54 µg/ml)		

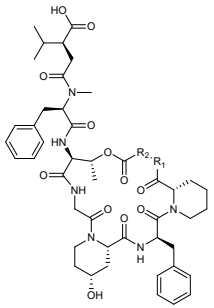
	R_1	R_2	R_3	R_4
191	H	H	H	Cl
192	H	Me	H	Cl

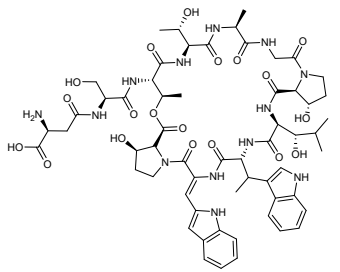
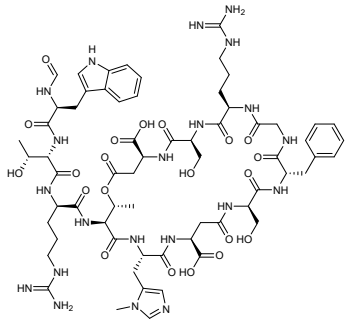
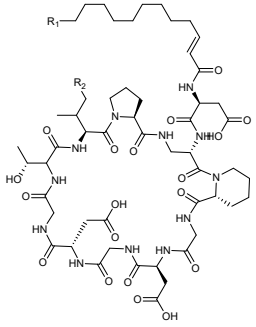
194	Svetamycin D	**193**	Me	Me	H	Cl			N/A	
195	Svetamycin F	**194**	H	π -band		Cl			*M. smegmatis* (2-32 μg/ml), MRSA (16-64 μg/ml)	
		195	H	H	H	Br				
196	Svetamycin G	**196**	Me	Me	H	Br				
197	Meliponamycin A						*Streptomyces* sp. ICBG1318	Sample isolated from M. scutellaris nurse bees.	*P. larvae* (0.43 μg/ml), *S. aureus* (0.86-1.72 μg/ml), *L. infantum* (1.03-2.19 μg/ml)	-	72
198	Meliponamycin B	**197** R=H **198** R=Me									
199	Dentigerumycin A						*Pseudonocardia* spp.	Isolated from ant (Apterostigma dentigerum) nest (Gamboa, Panama)	*Escovopsis sp.* (2.8 μm)	-	73-76
200	Dentigerumycin B	**199** R_1=$CH_2CH_2CH_3$, R_2=CH_3, R_3=H, R_4=OH, R_5=CH_3					*Streptomyces* sp. M41	isolated from a South African termite, Macrotermes natalensis	N/A		
		200 R_1=CH_2CH_3, R_2=CH(S-OH)CH_3, R_3=OH, R_4=H, R_5=H									

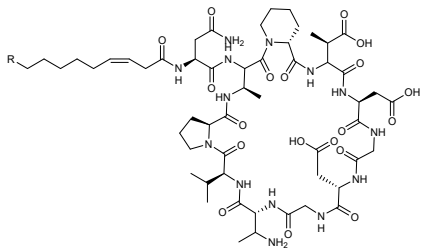
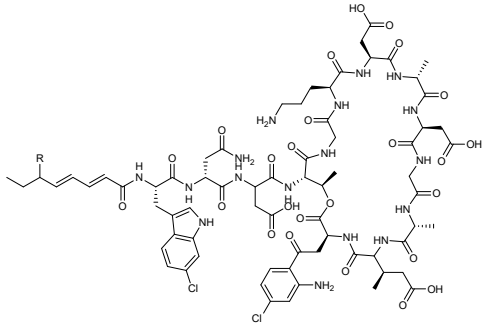
201	Dentigerumycin C	**203** R_1=CH_2COOH, R_2=$CH(S\text{-}OH)CH_3$, R_3=OH, R_4=H, R_5=H **204** R_1=CH_2CH_3, R_2=CH_3, R_3=H, R_4=OH, R_5=CH_3					
202	Dentigerumycin D	**201** 					
203	Dentigerumycin E	**202** 		*Streptomyces* sp. JB5	isolated from an intertidal mudflat (Wando, Korea)		
204	Dentigerumycin F			*Pseudonocardia* sp. ICBG1122 (Ps1122)	isolated from the nest of the ant *Trachymyrmex* sp. (the Adolpho Ducke Forest Reserve, Brazil)	*Escovopsis* sp (8 μg/ml)	
205	Marformycin A		**205** R_1=H, R_2=Me, R_3=H **206** R_1=H, R_2=Me, R_3=Me **207** R_1=OH, R_2=H, R_3=Me **208** R_1=OH, R_2=Me, R_3=Me **209** R_1=OH, R_2=H, R_3=H **210** R_1=H, R_2=H, R_3=H	*Streptomyces drozdowiczii* SCSIO 10141.	marine-derived sample (South China Sea)	*M. luteus (0.063-4* μg/ml*)* N/A	-	77
206	Marformycin B						
207	Marformycin C						
208	Marformycin D						
209	Marformycin E						
210	Marformycin F						

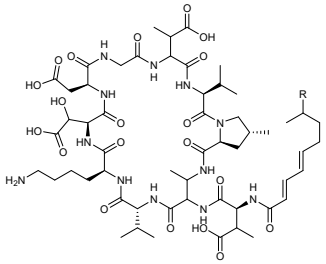
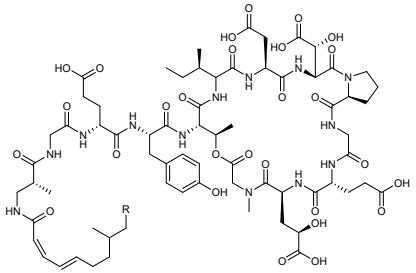
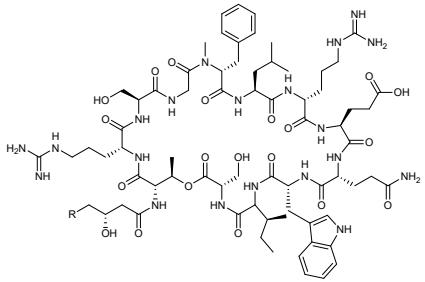
211	Aurantimycin A			*Streptomyces aurantiacus* IMET43917	-	*B. subtilis, S. aureus, M. luteus, M. flavus, S. pyogenes, E. faecium* (0.007-0.08 µg/ml)	-	78
212	Aurantimycin B							
213	Aurantimycin C		R_1 R_2 R_3 R_4 **211**   **212**   **213**  				
214	Krisynomycin A		**214** R_1=Cl, R_2=Cl	*Streptomyces fradiae* strain MA7310	-	MRSA (16-32 µg/ml)	Signal Peptidase Type I	79-80
215	Krisynomycin B		**215** R_1=H, R_2=H	*Streptomyces canus* CA-091830	sand sample (Kalahari Desert, South Africa)	inactive		
216	Krisynomycin C		**216** R_1=Cl, R_2=H					
217	Ohmyungsa-mycin A			*Streptomyces* sp. SNJ042	Sample from a beach (Jeju, Republic of Korea)	*B. subtilis* (4.28-34 µg/ml), *K. rhizophila* (1.07-8.5 µg/ml), *P. hauseri* (2.14-17 µg/ml)	-	81
218	Ohmyungsa-mycin B							

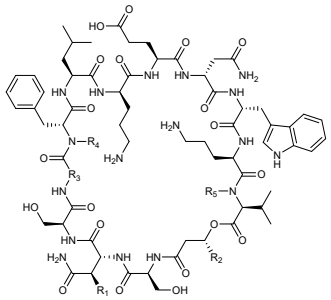
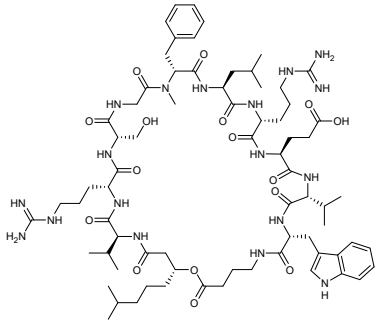
219	Ecumicin	**217** R_1=H, R_2=H, R_3= CH_3 **218** R_1= CH_3, R_2=H, R_3= CH_3 **219** R_1= CH_3, R_2= CH_3, R_3= 	*Nonomuraea* sp. MJM5123	-	*M. tuberculosis* (0.26 µg/ml)	ATPase of ClpC1	82
220	Teixobactin		*Eleftheria terrae*	-	Gram-positive bacteria (0.005-0.31 µg/ml) and Gram-negative bacteria (2.5-25 µg/ml)	peptidoglycan synthesis	83
221	Hypeptin		*Lysobacter* sp. K5869	-	Gram-positive bacteria (0.0625-16 µg/ml)	bacterial cell wall biosynthesis	84
222	Clavariopsin A		*Clavariopsis aquatica* AJ117363	stream sediment sample (Mt. Takao, Tokyo, Japan.)	*C. albicans, A. niger, A. fumigatus, B. cinerea, M. oryzae, C. orbiculare, A. alternata* (2-16 µg/ml)	-	85-86
223	Clavariopsin B	**222** R_1=CH_3, R_2=$CH(CH_3)_2$, R_3=$CH(CH_3)C_2H_5$, R_4=CH_3, R_5=$CH(CH_3)C_2H_5$, R_6=CH_2CH_2					

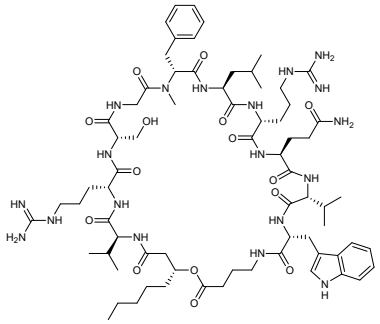
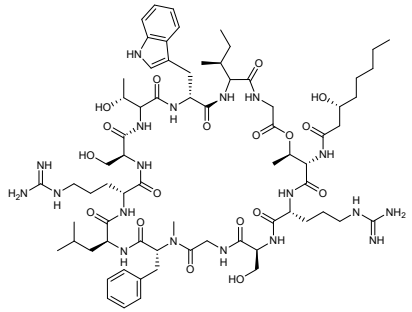
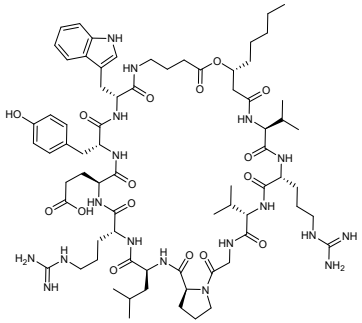
224	Clavariopsin C	**223** R_1=H, R_2=$CH(CH_3)_2$, R_3=$CH(CH_3)C_2H_5$, R_4=CH_3, R_5=$CH(CH_3)C_2H_5$, R_6=CH_2CH_2			*B. cinerea* (0.01-0.3 µg/disk), *A. alternata* (0.3-3 µg/disk)		
225	Clavariopsin D	**224** R_1=CH_3, R_2=$CH(CH_3)_2$, R_3=$CH(CH_3)C_2H_5$, R_4=H, R_5=$CH(CH_3)C_2H_5$, R_6=CH_2CH_2					
226	Clavariopsin E	**225** R_1=CH_3, R_2=$CH(CH_3)_2$, R_3=$CH(CH_3)_2$, R_4=CH_3, R_5=$CH(CH_3)C_2H_5$, R_6=CH_2CH_2					
227	Clavariopsin F	**226** R_1=CH_3, R_2=$CH(CH_3)_2$, R_3=$CH(CH_3)C_2H_5$, R_4=CH_3, R_5=$CH(CH_3)_2$, R_6=CH_2CH_2					
228	Clavariopsin G	**227** R_1=CH_3, R_2=$CH(CH_3)_2$, R_3=$CH_2CH(CH_3)_2$, R_4=CH_3, R_5=$CH(CH_3)C_2H_5$, R_6=CH_2CH_2					
229	Clavariopsin H	**228** R_1=CH_3, R_2=$CH(CH_3)_2$, R_3=$CH(CH_3)C_2H_5$, R_4=CH_3, R_5=$CH_2CH(CH_3)_2$, R_6=CH_2CH_2					
230	Clavariopsin I	**229** R_1=CH_3, R_2=$CH(CH_3)_2$, R_3=$CH(CH_3)C_2H_5$, R_4=CH_3, R_5=$CH(CH_3)C_2H_5$, R_6=CH_2					
		230 R_1=CH_3, R_2=$CH_2CH(CH_3)_2$, R_3=$CH(CH_3)C_2H_5$, R_4=CH_3, R_5=$CH(CH_3)C_2H_5$, R_6=CH_2CH_2					
231	Ulleungamide A		**231** R_1-R_2= 	*Streptomyces* sp. KCB13F003	Soil sample	*S. aureus* (25 µg/disk), *S. typhimurium* (50 µg/disk)	-	87-88
232	Ulleungamide B		**232** R_1-R_2= 			inactive		
233	Ulleungamide C		**233** R_1-R_2= 			N/A		

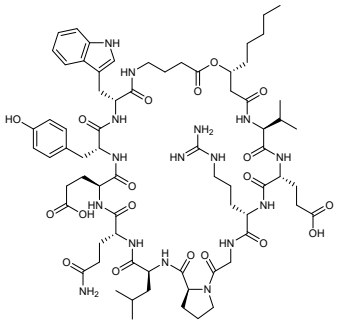
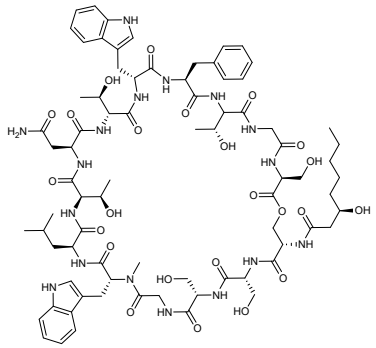
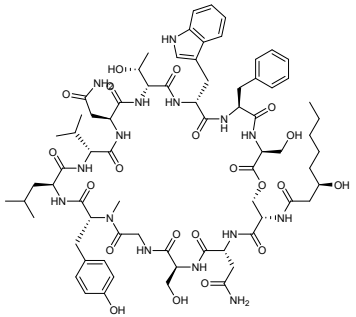
234	Ambobactin		*Streptomyces ambofaciens* F3	an endophyte of *Platycladus orientalis*	*B. subtilis, B. cereus, S. aureus, E. coli, E. carotovora, P. syringae pv. Actinidiae, A. solanacearum, X. oryzae pv. Oryzae.* (3.13-25 μg/ml)	-	89
235	Evybactin		*P. noenieputensis* DSM 25462	-	*M. tuberculosis* (0.0625-64 μg/ml), *E. coli* (0.0625-16 μg/ml)	DNA gyrase	90
4 Cyclic liopeptides							
236	Glycinocin A		**236** R_1=  , R_2=CH_3 **237** R_1=  , R_2= CH_3 **238** R_1=  , R_2= CH_3 **239** R_1=  , R_2=H	*Actinomycete* AW998	-	*S. aureus* (5.5-17 μg/ml), *B. subtilis* (8.3-17 μg/ml)	lipid carrier undecylenyl phosphate (C55-P)	91
237	Glycinocin B						
238	Glycinocin C						
239	Glycinocin D						

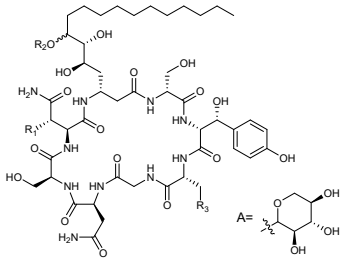
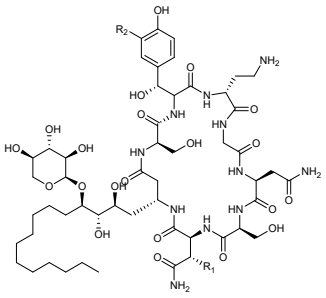
240	Friulimicin A		*Actinoplanes friuliensis* HAG01 0964	-	N/A	lipid carrier undecylenyl phosphate (C55-P)	92
241	Friulimicin B				*S. simulans* (0.078 µg/ml), *B. subtilis* (0.078 µg/ml)		
242	Friulimicin C	**240** R=  **241** R= 			N/A		
243	Friulimicin D	**242** R=  **243** R= 					
244	Taromycin A	 **244** R=H **245** R=CH_3	*Saccharomonospora* sp. CNQ-490	marine-derived sample	MRSA (12 µg/ml), *E. faecalis* (6-50 µg/ml)	-	93-94
245	Taromycin B						

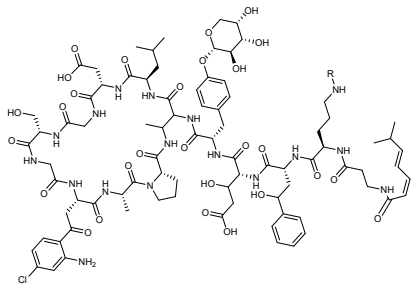
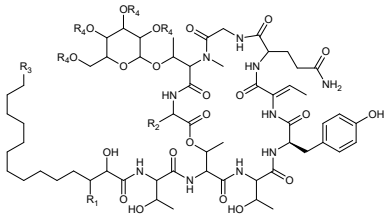
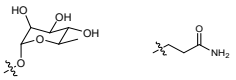
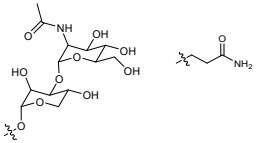
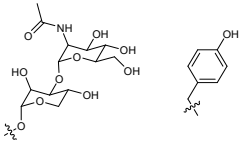
246	Malacidin A		**246** R=Me	heterologous expression in Streptomyces albus J1074 (cosmids DFD0097-644, DFD0097-735 and DFD0097-388)	soil sample (USA)	multidrug-resistant Gram-positive pathogens (0.1-2 μg/ml)	cell wall synthesis precursor lipid II	95
247	Malacidin B		**247** R=Et			N/A		
248	Cadaside A			heterologous expression in Streptomyces albus J1074（cosmids DFD0097-431, DFD0097-157, DFD0097-262）	soil sample (Australia)	*S. aureus* (1 μg/ml), *E. faecalis* (4 μg/ml)	cell wall synthesis	96
249	Cadaside B		**248** R=CH_3 **249** R=H					
250	Lysocin E			*Lysobacter* sp. RH2180-5	soil sample (Japan)	*S. aureus, S. simulans, S. haemolyticus, S. pseudintermedius, B. subtilis, B. cereus, L. monocytogene* (1-4 μg/ml)	menaquinone on the cell membrane	97
251	Lysocin I			*Lysobacter enzymogenes*	-	*M. smegmatis* (8 μg/ml), *S. aureus* (1-4 μg/ml), *S. epidermidis* (1 μg/ml)	-	98
252	Lysocin J		**250** R=  **251** R=  **252** R= 					

253	WAP-8294A1							*Lysobacter* WAP-8294	Soil sample (Shimoda City, Shizuoka Prefecture, Japan)	MRSA, *S. aureus, S. epidermidis, B. subtilis, E. faecium* (0.39-25 µg/ml)	menaquinone on the cell membrane	99
254	WAP-8294A2											
255	WAP-8294A4											
256	WAP-8294A8											
257	WAP-8294A9			R_1	R_2	R_3	R_4	R_5				
258	WAP-8294A13		**253**	OH	$(CH_2)_4CH_3$	CH_2	CH_3	CH_3				
			254	OH	$(CH_2)_3CH(CH_3)_2$	CH_2	CH_3	CH_3				
			255	OH	$(CH_2)_4CH(CH_3)_2$	CH_2	CH_3	CH_3				
			256	OH	$((CH_2)_3CH(CH_3)_2$	CH_2	CH_3	H				
			257	OH	$(CH_2)_3CH(CH_3)_2$	$(CH_2)_2$	H	CH_3				
			258	OH	$(CH_2)_3CH(CH_3)_2$	CH_2	CH_3	CH_3				
259	WBP-29479A1							*L. antibioticus* ATCC 29479	-	*S. aureus* (0.25-8 µg/ml)	-	100

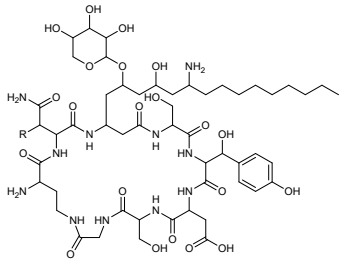
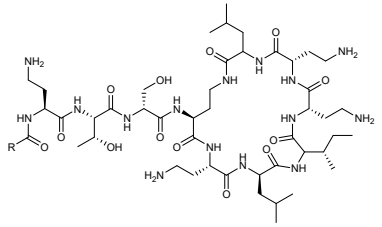
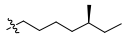
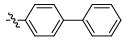
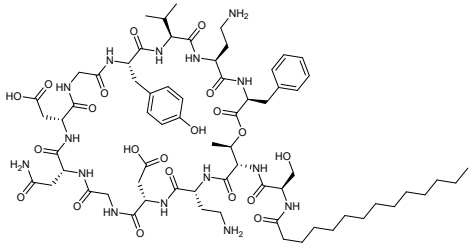
260	MBA1 wameb		synthetic bioinformatic natural products	-			
261	MBA2 lysomeb		synthetic bioinformatic natural products	-	Gram-positive bacteria (0.5-64 µg/ml)	menaquinone	101
262	MBA3 metameb		synthetic bioinformatic natural products	-			

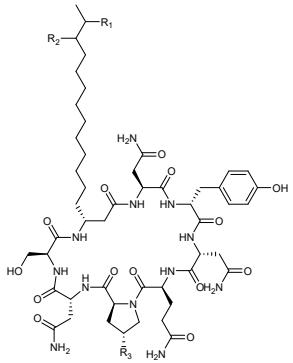
263	MBA4 alcameb		synthetic bioinformatic natural products	-
264	MBA5 tabameb		synthetic bioinformatic natural products	-
265	MBA6 mobimeb		synthetic bioinformatic natural products	-

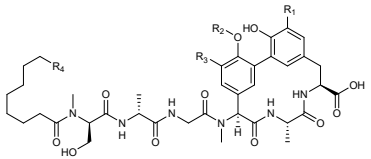
266	Burkholdine 1229	 **266** R_1=OH, R_2=β-A, R_3=  **267** R_1=OH, R_2=H, R_3=  **268** R_1=OH, R_2=α-A, R_3=  **269** R_1=H, R_2=β-A, R_3=  **270** R_1=OH, R_2=β-A, R_3= 	*Burkholderia ambifaria* 2.2N.	Soil sample (Pennsylvania State University, USA)	*P. infestans, A. solani, B. cinerea, M. figiensis, S. cerevisiae, A. niger, C. albicans* (0.4-12.5 µg/ml) *S. cerevisiae* (0.15-2 µg/ml), *A. niger* (0.15-2 µg/ml), *C. albicans* (0.5-64 µg/ml)	-	102-103
267	Burkholdine 1097						
268	Burkholdine 1119						
269	Burkholdine 1213						
270	Burkholdine 1215						
271	Occidiofungin A	 **271** R_1=H, R_2=H **272** R1=OH, R_2=H **273** R_1=H, R_2=Cl **274** R_1=OH, R2=Cl	*Burkholderia contaminans* MS14	soil sample	*R. solani, A. fumigatus, A. niger, M. gypseum, T. mentagrophytes, A. alternata, M. phaseolina, G. candidum, P. spinosum, P. ultimum* (1-8 µg/ml)	in the intracellular actin cable	104-105
272	Occidiofungin B						
273	Occidiofungin C						
274	Occidiofungin D						

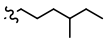
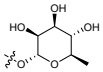
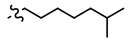
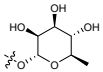
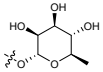
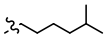
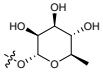
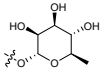
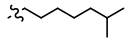
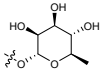
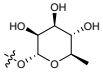
275	Gausemycin A	 **275** R=H **276** R=$COCH_2CH_2NH_2$	*Streptomyces* sp. INA-Ac-5812	-	*Staphylococcus* sp. (0.125-1 µg/ml)	-	106
276	Gausemycin B						
277	Hassallidin A		*Hassallia sp. B0207*	Sample from epilithic cyanobacterium (Orrido Clough, Bellano, Italy)	*A. fumigatus* (4.8 µg/ml), *C. albicans* (4.8 µg/ml), *C. neoformans* (8 µg/ml)	-	107-110
278	Hassallidin B						
279	Hassallidin C	**277**  **278**  **279**  **280** 	*Anabaena* sp. SYKE748A	-	N/A		
280	Hassallidin D				*C. albicans* (1.5 µm), *C. krusei* (1.5 µm)	cell membranes	
281	Hassallidin E		Planktothrix serta PCC 8927	-	*C. albicans* (23 µm)	-	

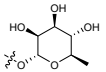
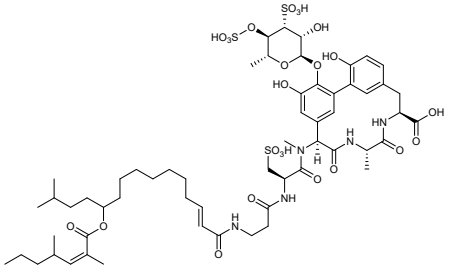
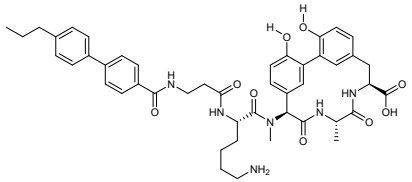
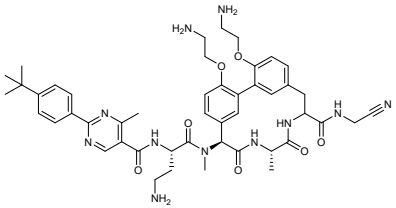
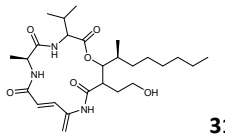
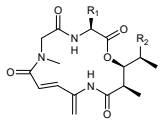
	R_1	R_2	R_3	R_4
277	OH		H	H
278			H	H
279				H or acetyl
280				H or acetyl

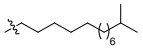
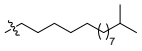
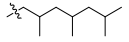
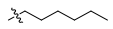
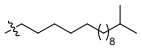
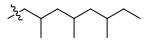
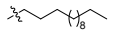
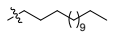
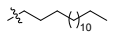
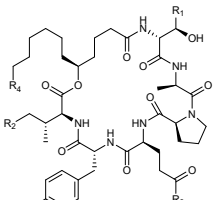
		281 OH  H					
282	Cepacidine A_1	 **282** R=OH **283** R=H	*Pseudomonas cepacia* AF 2001.	Soil sample (Munchon, Kyunggi-Do, Korea.)	*C. albicans*, *C. glabrata*, *C. neoformans*, *S. cerevisiae*, *A. niger*, *M. canis*, *T. rubrum* (0.049-0.391 µg/ml)	-	111
283	Cepacidine A_2						
284	Macolacin	 **284** R=  **285** R= 	synthetic bioinformatic natural products	-	Gram-negative bacteria (1-8 µg/ml), colistin-resistant pathogens (2-4 µg/ml)	lipid A	112
285	Biphenyl-macolacin		Semi-synthesis				
286	Cilagicin		*Paenibacillus mucilaginosus* KNP414 and K02	-	Gram-positive bacteria (0.125-2 µg/ml)	Undecaprenyl phosphate and Undecaprenyl pyrophosphate (C55-PP)	113

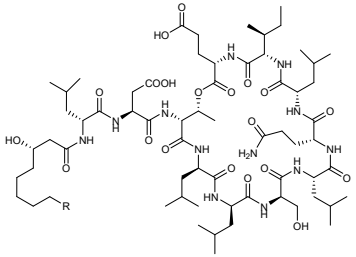
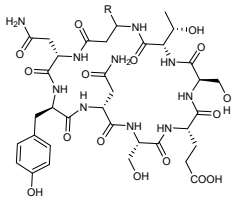
287	Iturin F1		**287** R_1=CH_3, R_2=H, R_3=OH **288** R_1=H, R_2=CH_3, R_3=OH **289** R_1=CH_3, R_2=H, R_3=H **290** R_1=H, R_2=CH_3, R_3=H	*Bacillus* sp. KCB14S006	saline water sample (Incheon, Korea)	*A. flavus, N. crassa, C. albicans, P. griseofulvum, C. tropicalis* (3.125-12.5 µg/ml)	-	114
288	Iturin F2							
289	Iturin A8							
290	Iturin A9							

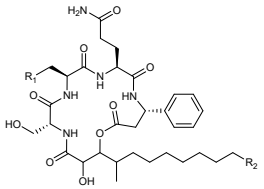
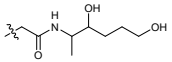
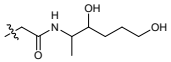
291	Arylomycin A1								
292	Arylomycin A2								
			R_1	R_2	R_3	R_4			
293	Arylomycin A3	**291**	H	H	H		*Streptomyces* sp. TÜ 6075	Soil sample (rain forest at Cape Coast, Ghana)	Gram-negative and gram-positive bacteria (0.25-16 µg/ml)	Signal Peptidase Type I (SPase I)	115
294	Arylomycin A4	**292**	H	H	H						
295	Arylomycin A5	**293**	H	H	H						
		294	H	H	H						
296	Arylomycin B1	**295**	H	H	H						
297	Arylomycin B2	**296**	NO_2	H	H						

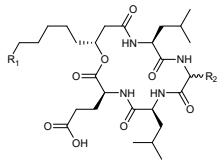
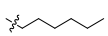
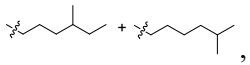
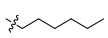
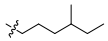
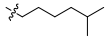
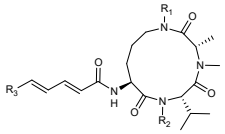
298	Arylomycin B3	**297**	NO_2	H	H				
299	Arylomycin B4	**298**	NO_2	H	H				
		299	NO_2	H	H				
300	Arylomycin B5	**300**	NO_2	H	H				
301	Arylomycin B6	**301**	NO_2	H	H				
302	Arylomycin B7	**302**	NO_2	H	H				
303	Arylomycin C1	**303**	H		OH				
304	Arylomycin C2	**304**	H		OH				
305	Arylomycin C3	**305**	H		H				
306	Arylomycin C4	**306**	H		OH		*Streptomyces* sp. PTA-3546	-	116
307	Arylomycin C5	**307**	H		H				
308	Arylomycin C6	**308**	H		H				
309	Arylomycin C7	**309**	H		H				

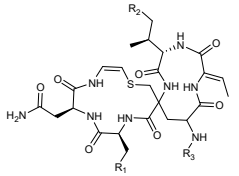
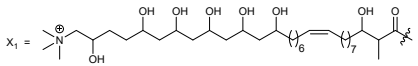
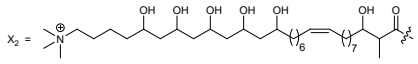
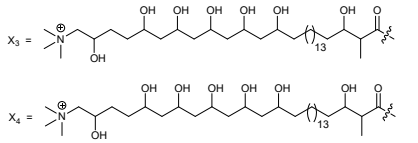
310	Arylomycin C8	**310**	H		OH				
311	Arylomycin D					*Actinoplanes ferrugineus MA738*	-		79
312	M131								
313	G0775					Total synthesis	-		117
314	Vinylamycin	 **314**				*Streptomyces* sp. MI982-63F1	Soil sample (Institute of Microbial Chemistry, Shinagawa-ku, Tokyo, Japan)	*S. aureus, M. luteus, B. subtilis, C. bovis* (1.56-12.5 µg/ml)	- 118

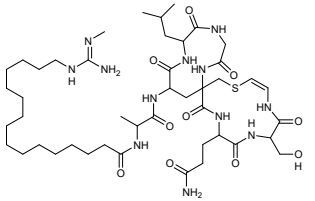
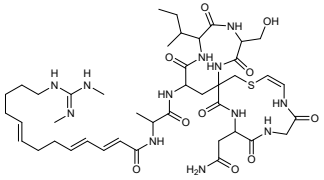
315	Rakicidin A	**315** R_1=  , R_2= 	*Micromonospor a* strain R385-2.	-	inactive		
316	Rakicidin B	**316** R_1=  , R_2= 					
317	Rakicidin C	**317** R_1=  , R_2= 	*Streptomyces* sp. (strain GT 61042)	-	*B. subtilis* (50 μg/disk), *E. coli*		
318	Rakicidin D	**318** R_1=  , R_2= 	*Streptomyces* sp. MWW064	Marine sediment sample	N/A	-	119-124
319	Rakicidin E	**319** R_1=  , R_2= 	*Micromonospora* sp. TP-A0860	-			
320	Rakicidin F	**320** R_1=  ,R_2= 	*Streptomyces* sp. GKU 220	marine sponge-derived sample	*B. subtilis, E. coli* (25 μg/disk)		
321	Rakicidin G	**321** R_1=  , R_2= 	*Micromonospor a chalcea* FIM 02-523	-	*C. difficile, P. anaerobius, P. gingivalis, P. acnes* (≦0.125-32 μg/ml)		
322	Rakicidin H	**322** R_1=  , R_2= 					
323	Rakicidin I	**323** R_1=  , R_2= 					
324	Simplicillium-tide J		*Micromonospora chalcea* FIM 02-523	-	*A. versicolor* (0.625 μg/disk), *C. australiensis* (0.156 μg/disk)	-	124-126
325	Simplicillium-tide K				inactive		

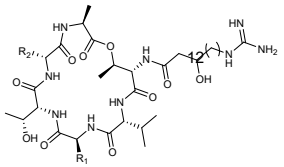
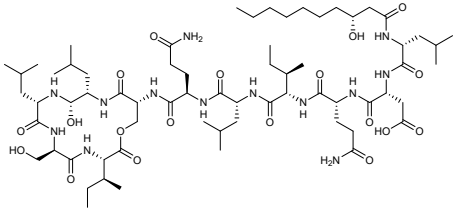
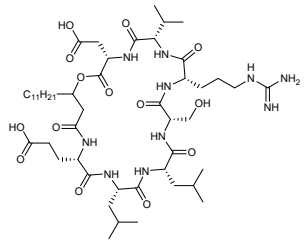
326	Simplicillium-tide L									
327	Simplicillium-tide N		R_1	R_2	R_3	R_4				
328	Simplicillium-tide O	**324**	CH_3	CH_3	NH_2				A. solani (1.562-6.250 µg/disk), C. asianum (0.195-3.125 µg/disk)	
		325	CH_3	H	NH_2					
329	Verlamelin A	**326**	CH_3	H	NH_2		*Lecanicillium* sp. HF627	-	*C. miyabeanus* (no MIC values), *A. solani* (no MIC values), *F. oxysporum* (2-4 µg/disk), *C. cucumerinum* (0.25-0.5 µg/disk), *U. maydis* (16->64 µg/disk)	127
330	Verlamelin B	**327**	CH_3	H	OH					
		328	CH_3	H	OCH_3					
		329	CH_3	H	NH_2					
		330	H	H	NH_2					
331	Stechlisin B2	 **331** R=H **332** R=  **333** R= 					*Pseudomonas* sp. FhG100052	Sample from lake (Brandenburg, Germany)	inactive	
332	Stechlisin F								*M. catarrhalis* (4µg/ml)	-
333	Tensin								*M. catarrhalis* (32 µg/ml)	
334	Bacillopeptin A	 **334** R= 					*Bacillus subtilis* FR-2	Sample from the the rhizosphere of garlic (Fukagawa city,	inactive	-

335	Bacillopeptin B	**335** R= 		Hokkaido, Japan)			
336	Bacillopeptin C	**336** R= 			*F. oxysporum*, *A. niger*, *A. oryzae*, *P. thomii, S. cerevisiae* (6.25-25 µg/ml)		
337	Alveolaride A				*P. oryzae* (2 µg/ml), *U. maydis* (0.4 µg/ml), *Z. tritici* (1 µg/ml)		
338	Alveolaride B	**337** R_1=  , R_2= 	*Microascus alveolaris* strain PF1466	Soil sample (Okinawa Prefecture, Japan)	inactive	-	131
339	Alveolaride C	**338** R_1=  , R_2= 					
		339 R_1=  , R_2= 					

340	Bacilotetrin A				Marine sediment sample (Gageocho reef, Republic of Korea)	MRSA (8-32 μg/ml)		
341	Bacilotetrin B	**340** R_1=  , R_2= 						
342	Bacilotetrin C	**341** R_1=  ,		*Bacillus subtilis* 109GGC020			-	132-133
343	Bacilotetrin D	R_2= 			marine sponge sample (Gageo reef, Republic of Korea)	*M. hyorhinis* (31 μg/ml)		
344	Bacilotetrin E	**342** R_1=  , R_2= 						
		343 R_1=  , R_2= 						
		344 R_1=  , R_2= 						
345	Sclerotiotide A				*Aspergillus sclerotiorum* PT06-1	Marine sample (Putian Sea Salt Field, Fujian, China)	*C. albicans* (3.8-30 μm)	-	134-135
346	Sclerotiotide B							
347	Sclerotiotide F		R_1	R_2	R_3			
348	Sclerotiotide M	**345**	H	H		*Aspergillus insulicola* HDN151418	a sample isolated from an unidentified sponge (Antarctic)	*B. cereus, P. species, E. tarda, V. parahemolyticus, B.*
		346	H	Me	Me			
349	Sclerotiotide N	**347**	H	Me	CHO			

350	Sclerotiotide O	**348**	H	Me				*subtilis* (1.56-25µm)	
		349	H	Me					
		350	Me	Me					
351	Goadvionin A1								
352	Goadvionin A2								
353	Goadvionin A3								
354	Goadvionin A4								
			R_1	R_2	R_3				
355	Goadvionin B1	**351**		H	X_1				
356	Goadvionin B2	**352**		H	X_2				
		353		H	X_3				
						Streptomyces sp. TP-A0584	-	inactive	- 136
								S. aureus (6.4 µg/ml), *B. subtilis* (3.2 µg/ml), *M. luteus* (3.2µg/ml)	

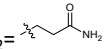
357	Goadvionin B3	**354**		H	X_4				
		355		CH_3	X_1			inactive	
358	Goadvionin B4	**356**		CH_3	X_2				
359	Goadpeptin A	**357**		CH_3	X_3				
		358		CH_3	X_4			N/A	
360	Goadpeptin B	**359**		H	H				
		360		CH_3	H				
361	Microvionin					*Microbacterium arborescens* 5913	-	MRSA (<0.46µg/ml), *S. pneumoniae* (<0.15 µg/ml)	- 137
362	Nocavionin					*Nocardia terpenica*	-	N/A	

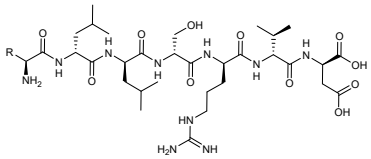
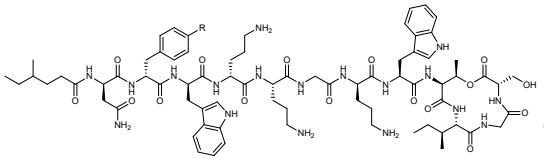
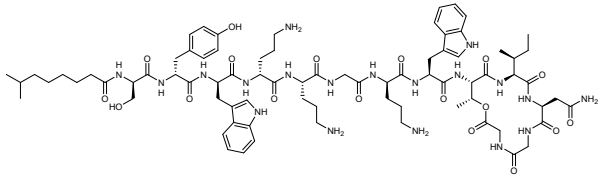
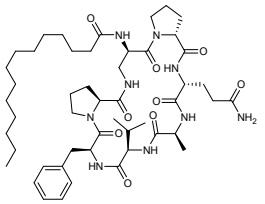
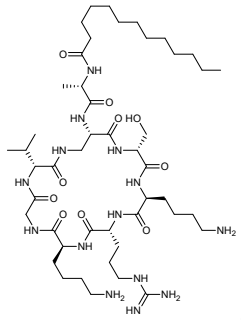
363	Fusaricidin A		*Bacillus polymyxa* KT-8	-	*S. aureus*, *M. luteus*, *B. subtilis*, *F. oxysporum*, *A. niger*, *A. oryzae*, *P. thomii* (<0.78-3.12 μg/ml)	σ (W)-regulated proteins	138-139
364	Fusaricidin B						
365	Fusaricidin C						
366	Fusaricidin D						
367	Gacamide A		*Pseudomonas fluorescens* Pf0-1	Genome Mining and Repair of the Defective GacA Regulator	*A. crystallopoietes* (32 μg/ml)	-	140
368	Bacaucin		*Bacillus subtilis* CAU21	-	MRSA (4μg/ml), VRE (16 μg/ml)	-	141-142

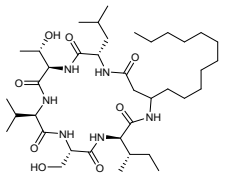
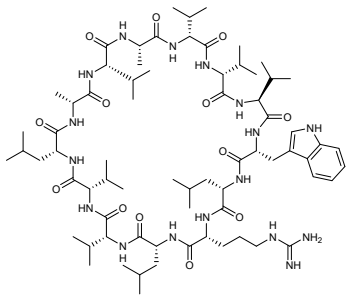
363 R_1=  , R_2= 

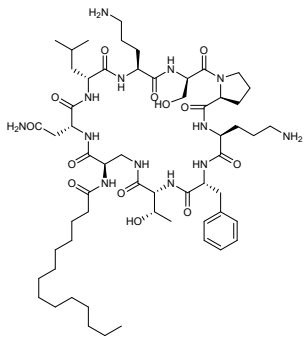
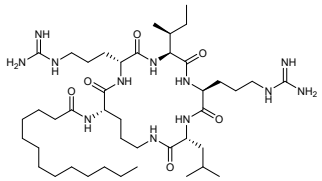
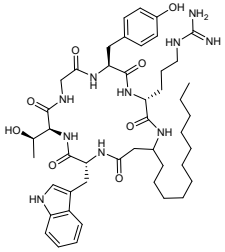
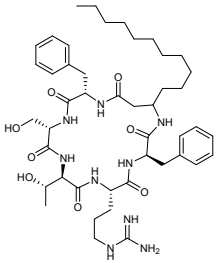
364 R_1=  , R_2= 

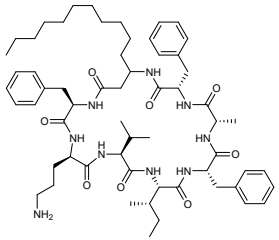
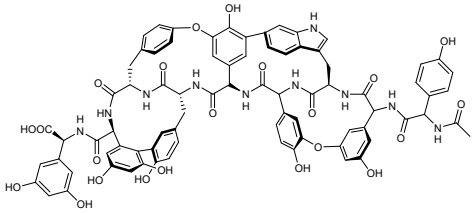
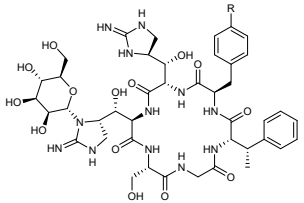
365 R_1=  , R_2= 

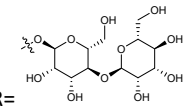
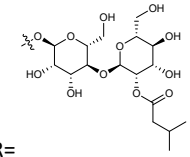
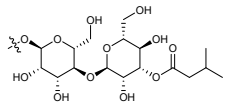
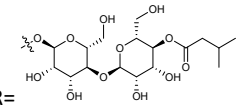
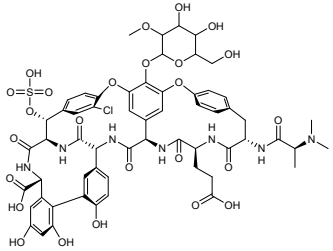
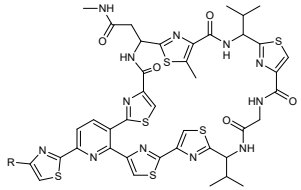
366 R_1=  , R_2= 

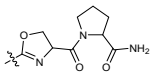
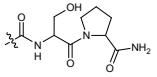
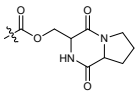
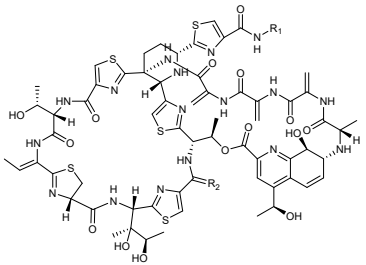
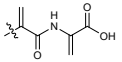
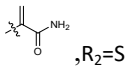
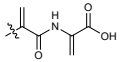
369	Bacaucin-1		Semi-synthesis	-	*S. aureus* (4 µg/ml)	cell membranes	
370	Bacaucin-1a	**369** R=  **370** R=CH_3			MRSA (2 µg/ml)	GMP synthase RNA polymerase	
371	Brevicidine		*Brevibacillus laterosporus* DSM 25	-	*E. coli*, *P. aeruginosa*, *A. baumannii*, *K. pneumoniae*, and *E. cloacae* (1-16 µg/ml)	LPS	143-144
372	Laterocidine	**371** R=OH **372** R=H	*Brevibacillus laterosporus* ATCC9141				
373	Brevicidine B		*Brevibacillus laterosporus* DSM 25			cell membrane, proton motive force of Gram-Negative Bacteria	
374	SyCPA 2	 **374**  **375**	synthetic-bioinformatic natural product	found in the genomes of eight species	Gram-positive bacteria, *A. baumannii, E. cloacae* (4-64 µg/ml)	-	145

375	SyCPA 4				The meso-diaminopimelic acid moiety
376	SyCPA 116	 **376**			protein hydrolase ClpP
377	SyCPA 153	 **377**	synthetic-bioinformatic natural product	found in the genomes of eight species	-

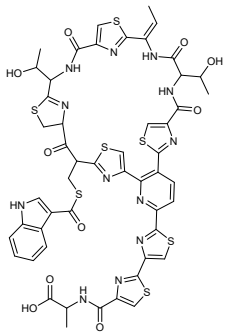
378	SyCPA 12	 **378**				cell membranes as cationic peptides
379	SyCPA 63	 **379**			Gram-positive bacteria, Gram-negative bacteria (2-64 μg/ml)	cell membrane
380	SyCPA 102	 **380**	synthetic-bioinformatic natural product	found in the genomes of eight species		cell membranes as cationic peptides
381	SyCPA 123	 **381**				

382	SyCPA 144	 **382**				-	
5. Other small-molecular antimicrobial peptides							
383	Corbomycin		*Streptomyces* sp. WAC01529	Alberta, Canada	Gram-positive bacteria (0.5-4 μg/ml)	peptidoglycan metabolism	146
384	Mannopepti-mycin α		*Streptomyces hygroscopicus* LL-AC98	-	inactive	lipid II	147
385	Mannopepti-mycin β				*S. aureus*, *S. hemolyticus*, *B. subtilis*, *M. luteus* (1-64 μg/ml)		

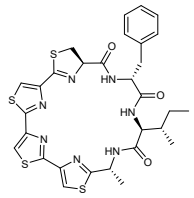
386	Mannopeptimycin γ	**384** R=  **385** R=OH  **387** R=  **386** R=  **388** R=				
387	Mannopeptimycin δ					
388	Mannopeptimycin ε					
389	Pekiskomycin		*Actinomycetes*, coded WAC1420 and WAC4229	-	VRE (no MIC value)	-	148
390	Amythiamicin A		*Amycolatopsis* sp. MI481-42F4	Soil sample (Nerimaku, Tokyo, Japan)	*S. aureus*, MRSA, *M. luteus*, *B. anthracis*, *B. subtilis*, *B. cereus*, *C. bovis* (0.32-5.12 µm)	bacterial elongation factor Tu (EF-Tu)	149
391	Amythiamicin B						

392	Amythiamicin C	**390** R=  **391** R=  **392** R= 					
393	Amythiamicin D	**393** R= 					
394	Saalfelduracin A	 **394** R_1=  ,R_2=S **395** R_1=H, R_2=S **396** R_1=  ,R_2=S **397** R_1=  ,R_2=O	*mycolatopsis saalfeldensis* NRRL B-24474	-	*S. aureus* (0.25 µg/ml), *E. faecium* (0.12 µg/ml), *B. anthracis* (0.25 µg/ml) N/A	-	150-151
395	Saalfelduracin B						
396	Saalfelduracin C						
397	Saalfelduracin D						

398	Lactocillin	*Lactobacillus gasseri* JV-V03	human urinary system	*S. aureus*, *E. faecalis*, *C. aurimucosum*, *G. vaginalis*, *S. sanguinis*, *S. sobrinus* and *S. mutans* (42-425 nM)	-	152
399	Marthiapeptide A	*Marinactinospora thermotolerans* SCSIO 00652	Marine sediment (South China Sea)	*M. luteus*, *S. aureus*, *B. subtilis*, *B. thuringiensis* (2.0-8.0 μg/ml)	-	153

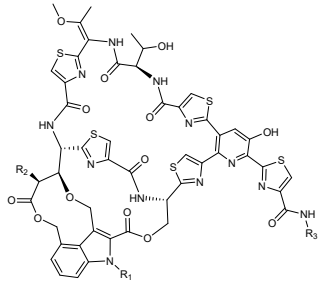


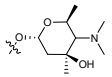
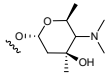
398

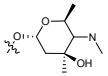
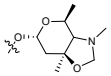


399

400	Nocathiacin I	*Nocardia* sp. WW-12651	Soil sample (New Mexico, USA)	*S. pneumoniae, E. faecalis, E. faecium, S. aureus, S. epidermidis, S. haemolyticus, M. catarrhalis* (0.01-0.25μg/ml)	-	154
401	Nocathiacin II					
402	Nocathiacin III					
403	Nocathiacin IV					



	R_1	R_2	R_3
400	OH		
401	H		

404	Thiazomycin	**402**	OH	OH		*Amycolatopsis fastidiosa* MA7332	-	*Gram-positive bacteria* (no MIC values)	155
		403	OH		H				
		404	OH						

Reference

1. G. Wu, B. T. M. Dentinger, J. R. Nielson, R. T. Peterson and J. M. Winter, *J Nat Prod*, 2021, **84**, 1113-1126.
2. L. Pantel, T. Florin, M. Dobosz-Bartoszek, E. Racine, M. Sarciaux, M. Serri, J. Houard, J. M. Campagne, R. M. de Figueiredo, C. Midrier, S. Gaudriault, A. Givaudan, A. Lanois, S. Forst, A. Aumelas, C. Cotteaux-Lautard, J. M. Bolla, C. Vingsbo Lundberg, D. L. Huseby, D. Hughes, P. Villain-Guillot, A. S. Mankin, Y. S. Polikanov and M. Gualtieri, *Mol Cell*, 2018, **70**, 83-94 e87.
3. E. Loza, M. Sarciaux, M. Ikaunieks, M. Katkevics, T. Kukosha, N. Trufilkina, V. Ryabova, K. Shubin, L. Pantel, M. Serri, D. L. Huseby, S. Cao, K. Yadav, K. Hjort, D. Hughes, M. Gualtieri, E. Suna and E. Racine, *Bioorg Med Chem*, 2020, **28**, 115469.
4. M. Sarciaux, L. Pantel, C. Midrier, M. Serri, C. Gerber, R. Marcia de Figueiredo, J.-M. Campagne, P. Villain-Guillot, M. Gualtieri and E. Racine, *Journal of Medicinal Chemistry*, 2018, **61**, 7814-7826.
5. C. L. Dieterich, S. I. Probst, R. Ueoka, I. Sandu, D. Schafle, M. D. Molin, H. A. Minas, R. Costa, A. Oxenius, P. Sander and J. Piel, *Angew Chem Int Ed Engl*, 2022, **61**, e202115802.
6. C. T. Lohans, M. J. van Belkum, S. A. Cochrane, Z. Huang, C. S. Sit, L. M. McMullen and J. C. Vederas, *Chembiochem*, 2014, **15**, 243-249.
7. S. A. Cochrane, B. Findlay, A. Bakhtiary, J. Z. Acedo, E. M. Rodriguez-Lopez, P. Mercier and J. C. Vederas, *Proc Natl Acad Sci U S A*, 2016, **113**, 11561-11566.
8. S. A. Cochrane, C. T. Lohans, M. J. van Belkum, M. A. Bels and J. C. Vederas, *Org Biomol Chem*, 2015, **13**, 6073-6081.
9. S. A. Cochrane, B. Findlay, J. C. Vederas and E. S. Ratemi, *Chembiochem*, 2014, **15**, 1295-1299.
10. X. Vila-Farres, J. Chu, D. Inoyama, M. A. Ternei, C. Lemetre, L. J. Cohen, W. Cho, B. V. Reddy, H. A. Zebroski, J. S. Freundlich, D. S. Perlin and S. F. Brady, *J Am Chem Soc*, 2017, **139**, 1404-1407.
11. J. Chu, X. Vila-Farres, D. Inoyama, M. Ternei, L. J. Cohen, E. A. Gordon, B. V. Reddy, Z. Charlop-Powers, H. A. Zebroski, R. Gallardo-Macias, M. Jaskowski, S. Satish, S. Park, D. S. Perlin, J. S. Freundlich and S. F. Brady, *Nat Chem Biol*, 2016, **12**, 1004-1006.
12. L. A. McDonald, L. R. Barbieri, G. T. Carter, E. Lenoy, J. Lotvin, P. J. Petersen, M. M. Siegel, G. Singh and R. T. Williamson, *J Am Chem Soc*, 2002, **124**, 10260-10261.
13. S. Chatterjee, S. R. Nadkarni, E. K. Vijayakumar, M. V. Patel, B. N. Ganguli, H. W. Fehlhaber and L. Vertesy, *J Antibiot (Tokyo)*, 1994, **47**, 595-598.

14. Y. Xie, R. Chen, S. Si, C. Sun and H. Xu, *J Antibiot (Tokyo)*, 2007, **60**, 158-161.
15. Y. Xie, H. Xu, S. Si, C. Sun and R. Chen, *J Antibiot (Tokyo)*, 2008, **61**, 237-240.
16. Y.-y. Xie, H.-z. Xu, Y. Yu and R.-x. Chen, *Zhongguo Kangshengsu Zazhi*, 2009, **34**, 12.
17. Y. Y. Xie, H. Z. Xu, Y. Yu and R. X. J. C. J. o. A. Chen, 2009, **34**, 326-328.
18. Y. Xie, H. Xu, C. Sun, Y. Yu and R. Chen, *J Antibiot (Tokyo)*, 2010, **63**, 143-146.
19. Y. Xie, Q. Cai, H. Ren, L. Wang, H. Xu, B. Hong, L. Wu and R. Chen, *J Nat Prod*, 2014, **77**, 1744-1748.
20. A. T. Tran, E. E. Watson, V. Pujari, T. Conroy, L. J. Dowman, A. M. Giltrap, A. Pang, W. R. Wong, R. G. Linington, S. Mahapatra, J. Saunders, S. A. Charman, N. P. West, T. D. Bugg, J. Tod, C. G. Dowson, D. I. Roper, D. C. Crick, W. J. Britton and R. J. Payne, *Nat Commun*, 2017, **8**, 14414.
21. C. M. Kayrouz, Y. Zhang, T. M. Pham and K. S. Ju, *ACS Chem Biol*, 2020, **15**, 1921-1929.
22. K. S. Ju, J. Gao, J. R. Doroghazi, K. K. Wang, C. J. Thibodeaux, S. Li, E. Metzger, J. Fudala, J. Su, J. K. Zhang, J. Lee, J. P. Cioni, B. S. Evans, R. Hirota, D. P. Labeda, W. A. van der Donk and W. W. Metcalf, *Proc Natl Acad Sci U S A*, 2015, **112**, 12175-12180.
23. M. Metelev, I. A. Osterman, D. Ghilarov, N. F. Khabibullina, A. Yakimov, K. Shabalin, I. Utkina, D. Y. Travin, E. S. Komarova, M. Serebryakova, T. Artamonova, M. Khodorkovskii, A. L. Konevega, P. V. Sergiev, K. Severinov and Y. S. Polikanov, *Nat Chem Biol*, 2017, **13**, 1129-1136.
24. J. Ma, H. Huang, Y. Xie, Z. Liu, J. Zhao, C. Zhang, Y. Jia, Y. Zhang, H. Zhang, T. Zhang and J. Ju, *Nat Commun*, 2017, **8**, 391.
25. C. Sun, Z. Liu, X. Zhu, Z. Fan, X. Huang, Q. Wu, X. Zheng, X. Qin, T. Zhang, H. Zhang, J. Ju and J. Ma, *J Nat Prod*, 2020, **83**, 1646-1657.
26. B. Zhou, G. Shetye, Y. Yu, B. D. Santarsiero, L. L. Klein, C. Abad-Zapatero, N. M. Wolf, J. Cheng, Y. Jin, H. Lee, J. W. Suh, H. Lee, J. Bisson, J. B. McAlpine, S. N. Chen, S. H. Cho, S. G. Franzblau and G. F. Pauli, *J Nat Prod*, 2020, **83**, 657-667.
27. B. Zhou, P. S. Achanta, G. Shetye, S. N. Chen, H. Lee, Y. Y. Jin, J. Cheng, M. J. Lee, J. W. Suh, S. Cho, S. G. Franzblau, G. F. Pauli and J. B. McAlpine, *J Nat Prod*, 2021, **84**, 2644-2663.
28. L. Li, L. W. MacIntyre, T. Ali, R. Russo, B. Koirala, Y. Hernandez and S. F. Brady, *J Nat Prod*, 2021, **84**, 1056-1066.
29. E. Gavrish, C. S. Sit, S. Cao, O. Kandror, A. Spoering, A. Peoples, L. Ling, A. Fetterman, D. Hughes, A. Bissell, H. Torrey, T. Akopian, A. Mueller, S. Epstein, A. Goldberg, J. Clardy and K. Lewis, *Chem Biol*, 2014, **21**, 509-518.
30. X. M. Hou, T. M. Liang, Z. Y. Guo, C. Y. Wang and C. L. Shao, *Chem Commun (Camb)*, 2019, **55**, 1104-1107.
31. R. Chao, X. M. Hou, W. F. Xu, Y. Hai, M. Y. Wei, C. Y. Wang, Y. C. Gu and C. L. Shao, *J Nat Prod*, 2021, **84**, 11-19.
32. Y. Imai, K. J. Meyer, A. Iinishi, Q. Favre-Godal, R. Green, S. Manuse, M. Caboni, M. Mori, S. Niles, M. Ghiglieri, C. Honrao, X. Ma, J. J. Guo, A. Makriyannis, L. Linares-Otoya, N. Bohringer, Z. G. Wuisan, H. Kaur, R. Wu, A. Mateus, A. Typas, M. M. Savitski, J. L. Espinoza, A. O'Rourke, K. E. Nelson, S. Hiller, N. Noinaj, T. F. Schaberle, A. D'Onofrio and K. Lewis, *Nature*, 2019, **576**, 459-464.

33. N. Bohringer, R. Green, Y. Liu, U. Mettal, M. Marner, S. M. Modaresi, R. P. Jakob, Z. G. Wuisan, T. Maier, A. Iinishi, S. Hiller, K. Lewis and T. F. Schaberle, *Microbiol Spectr*, 2021, **9**, e0153521.
34. S. Gross, F. Panter, D. Pogorevc, C. E. Seyfert, S. Deckarm, C. D. Bader, J. Herrmann and R. Muller, *Chem Sci*, 2021, **12**, 11882-11893.
35. C. E. Seyfert, C. Porten, B. Yuan, S. Deckarm, F. Panter, C. D. Bader, J. Coetzee, F. Deschner, K. Tehrani, P. G. Higgins, H. Seifert, T. C. Marlovits, J. Herrmann and R. Muller, *Angew Chem Int Ed Engl*, 2023, **62**, e202214094.
36. R. D. Miller, A. Iinishi, S. M. Modaresi, B. K. Yoo, T. D. Curtis, P. J. Lariviere, L. Liang, S. Son, S. Nicolau, R. Bargabos, M. Morrissette, M. F. Gates, N. Pitt, R. P. Jakob, P. Rath, T. Maier, A. G. Malyutin, J. T. Kaiser, S. Niles, B. Karavas, M. Ghiglieri, S. E. J. Bowman, D. C. Rees, S. Hiller and K. Lewis, *Nat Microbiol*, 2022, **7**, 1661-1672.
37. A. Zipperer, M. C. Konnerth, C. Laux, A. Berscheid, D. Janek, C. Weidenmaier, M. Burian, N. A. Schilling, C. Slavetinsky, M. Marschal, M. Willmann, H. Kalbacher, B. Schittek, H. Brotz-Oesterhelt, S. Grond, A. Peschel and B. Krismer, *Nature*, 2016, **535**, 511-516.
38. Y. H. Shin, S. Bae, J. Sim, J. Hur, S. I. Jo, J. Shin, Y. G. Suh, K. B. Oh and D. C. Oh, *J Nat Prod*, 2017, **80**, 2962-2968.
39. S. Son, Y. S. Hong, M. Jang, K. T. Heo, B. Lee, J. P. Jang, J. W. Kim, I. J. Ryoo, W. G. Kim, S. K. Ko, B. Y. Kim, J. H. Jang and J. S. Ahn, *J Nat Prod*, 2017, **80**, 3025-3031.
40. C. M. Mudalungu, W. J. von Törne, K. Voigt, C. Rückert, S. Schmitz, O. N. Sekurova, S. B. Zotchev and R. D. Süssmuth, *Journal of Natural Products*, 2019, **82**, 1478-1486.
41. I. Kaweewan, H. Komaki, H. Hemmi and S. Kodani, *Asian Journal of Organic Chemistry*, 2017, **6**, 1838-1844.
42. J. P. Jang, G. J. Hwang, M. C. Kwon, I. J. Ryoo, M. Jang, S. Takahashi, S. K. Ko, H. Osada, J. H. Jang and J. S. Ahn, *J Nat Prod*, 2018, **81**, 806-810.
43. D. Carretero-Molina, F. J. Ortiz-Lopez, J. Martin, I. Gonzalez, M. Sanchez-Hidalgo, F. Roman-Hurtado, C. Diaz, M. de la Cruz, O. Genilloud and F. Reyes, *J Nat Prod*, 2021, **84**, 1127-1134.
44. I. Kaweewan, H. Hemmi, H. Komaki and S. Kodani, *J Antibiot (Tokyo)*, 2020, **73**, 224-229.
45. S. Hwang, L. Le, S. I. Jo, J. Shin, M. J. Lee and D. C. Oh, *Microorganisms*, 2020, **8**.
46. M. Igarashi, R. Sawa, N. Kinoshita, H. Hashizume, N. Nakagawa, Y. Homma, Y. Nishimura and Y. Akamatsu, *J Antibiot (Tokyo)*, 2008, **61**, 387-393.
47. H. Hashizume, R. Sawa, K. Yamashita, Y. Nishimura and M. Igarashi, *J Antibiot (Tokyo)*, 2017, **70**, 699-704.
48. D. I. Ekanayake, B. Perlatti, D. C. Swenson, K. Poldmaa, G. F. Bills and J. B. Gloer, *J Nat Prod*, 2021, **84**, 2028-2034.
49. R. Teta, V. T. Marteinsson, A. Longeon, A. M. Klonowski, R. Groben, M. L. Bourguet-Kondracki, V. Costantino and A. Mangoni, *J Nat Prod*, 2017, **80**, 2530-2535.
50. L. Zhao, R. M. Awori, M. Kaiser, J. Gross, T. Opatz and H. B. Bode, *J Nat Prod*, 2019, **82**, 3499-3503.
51. Y. M. Ma, X. A. Liang, H. C. Zhang and R. Liu, *J Agric Food Chem*, 2016, **64**, 3789-3793.
52. S. Miao, M. R. Anstee, K. LaMarco, J. Matthew, L. H. T. Huang and M. M. Brasseur, *Journal of Natural Products*, 1997, **60**, 858-861.
53. Y. Song, Q. Li, X. Liu, Y. Chen, Y. Zhang, A. Sun, W. Zhang, J. Zhang and J. Ju, *J Nat Prod*, 2014, **77**, 1937-1941.
54. Z. G. Khalil, A. A. Salim, E. Lacey, A. Blumenthal and R. J. Capon, *Org Lett*, 2014, **16**, 5120-5123.

55. K. Takada, A. Ninomiya, M. Naruse, Y. Sun, M. Miyazaki, Y. Nogi, S. Okada and S. Matsunaga, *J Org Chem*, 2013, **78**, 6746-6750.
56. F. Xu, B. Nazari, K. Moon, L. B. Bushin and M. R. Seyedsayamdost, *J Am Chem Soc*, 2017, **139**, 9203-9212.
57. A. Ibrahim, J. B. Tanney, F. Fei, K. A. Seifert, G. C. Cutler, A. Capretta, J. D. Miller and M. W. Sumarah, *Sci Rep*, 2020, **10**, 4599.
58. J. Zheng, H. Zhu, K. Hong, Y. Wang, P. Liu, X. Wang, X. Peng and W. Zhu, *Org Lett*, 2009, **11**, 5262-5265.
59. Q. Liu, Z. Liu, C. Sun, M. Shao, J. Ma, X. Wei, T. Zhang, W. Li and J. Ju, *Org Lett*, 2019, **21**, 2634-2638.
60. C. Sun, Z. Yang, C. Zhang, Z. Liu, J. He, Q. Liu, T. Zhang, J. Ju and J. Ma, *Org Lett*, 2019, **21**, 1453-1457.
61. Z. Yang, C. Sun, Z. Liu, Q. Liu, T. Zhang, J. Ju and J. Ma, *J Nat Prod*, 2020, **83**, 1666-1673.
62. S. Um, S. H. Park, J. Kim, H. J. Park, K. Ko, H. S. Bang, S. K. Lee, J. Shin and D. C. Oh, *Org Lett*, 2015, **17**, 1272-1275.
63. Y. H. Shin, Y. H. Ban, T. H. Kim, E. S. Bae, J. Shin, S. K. Lee, J. Jang, Y. J. Yoon and D. C. Oh, *J Nat Prod*, 2021, **84**, 239-246.
64. S. Toki, T. Agatsuma, K. Ochiai, Y. Saitoh, K. Ando, S. Nakanishi, N. A. Lokker, N. A. Giese and Y. Matsuda, *The Journal of Antibiotics*, 2001, **54**, 405-414.
65. J. Bracegirdle, P. Hou, V. V. Nowak, D. F. Ackerley, R. A. Keyzers and J. G. Owen, *J Nat Prod*, 2021, **84**, 2536-2543.
66. G. Navarro, A. T. Cheng, K. C. Peach, W. M. Bray, V. S. Bernan, F. H. Yildiz and R. G. Linington, *Antimicrob Agents Chemother*, 2014, **58**, 1092-1099.
67. S. Pohle, C. Appelt, M. Roux, H. P. Fiedler and R. D. Sussmuth, *J Am Chem Soc*, 2011, **133**, 6194-6205.
68. M. R. U. Karim, Y. In, T. Zhou, E. Harunari, N. Oku and Y. Igarashi, *Org Lett*, 2021, **23**, 2109-2113.
69. J. S. An, M. S. Kim, J. Han, S. C. Jang, J. H. Im, J. Cui, Y. Lee, S. J. Nam, J. Shin, S. K. Lee, Y. J. Yoon and D. C. Oh, *J Nat Prod*, 2022, **85**, 804-814.
70. C. Zhang and M. R. Seyedsayamdost, *Angew Chem Int Ed Engl*, 2020, **59**, 23005-23009.
71. D. Dardic, G. Lauro, G. Bifulco, P. Laboudie, P. Sakhaii, A. Bauer, A. Vilcinskas, P. E. Hammann and A. Plaza, *J Org Chem*, 2017, **82**, 6032-6043.
72. C. Menegatti, V. B. Lourenzon, D. Rodriguez-Hernandez, W. G. da Paixao Melo, L. L. G. Ferreira, A. D. Andricopulo, F. S. do Nascimento and M. T. Pupo, *J Nat Prod*, 2020, **83**, 610-616.
73. D.-C. Oh, M. Poulsen, C. R. Currie and J. Clardy, *Nature Chemical Biology*, 2009, **5**, 391-393.
74. T. P. Wyche, A. C. Ruzzini, C. Beemelmanns, K. H. Kim, J. L. Klassen, S. Cao, M. Poulsen, T. S. Bugni, C. R. Currie and J. Clardy, *Org Lett*, 2017, **19**, 1772-1775.
75. D. Shin, W. S. Byun, K. Moon, Y. Kwon, M. Bae, S. Um, S. K. Lee and D. C. Oh, *Front Chem*, 2018, **6**, 498.
76. M. Bae, E. Mevers, G. Pishchany, S. G. Whaley, C. O. Rock, D. R. Andes, C. R. Currie, M. T. Pupo and J. Clardy, *Org Lett*, 2021, **23**, 1648-1652.
77. X. Zhou, H. Huang, J. Li, Y. Song, R. Jiang, J. Liu, S. Zhang, Y. Hua and J. Ju, *Tetrahedron*, 2014, **70**, 7795-7801.
78. U. Grafe, R. Schlegel, M. Ritzau, W. Ihn, K. Dornberger, C. Stengel, W. F. Fleck, W. Gutsche, A. Hartl and E. F. Paulus, *J Antibiot (Tokyo)*, 1995, **48**, 119-125.
79. A. G. Therien, J. L. Huber, K. E. Wilson, P. Beaulieu, A. Caron, D. Claveau, K. Deschamps, R. G. Donald, A. M. Galgoci, M. Gallant, X. Gu, N. J. Kevin, J. Lafleur, P. S. Leavitt, C. Lebeau-Jacob, S. S. Lee, M. M. Lin, A. A. Michels, A. M. Ogawa, R. E. Painter, C. A. Parish, Y. W. Park, L. Benton-Perdomo, M. Petcu, J. W. Phillips, M. A. Powles, K. I. Skorey, J. Tam, C. M. Tan, K. Young,

S. Wong, S. T. Waddell and L. Miesel, *Antimicrob Agents Chemother*, 2012, **56**, 4662-4670.

80. M. Perez-Bonilla, D. Oves-Costales, I. Gonzalez, M. de la Cruz, J. Martin, F. Vicente, O. Genilloud and F. Reyes, *J Nat Prod*, 2020, **83**, 2597-2606.
81. S. Um, T. J. Choi, H. Kim, B. Y. Kim, S. H. Kim, S. K. Lee, K. B. Oh, J. Shin and D. C. Oh, *J Org Chem*, 2013, **78**, 12321-12329.
82. W. Gao, J. Y. Kim, S. N. Chen, S. H. Cho, J. Choi, B. U. Jaki, Y. Y. Jin, D. C. Lankin, J. E. Lee, S. Y. Lee, J. B. McAlpine, J. G. Napolitano, S. G. Franzblau, J. W. Suh and G. F. Pauli, *Org Lett*, 2014, **16**, 6044-6047.
83. L. L. Ling, T. Schneider, A. J. Peoples, A. L. Spoering, I. Engels, B. P. Conlon, A. Mueller, T. F. Schaberle, D. E. Hughes, S. Epstein, M. Jones, L. Lazarides, V. A. Steadman, D. R. Cohen, C. R. Felix, K. A. Fetterman, W. P. Millett, A. G. Nitti, A. M. Zullo, C. Chen and K. Lewis, *Nature*, 2015, **517**, 455-459.
84. D. A. Wirtz, K. C. Ludwig, M. Arts, C. E. Marx, S. Krannich, P. Barac, S. Kehraus, M. Josten, B. Henrichfreise, A. Muller, G. M. Konig, A. J. Peoples, A. Nitti, A. L. Spoering, L. L. Ling, K. Lewis, M. Crusemann and T. Schneider, *Angew Chem Int Ed Engl*, 2021, **60**, 13579-13586.
85. K. Kaida, R. Fudou, T. Kameyama, K. Tubaki, Y. Suzuki, M. Ojika and Y. Sakagami, *J Antibiot (Tokyo)*, 2001, **54**, 17-21.
86. T. W. Soe, C. Han, R. Fudou, K. Kaida, Y. Sawaki, T. Tomura and M. Ojika, *J Nat Prod*, 2019, **82**, 1971-1978.
87. S. Son, S. K. Ko, M. Jang, J. K. Lee, I. J. Ryoo, J. S. Lee, K. H. Lee, N. K. Soung, H. Oh, Y. S. Hong, B. Y. Kim, J. H. Jang and J. S. Ahn, *Org Lett*, 2015, **17**, 4046-4049.
88. S. Son, M. Jang, B. Lee, J. P. Jang, Y. S. Hong, B. Y. Kim, S. K. Ko, J. H. Jang and J. S. Ahn, *J Antibiot (Tokyo)*, 2021, **74**, 181-189.
89. S. Wei, W. Zhang and Z. Ji, *Molecules*, 2015, **20**, 16278-16289.
90. Y. Imai, G. Hauk, J. Quigley, L. Liang, S. Son, M. Ghiglieri, M. F. Gates, M. Morrissette, N. Shahsavari, S. Niles, D. Baldisseri, C. Honrao, X. Ma, J. J. Guo, J. M. Berger and K. Lewis, *Nat Chem Biol*, 2022, **18**, 1236-1244.
91. F. Kong and G. T. Carter, *J Antibiot (Tokyo)*, 2003, **56**, 557-564.
92. L. Vertesy, E. Ehlers, H. Kogler, M. Kurz, J. Meiwes, G. Seibert, M. Vogel and P. Hammann, *J Antibiot (Tokyo)*, 2000, **53**, 816-827.
93. K. Yamanaka, K. A. Reynolds, R. D. Kersten, K. S. Ryan, D. J. Gonzalez, V. Nizet, P. C. Dorrestein and B. S. Moore, *Proc Natl Acad Sci U S A*, 2014, **111**, 1957-1962.
94. K. A. Reynolds, H. Luhavaya, J. Li, S. Dahesh, V. Nizet, K. Yamanaka and B. S. Moore, *J Antibiot (Tokyo)*, 2018, **71**, 333-338.
95. B. M. Hover, S. H. Kim, M. Katz, Z. Charlop-Powers, J. G. Owen, M. A. Ternei, J. Maniko, A. B. Estrela, H. Molina, S. Park, D. S. Perlin and S. F. Brady, *Nat Microbiol*, 2018, **3**, 415-422.
96. C. Wu, Z. Shang, C. Lemetre, M. A. Ternei and S. F. Brady, *J Am Chem Soc*, 2019, **141**, 3910-3919.
97. H. Hamamoto, M. Urai, K. Ishii, J. Yasukawa, A. Paudel, M. Murai, T. Kaji, T. Kuranaga, K. Hamase, T. Katsu, J. Su, T. Adachi, R. Uchida, H. Tomoda, M. Yamada, M. Souma, H. Kurihara, M. Inoue and K. Sekimizu, *Nat Chem Biol*, 2015, **11**, 127-133.
98. M. Santiago, W. Lee, A. A. Fayad, K. A. Coe, M. Rajagopal, T. Do, F. Hennessen, V. Srisuknimit, R. Muller, T. C. Meredith and S. Walker, *Nat Chem Biol*, 2018, **14**, 601-608.
99. A. Kato, S. Nakaya, N. Kokubo, Y. Aiba, Y. Ohashi, H. Hirata, K. Fujii and K.-I. Harada, *The Journal of Antibiotics*, 1998, **51**, 929-935.

100. M. Sang, H. Wang, Y. Shen, N. Rodrigues de Almeida, M. Conda-Sheridan, S. Li, Y. Li and L. Du, *Org Lett*, 2019, **21**, 6432-6436.
101. L. Li, B. Koirala, Y. Hernandez, L. W. MacIntyre, M. A. Ternei, R. Russo and S. F. Brady, *Nat Microbiol*, 2022, **7**, 120-131.
102. K. A. Tawfik, P. Jeffs, B. Bray, G. Dubay, J. O. Falkinham, M. Mesbah, D. Youssef, S. Khalifa and E. W. Schmidt, *Org Lett*, 2010, **12**, 664-666.
103. Z. Lin, J. O. Falkinham, 3rd, K. A. Tawfik, P. Jeffs, B. Bray, G. Dubay, J. E. Cox and E. W. Schmidt, *J Nat Prod*, 2012, **75**, 1518-1523.
104. S. E. Lu, J. Novak, F. W. Austin, G. Gu, D. Ellis, M. Kirk, S. Wilson-Stanford, M. Tonelli and L. Smith, *Biochemistry*, 2009, **48**, 8312-8321.
105. G. Gu, L. Smith, A. Liu and S. E. Lu, *Appl Environ Microbiol*, 2011, **77**, 6189-6198.
106. A. P. Tyurin, V. A. Alferova, A. S. Paramonov, M. V. Shuvalov, G. K. Kudryakova, E. A. Rogozhin, A. Y. Zherebker, V. A. Brylev, A. A. Chistov, A. A. Baranova, M. V. Biryukov, I. A. Ivanov, I. A. Prokhorenko, N. E. Grammatikova, T. V. Kravchenko, E. B. Isakova, E. P. Mirchink, E. G. Gladkikh, E. V. Svirshchevskaya, A. V. Mardanov, A. V. Beletsky, M. V. Kocharovskaya, V. V. Kulyaeva, A. S. Shashkov, D. E. Tsvetkov, N. E. Nifantiev, A. S. Apt, K. B. Majorov, S. S. Efimova, N. V. Ravin, E. N. Nikolaev, O. S. Ostroumova, G. S. Katrukha, O. A. Lapchinskaya, O. A. Dontsova, S. S. Terekhov, I. A. Osterman, Z. O. Shenkarev and V. A. Korshun, *Angew Chem Int Ed Engl*, 2021, **60**, 18694-18703.
107. T. Neuhof, P. Schmieder, K. Preussel, R. Dieckmann, H. Pham, F. Bartl and H. von Dohren, *J Nat Prod*, 2005, **68**, 695-700.
108. T. Neuhof, P. Schmieder, M. Seibold, K. Preussel and H. von Dohren, *Bioorg Med Chem Lett*, 2006, **16**, 4220-4222.
109. J. Vestola, T. K. Shishido, J. Jokela, D. P. Fewer, O. Aitio, P. Permi, M. Wahlsten, H. Wang, L. Rouhiainen and K. Sivonen, *Proc Natl Acad Sci U S A*, 2014, **111**, E1909-1917.
110. C. Pancrace, J. Jokela, N. Sassoon, C. Ganneau, M. Desnos-Ollivier, M. Wahlsten, A. Humisto, A. Calteau, S. Bay, D. P. Fewer, K. Sivonen and M. Gugger, *ACS Chem Biol*, 2017, **12**, 1796-1804.
111. Y. Lim, J. W. Suh, S. Kim, B. Hyun, C. Kim and C. H. Lee, *J Antibiot (Tokyo)*, 1994, **47**, 1406-1416.
112. Z. Wang, B. Koirala, Y. Hernandez, M. Zimmerman, S. Park, D. S. Perlin and S. F. Brady, *Nature*, 2022, **601**, 606-611.
113. Z. Wang, B. Koirala, Y. Hernandez, M. Zimmerman and S. F. Brady, *Science*, 2022, **376**, 991-996.
114. S. Son, S. K. Ko, M. Jang, J. W. Kim, G. S. Kim, J. K. Lee, E. S. Jeon, Y. Futamura, I. J. Ryoo, J. S. Lee, H. Oh, Y. S. Hong, B. Y. Kim, S. Takahashi, H. Osada, J. H. Jang and J. S. Ahn, *Mar Drugs*, 2016, **14**.
115. A. Holtzel, D. G. Schmid, G. J. Nicholson, S. Stevanovic, J. Schimana, K. Gebhardt, H. P. Fiedler and G. Jung, *J Antibiot (Tokyo)*, 2002, **55**, 571-577.
116. P. Kulanthaivel, A. J. Kreuzman, M. A. Strege, M. D. Belvo, T. A. Smitka, M. Clemens, J. R. Swartling, K. L. Minton, F. Zheng, E. L. Angleton, D. Mullen, L. N. Jungheim, V. J. Klimkowski, T. I. Nicas, R. C. Thompson and S. B. Peng, *J Biol Chem*, 2004, **279**, 36250-36258.
117. P. A. Smith, M. F. T. Koehler, H. S. Girgis, D. Yan, Y. Chen, Y. Chen, J. J. Crawford, M. R. Durk, R. I. Higuchi, J. Kang, J. Murray, P. Paraselli, S. Park, W. Phung, J. G. Quinn, T. C. Roberts, L. Rouge, J. B. Schwarz, E. Skippington, J. Wai, M. Xu, Z. Yu, H. Zhang, M. W. Tan and C. E. Heise, *Nature*, 2018, **561**, 189-194.
118. M. Igarashi, T. Shida, Y. Sasaki, N. Kinoshita, H. Naganawa, M. Hamada and T. Takeuchi, *J Antibiot (Tokyo)*, 1999, **52**, 873-879.

119. K. D. McBrien, R. L. Berry, S. E. Lowe, K. M. Neddermann, I. Bursuker, S. Huang, S. E. Klohr and J. E. Leet, *J Antibiot (Tokyo)*, 1995, **48**, 1446-1452.
120. J.-F. Hu, D. Wunderlich, I. Sattler, X.-Z. Feng, S. Grabley and R. Thiericke, *European Journal of Organic Chemistry*, 2000, **2000**, 3353-3356.
121. S. Kitani, T. Ueguchi, Y. Igarashi, K. Leetanasaksakul, A. Thamchaipenet and T. Nihira, *J Antibiot (Tokyo)*, 2017, DOI: 10.1038/ja.2017.92.
122. Y. Igarashi, R. Shimasaki, S. Miyanaga, N. Oku, H. Onaka, H. Sakurai, I. Saiki, S. Kitani, T. Nihira, W. Wimonsiravude and W. Panbangred, *J Antibiot (Tokyo)*, 2010, **63**, 563-565.
123. N. Oku, S. Matoba, Y. M. Yamazaki, R. Shimasaki, S. Miyanaga and Y. Igarashi, *J Nat Prod*, 2014, **77**, 2561-2565.
124. L. Chen, W. Zhao, H.-L. Jiang, J. Zhou, X.-M. Chen, Y.-Y. Lian, H. Jiang and F. Lin, *Tetrahedron*, 2018, **74**, 4151-4154.
125. X. Liang, X. H. Nong, Z. H. Huang and S. H. Qi, *J Agric Food Chem*, 2017, **65**, 5114-5121.
126. F. Karim, X. Liang and S.-H. Qi, *Phytochemistry Letters*, 2022, **48**, 68-71.
127. K. Ishidoh, H. Kinoshita, Y. Igarashi, F. Ihara and T. Nihira, *J Antibiot (Tokyo)*, 2014, **67**, 459-463.
128. M. Marner, M. A. Patras, M. Kurz, F. Zubeil, F. Forster, S. Schuler, A. Bauer, P. Hammann, A. Vilcinskas, T. F. Schaberle and J. Glaeser, *J Nat Prod*, 2020, **83**, 2607-2617.
129. A. Henriksen, U. Anthoni, T. H. Nielsen, J. Sorensen, C. Christophersen and M. Gajhede, *Acta Crystallogr C*, 2000, **56 (Pt 1)**, 113-115.
130. Y. Kajimura, M. Sugiyama and M. Kaneda, *J Antibiot (Tokyo)*, 1995, **48**, 1095-1103.
131. S. Fotso, P. Graupner, Q. Xiong, J. R. Gilbert, D. Hahn, C. Avila-Adame, G. Davis and K. Sumiyoshi, *J Nat Prod*, 2018, **81**, 10-15.
132. F. S. Tareq and H. J. Shin, *J Nat Prod*, 2017, **80**, 2889-2892.
133. H. S. Lee and H. J. Shin, *Mar Drugs*, 2021, **19**.
134. J. Zheng, Z. Xu, Y. Wang, K. Hong, P. Liu and W. Zhu, *J Nat Prod*, 2010, **73**, 1133-1137.
135. C. Sun, Z. Zhang, Z. Ren, L. Yu, H. Zhou, Y. Han, M. Shah, Q. Che, G. Zhang, D. Li and T. Zhu, *Mar Drugs*, 2020, **18**.
136. R. Kozakai, T. Ono, S. Hoshino, H. Takahashi, Y. Katsuyama, Y. Sugai, T. Ozaki, K. Teramoto, K. Teramoto, K. Tanaka, I. Abe, S. Asamizu and H. Onaka, *Nat Chem*, 2020, **12**, 869-877.
137. V. Wiebach, A. Mainz, M. J. Siegert, N. A. Jungmann, G. Lesquame, S. Tirat, A. Dreux-Zigha, J. Aszodi, D. Le Beller and R. D. Sussmuth, *Nat Chem Biol*, 2018, **14**, 652-654.
138. Y. Kajimura and M. Kaneda, *J Antibiot (Tokyo)*, 1996, **49**, 129-135.
139. Y. Kajimura and M. Kaneda, *The Journal of Antibiotics*, 1997, **50**, 220-228.
140. G. Jahanshah, Q. Yan, H. Gerhardt, Z. Pataj, M. Lammerhofer, I. Pianet, M. Josten, H. G. Sahl, M. W. Silby, J. E. Loper and H. Gross, *J Nat Prod*, 2019, **82**, 301-308.
141. Y. Liu, S. Ding, R. Dietrich, E. Martlbauer and K. Zhu, *Angew Chem Int Ed Engl*, 2017, **56**, 1486-1490.
142. Y. Liu, M. Song, S. Ding and K. Zhu, *ACS Infect Dis*, 2019, **5**, 123-130.
143. Y. X. Li, Z. Zhong, W. P. Zhang and P. Y. Qian, *Nat Commun*, 2018, **9**, 3273.
144. X. H. Zhao and O. P. Kuipers, *Frontiers in Microbiology*, 2021, **12**.

145. J. Chu, B. Koirala, N. Forelli, X. Vila-Farres, M. A. Ternei, T. Ali, D. A. Colosimo and S. F. Brady, *J Am Chem Soc*, 2020, **142**, 14158-14168.
146. E. J. Culp, N. Waglechner, W. Wang, A. A. Fiebig-Comyn, Y. P. Hsu, K. Koteva, D. Sychantha, B. K. Coombes, M. S. Van Nieuwenhze, Y. V. Brun and G. D. Wright, *Nature*, 2020, **578**, 582-587.
147. H. He, R. T. Williamson, B. Shen, E. I. Graziani, H. Y. Yang, S. M. Sakya, P. J. Petersen and G. T. Carter, *J Am Chem Soc*, 2002, **124**, 9729-9736.
148. M. N. Thaker, W. Wang, P. Spanogiannopoulos, N. Waglechner, A. M. King, R. Medina and G. D. Wright, *Nat Biotechnol*, 2013, **31**, 922-927.
149. K. Shimanaka, N. Kinoshita, H. Iinuma, M. Hamada and T. Takeuchi, *J Antibiot (Tokyo)*, 1994, **47**, 668-674.
150. C. J. Schwalen, G. A. Hudson, B. Kille and D. A. Mitchell, *J Am Chem Soc*, 2018, **140**, 9494-9501.
151. S. Um, E. Seibel, F. Schalk, S. Balluff and C. Beemelmanns, *J Nat Prod*, 2021, **84**, 1002-1011.
152. M. S. Donia, P. Cimermancic, C. J. Schulze, L. C. Wieland Brown, J. Martin, M. Mitreva, J. Clardy, R. G. Linington and M. A. Fischbach, *Cell*, 2014, **158**, 1402-1414.
153. X. Zhou, H. Huang, Y. Chen, J. Tan, Y. Song, J. Zou, X. Tian, Y. Hua and J. Ju, *J Nat Prod*, 2012, **75**, 2251-2255.
154. J. E. Leet, W. Li, H. A. Ax, J. A. Matson, S. Huang, R. Huang, J. L. Cantone, D. Drexler, R. A. Dalterio and K. S. Lam, *J Antibiot (Tokyo)*, 2003, **56**, 232-242.
155. H. Jayasuriya, K. Herath, J. G. Ondeyka, C. Zhang, D. L. Zink, M. Brower, F. P. Gailliot, J. Greene, G. Birdsall, J. Venugopal, M. Ushio, B. Burgess, G. Russotti, A. Walker, M. Hesse, A. Seeley, B. Junker, N. Connors, O. Salazar, O. Genilloud, K. Liu, P. Masurekar, J. F. Barrett and S. B. Singh, *J Antibiot (Tokyo)*, 2007, **60**, 554-564.