APPENDIX 1

Chemistry and Biology of Siderophores

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List of Siderophore Structures

(Prepared November 2009)

(Updated January 2015)

Index of Appendix 1

Name of siderophore	Code number in appendix
Achromobactina	104
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Desferrioxamine H	12
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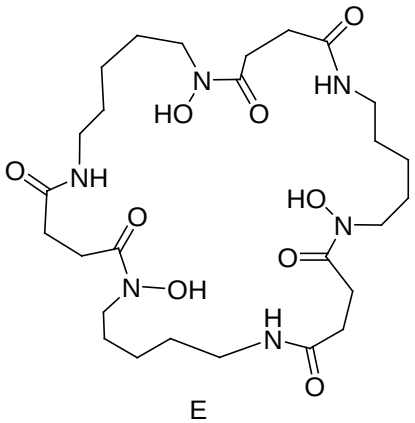
Staphyloferrin B	232
Taiwachelin	210
Tetraglycine ferrichrome	46
Thiazostatin	279
Triacetylfusarine	49
Triornicin	55
Vibriobactin	90
Vibrioferrin	103
Vicibactin	83
Vulnibactin	91
Yersiniabactin	265

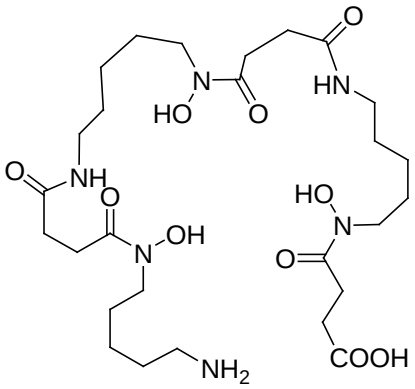
1. HEXADENTATE SIDEROPHORES

1.1 HYDROXAMATES

1.1.1 Desferrioxamines (iron complexes – ferrioxamines)

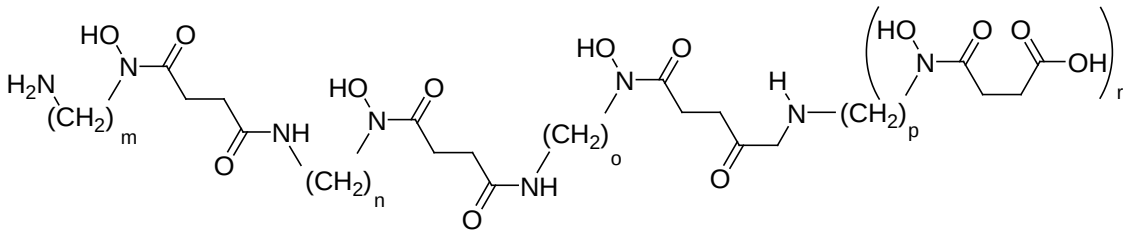


E



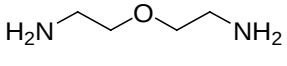
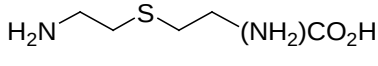
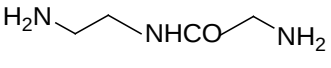
G_1

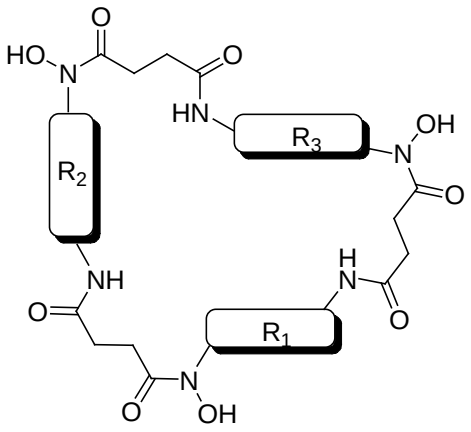
Examples of a cyclic (Desferrioxamine E) and an acyclic (Desferrioxamine G_1) trihydroxamate. Within the group the hydroxamate and internal succinyl groups are conserved, the lengths of the interconnecting diaminoalkane groups are variable:



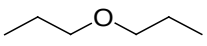
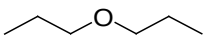
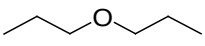
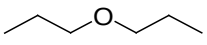
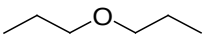
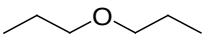
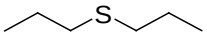
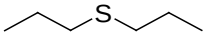
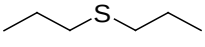
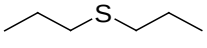
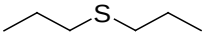
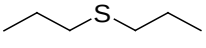
general structure

Code	Name	Cyclic	Number of methylene groups					N-terminal modification	C-terminal modification
			m	n	o	p	r		
1	Desferrioxamine A_{1A}	-	5	5	4	0	0	-	CH_3CO replaces succinyl
2	Desferrioxamine A_{1B}	-	5	4	5	0	0	-	CH_3CO replaces succinyl
3	Desferrioxamine A_2	-	5	4	4	0	0	-	CH_3CO replaces succinyl
4	Desferrioxamine B	-	5	5	5	0	0	-	CH_3CO replaces succinyl
5	Desferrioxamine D_1	-	5	5	5	0	0	CH_3CO	CH_3CO replaces succinyl
6	Desferrioxamine D_2	+	4	5	5	0	0	-	-
7	Desferrioxamine E	+	5	5	5	0	0	-	-
8	Desferrioxamine G_1	-	5	5	5	0	0	-	-
9	Desferrioxamine G_{2A}	-	5	5	4	0	0	-	-
10	Desferrioxamine G_{2B}	-	5	4	5	0	0	-	-
11	Desferrioxamine G_{2C}	-	4	5	5	0	0	-	-
12	Desferrioxamine H	-	5	5	0	0	0	Succinyl	CH_3CO replaces succinyl
13	Desferrioxamine N	-	6	5	5	0	0	-	CH_3CO replaces succinyl
14	Desferrioxamine T_1	+	5	5	5	5	1	-	-
15	Desferrioxamine T_2	+	4	5	5	5	1	-	-
16	Desferrioxamine T_3	+	3	5	5	5	1	-	-
17	Desferrioxamine T_7	+	4	4	5	5	1	-	-
18	Desferrioxamine T_8	+	3	3	3	5	1	-	-
19	Desferrioxamine X_1	+	4	4	5	0	0	-	-
20	Desferrioxamine X_2	+	4	4	4	0	0	-	-
21	Desferrioxamine X_3	+	5	5	6	0	0	-	-
22	Desferrioxamine X_4	+	5	6	6	0	0	-	-

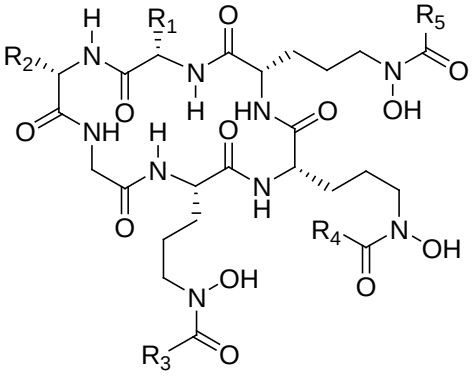
Some of the above listed siderophores are prepared by directed fermentation of *Streptomyces olivaceus*. Examples are ferrioxamines D_2, E, X_1 –X_6. Additional artificial siderophores have been made using the same organism using 1,5-diamine ethyl ether (), S,2-aminoethylcysteine () and N-glycine-1,2-ethylenediamine () (21A – 21F, 22)



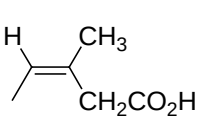
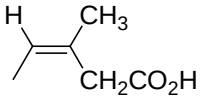
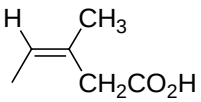
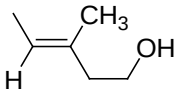
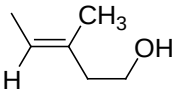
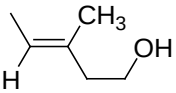
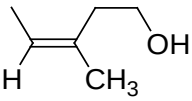
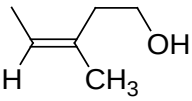
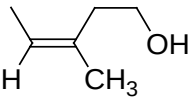
Cyclic desferrioxamines 21 and 22

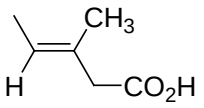
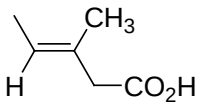
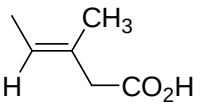
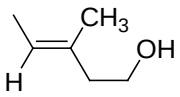
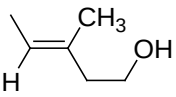
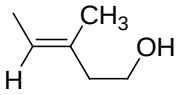
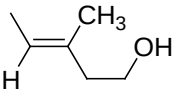
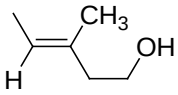
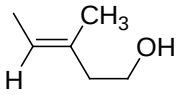
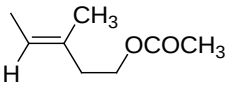
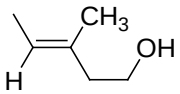
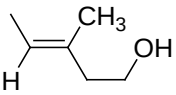
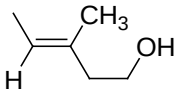
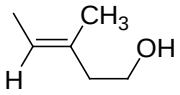
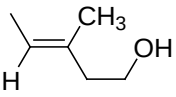
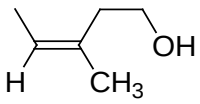
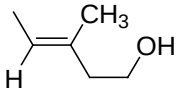
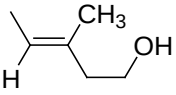
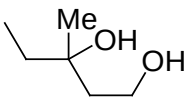
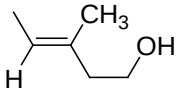
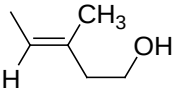
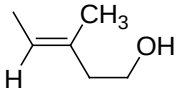
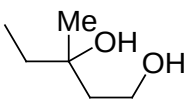
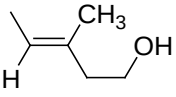
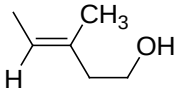
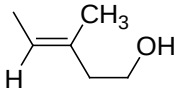
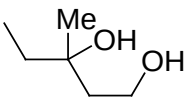
Code	Name	R_1	R_2	R_3
23A	Desferrioxamine Et_1		$(CH_2)_5$	$(CH_2)_5$
23B	Desferrioxamine Et_2			$(CH_2)_5$
23C	Desferrioxamine Et_3			
23D	Desferrioxamine Te_1		$(CH_2)_5$	$(CH_2)_5$
23E	Desferrioxamine Te_2			$(CH_2)_5$
23F	Desferrioxamine Te_3			
24	Desferrioxamine P_1		$(CH_2)_5$	$(CH_2)_5$

1.1.2 Desferriferrichromes (iron complexes – ferrichromes)

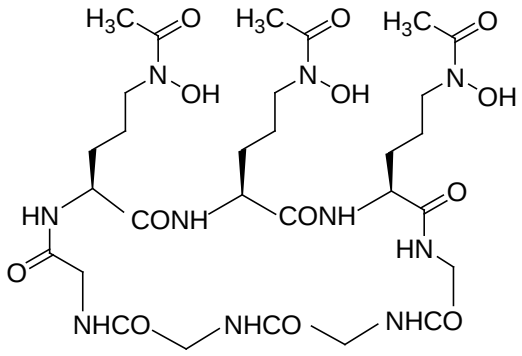


Trishydroxamate attached to peptide backbone (all L-amino acids)

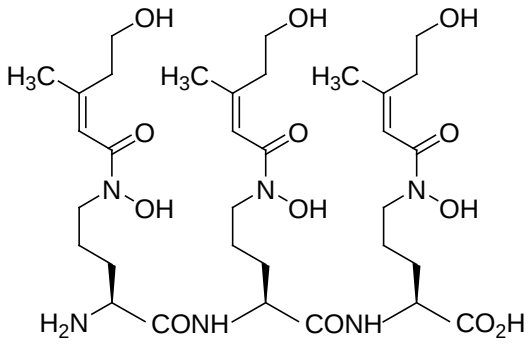
Code	Name of Iron complex	R_1	R_2	R_3	R_4	R_5
25	Ferrichrome	H	H	CH_3	CH_3	CH_3
26	Ferrichrome C	CH_3	H	CH_3	CH_3	CH_3
27	Ferricrocin	CH_2OH	H	CH_3	CH_3	CH_3
28	Sake Colorant A	CH_3	CH_2OH	CH_3	CH_3	CH_3
29	Ferrichrysin	CH_2OH	CH_2OH	CH_3	CH_3	CH_3
30	Ferrichrome A	CH_2OH	CH_2OH			
31	Ferrirubin	CH_2OH	CH_2OH			
32	Ferrirhodin	CH_2OH	CH_2OH			
33	Malonichrome	CH_3	H	CH_2CO_2H	CH_2CO_2H	CH_2CO_2H

34	Asperchrome A	CH_2OH	CH_3			
35	Asperchrome B_1	CH_2OH	CH_2OH	CH_3		
36	Asperchrome B_2	CH_2OH	CH_2OH		CH_3	
37	Asperchrome B_3	CH_2OH	CH_2OH			CH_3
38	Asperchrome C	CH_2OH	CH_2OH			
39	Asperchrome D_1	CH_2OH	CH_2OH		CH_3	CH_3
40	Asperchrome D_2	CH_2OH	CH_2OH	CH_3		CH_3
41	Asperchrome D_3	CH_2OH	CH_2OH	CH_3	CH_3	
42	Asperchrome E	CH_2OH	CH_2OH			
43	Asperchrome F_1	CH_2OH	CH_2OH			
44	Asperchrome F_2	CH_2OH	CH_2OH			
45	Asperchrome F_3	CH_2OH	CH_2OH			

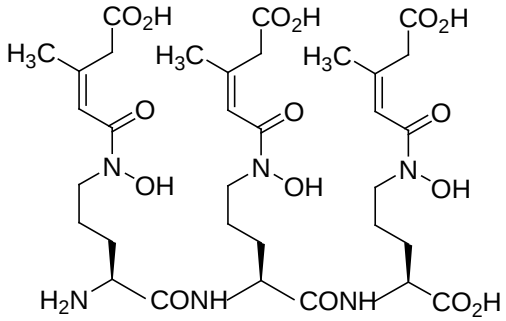
46 Tetraglycine ferrichrome



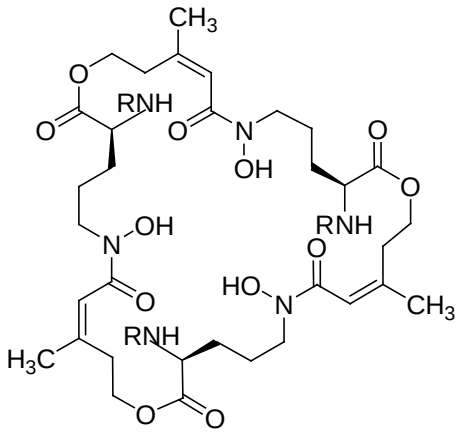
47 Des(diserylglycyl)ferrirhodin



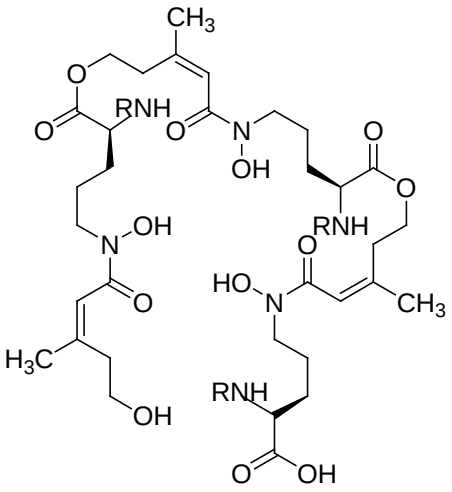
48 Basidiochrome



1.1.3 Fusarinines



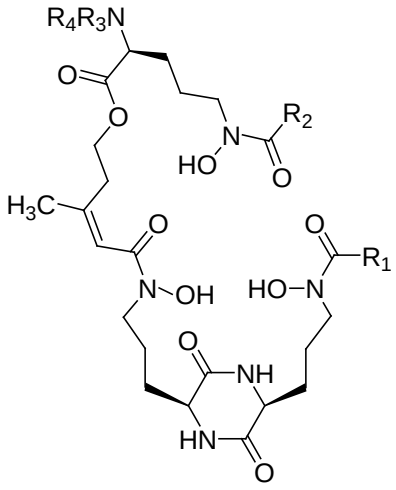
Cyclic form 49, 50, 52

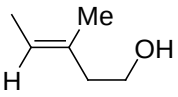
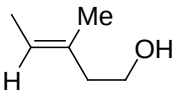
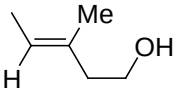
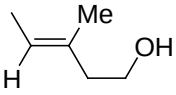
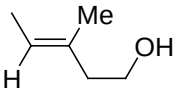
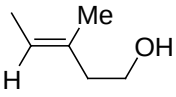
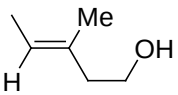
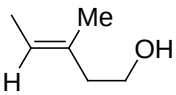
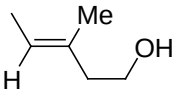
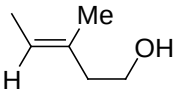
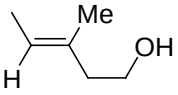
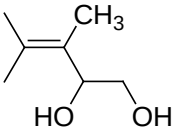
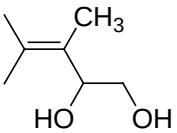
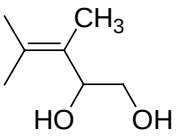
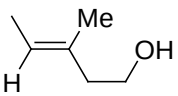
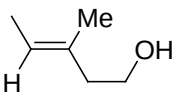


Linear form 51

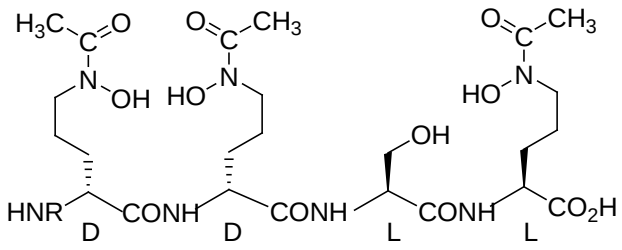
Code	Name	R	Chirality of ornithine
49	Triacetylfusarine	CH_3CO	L
50	Fusarinine C	H	L
51	Fusarinine B	H	L
52	Neurosporin	CH_3CO	D

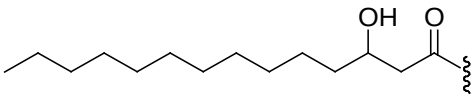
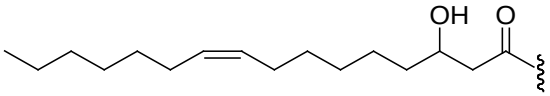
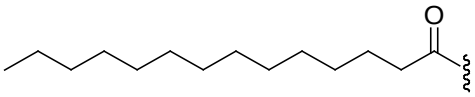
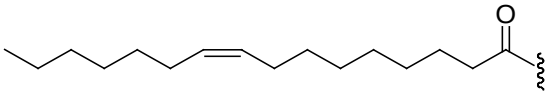
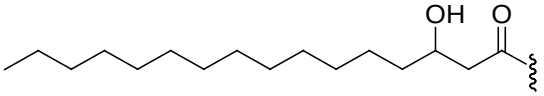
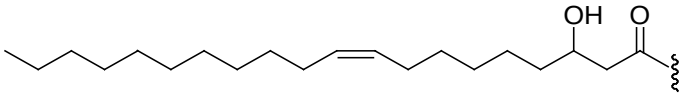
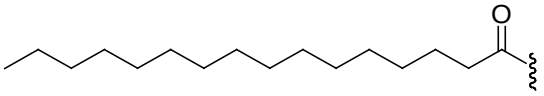
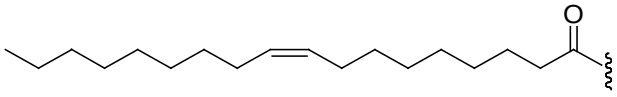
1.1.4 Coprogens (name refers to iron complex)



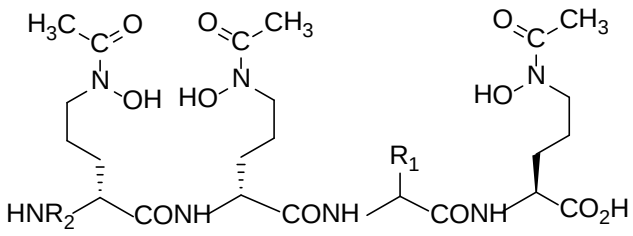
Code	Name	R_1	R_2	R_3	R_4
53	Coprogen			CH_3-CO	H
54	Coprogen B (Desacetylcoprogen)			H	H
55	Triornicin (isoneocoprogen I)		CH_3	CH_3CO	H
56	Isotriornicin (neocoprogen I)	CH_3		CH_3CO	H
57	Neocoprogen II	CH_3	CH_3	CH_3CO	H
58	Dimethylcoprogen			CH_3	CH_3
59	Dimethylneocoprogen I	CH_3		CH_3	CH_3
60	Dimethyltriornicin		CH_3	CH_3	CH_3
61	Hydroxycopropen			CH_3CO	H
62	Hydroxy-neocoprogen I	CH_3		CH_3CO	H
63	Hydroxyisoneocoprogen I		CH_3	CH_3CO	H
64	Palmitoylcoprogen			H	$C_{15}H_{31}CO$

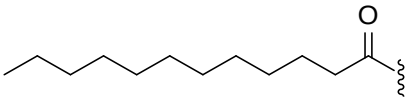
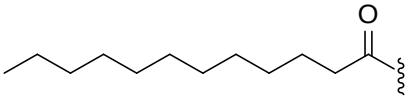
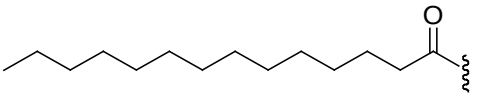
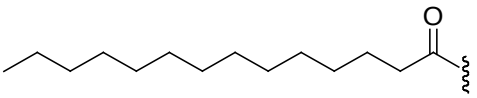
1.1.5 Amphibactins



Code	Name	R
65	Amphibactin B	
66	Amphibactin C	
67	Amphibactin D	
68	Amphibactin E	
69	Amphibactin F	
70	Amphibactin G	
71	Amphibactin H	
72	Amphibactin I	
73	Amphibactin S	
74	Amphibactin T	

1.1.6 Moanachelins

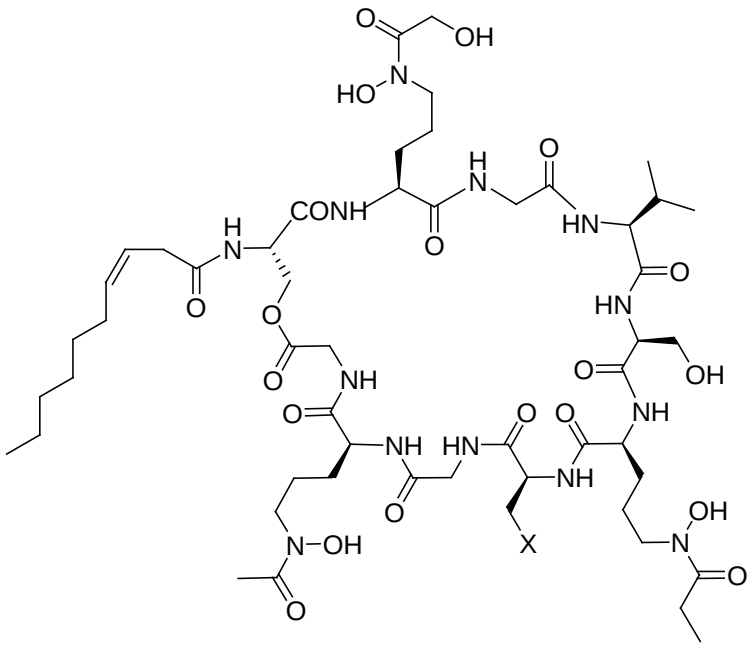


Code	Name	R_1	R_2
75	Moanachelins gly-B	H	
76	Moanachelins ala-B	CH_3	
77	Moanachelins gly-D	H	
78	Moanachelins ala-D	CH_3	
79	Moanachelins gly-E	H	

1.1.7 Other hexadentate hydroxamate siderophores

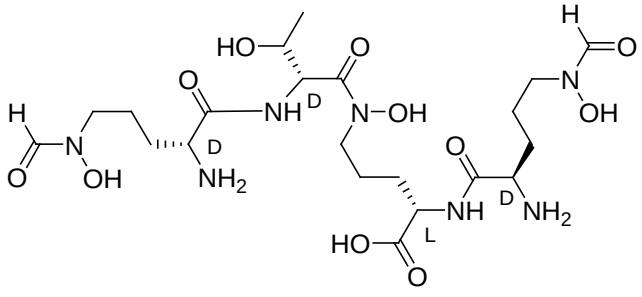
80 Ferrocin A (X = H) [Ferrocin B; X = OH]

(based on L-amino acids)

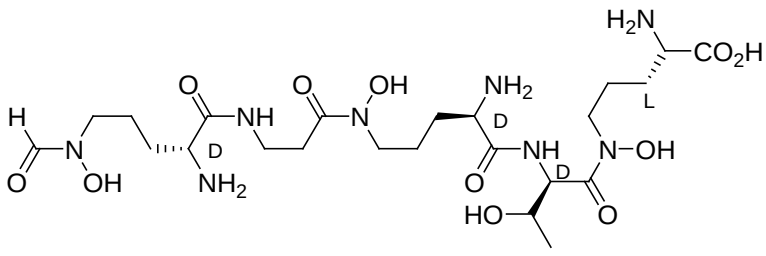


81 Coelichelin

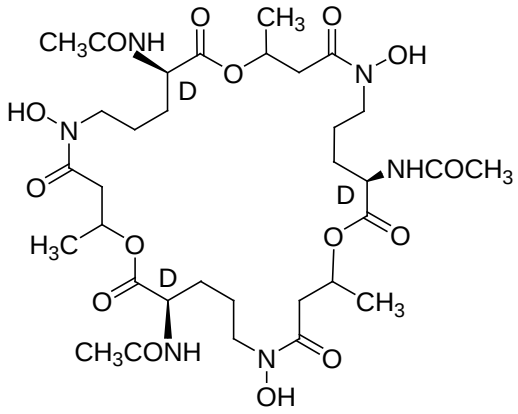
(based on L-ornithine)



82 Exochelin MS



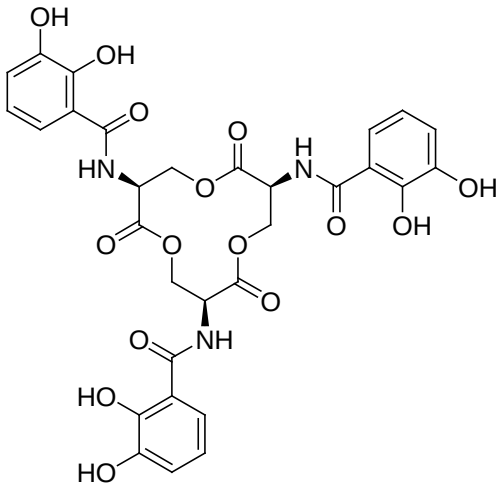
83 Vicibactin

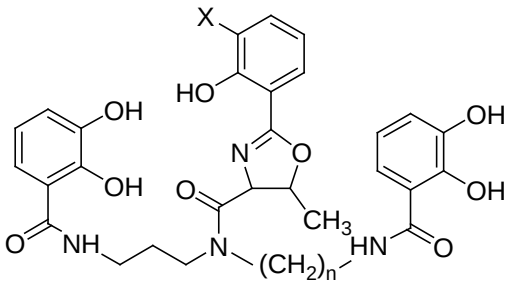


1.2 CATECHOLATES AND PHENOLATES

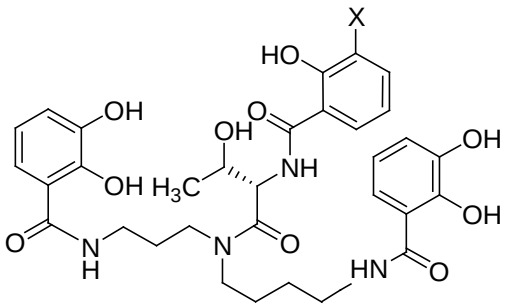
84 Enterobactin

(catechol ligands)

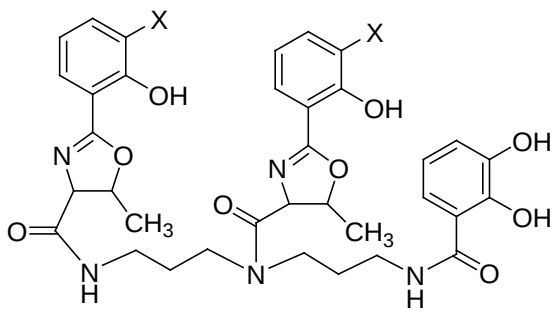




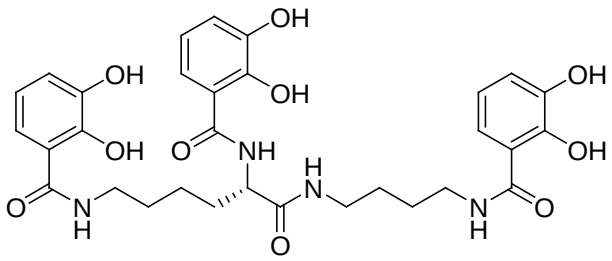
Code	Name	X	N	Ligands
85	Agrobactin	OH	4	Catechol 2-Hydroxyphenyloxazoline
86	Parabactin	H	4	Catechol 2-Hydroxyphenyloxazoline
87	Fluvibactin	OH	3	Catechol 2-Hydroxyphenyloxazoline



Code	Name	X	Ligands
88	Agrobactin A	OH	Catechol
89	Parabactin A	H	Catechol and salicylate

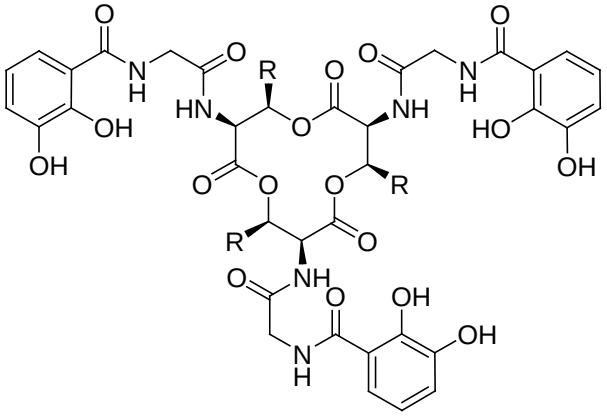


Code	Name	X	Ligands
90	Vibriobactin	OH	Catechol
91	Vulnibactin	H	Catechol and 2-Hydroxyphenyloxazoline

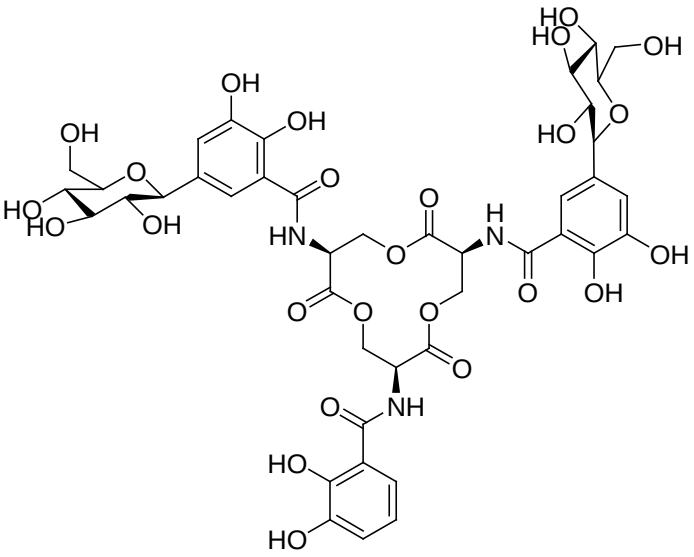


92 Protochelin

(catechol ligands)

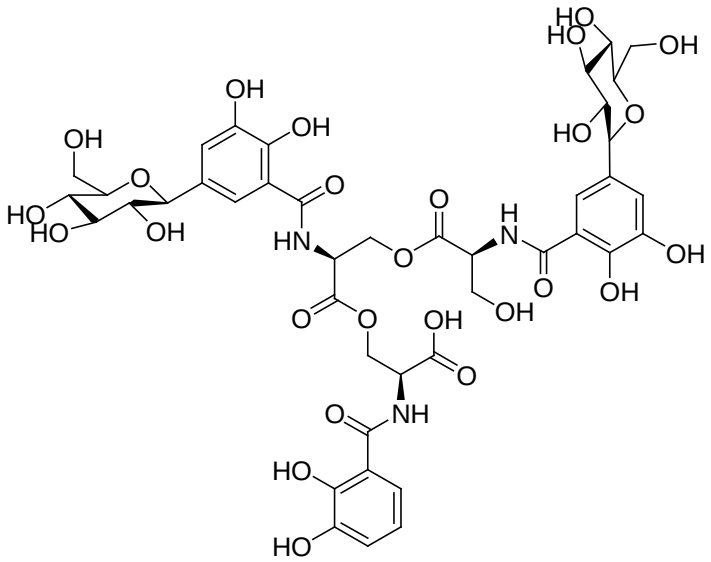


Code	Name	R	Ligands
93	Corynebactin	H	Catechol
94	Bacillibactin	CH_3	Catechol



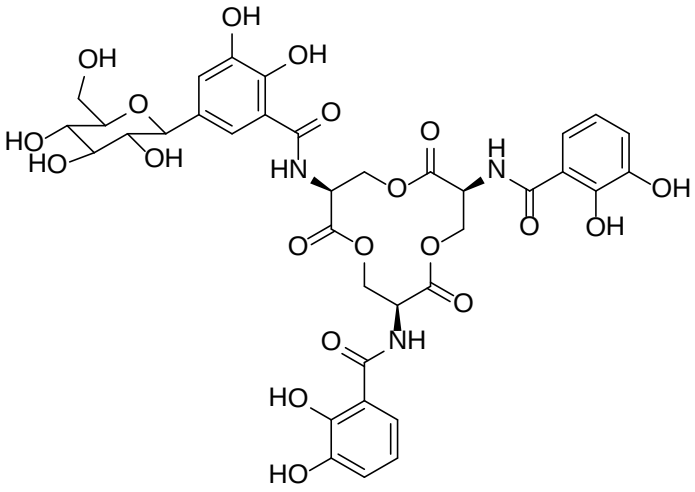
95 Salmochelin (S4)

(catechol ligands)

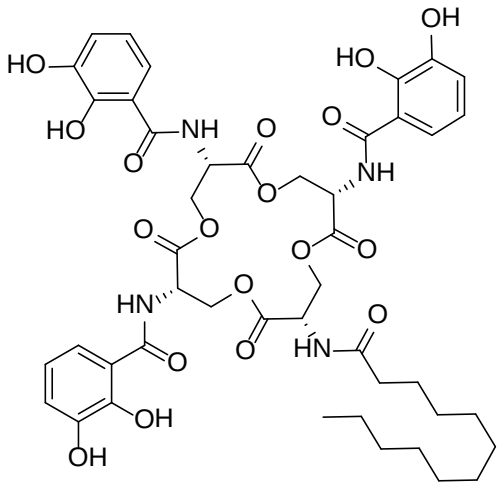


96 Salmochelin (S2)

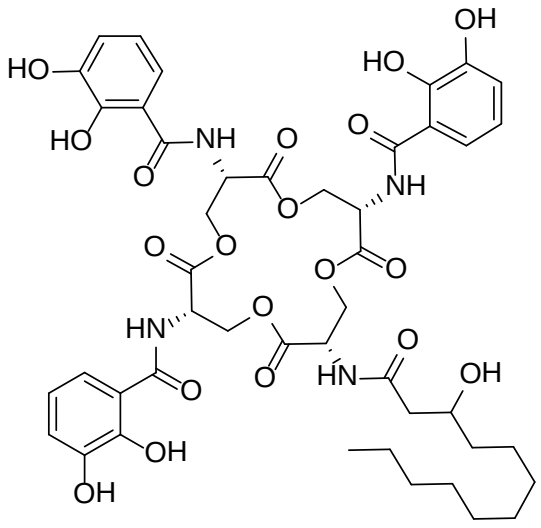
97 Monoglucosylated Enterobactin (MGE)



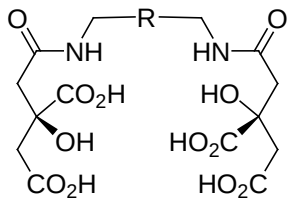
98 Amphi-enterobactin



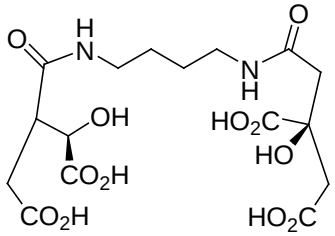
99 Amphi-enterobactin C12-OH



1.3 α-HYDROXYCARBOXYLATES

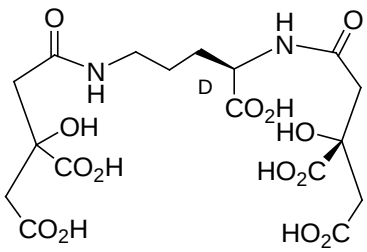


88



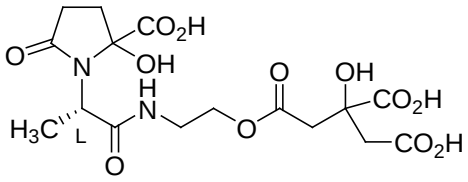
89

Code	Name	R	Ligand
100	Rhizoferrin	$(CH_2)_2$	α-Hydroxycarboxylate and carboxylate
100A-100E are artifical siderophores produced by directed fermentation			
100A	Homorhizoferrin	$-(CH_2)_3-$	α-Hydroxycarboxylate and carboxylate
100B	Norrhizoferrin	$-(CH_2)-$	α-Hydroxycarboxylate and carboxylate
100C	Oxahomorhizoferrin	$-CH_2OCH_2-$	α-Hydroxycarboxylate and carboxylate
100D	2-Methylhomorhizoferrin	$-CH(CH_3)CH_2CH_2-$	α-Hydroxycarboxylate and carboxylate
100E	2-Oxorhizoferrin	$-COCH_2-$	α-Hydroxycarboxylate and carboxylate
101	Enantio Rhizoferrin		α-Hydroxycarboxylate and carboxylate



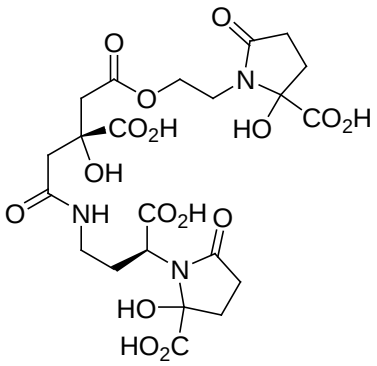
102 Staphyloferrin A

(α-hydroxycarboxylate and carboxylate ligands)



103 Vibrioferrin

(α-hydroxycarboxylate and carboxylate ligands)



104 Achromobactin

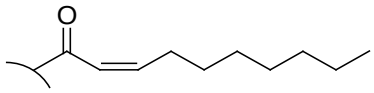
(α-hydroxycarboxylate ligands)

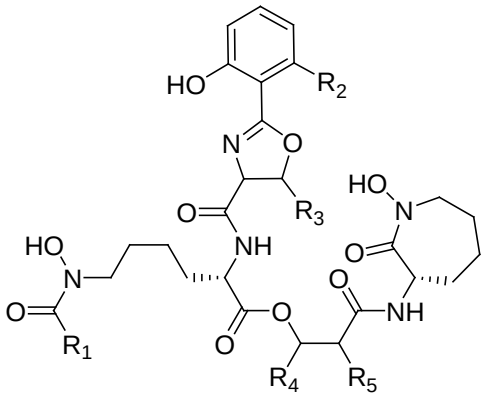
1.4 MIXED FUNCTION SIDEROPHORES

1.4.1 Hydroxamate / Phenolate

1.4.1.1 Mycobactins

R_1/R_4 – Generally a long chain fatty acid (C_{10-21}) which is frequently unsaturated with a *cis* double bond conjugated to the CO function.

e.g. C_9 

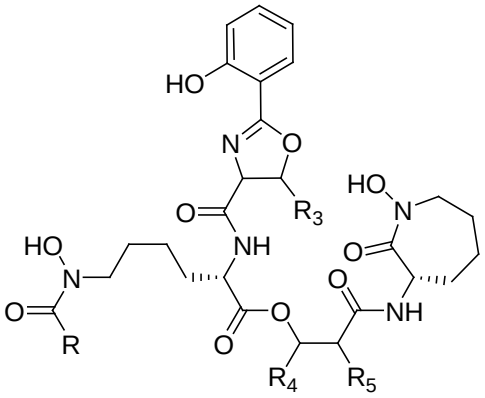


Hydroxamate and 2-Hydroxyphenyloxazoline ligands

Code	Name	R_1	R_2	R_3	R_4	R_5
105	Mycobactin P	C_{15-19}	CH_3	H	C_2H_5	CH_3
106	Mycobactin A	C_{13}	CH_3	H	CH_3	H
107	Mycobactin F	C_{9-17}	H	CH_3	CH_3	H
108	Mycobactin H	C_{17-19}	CH_3	CH_3	CH_3	H
109	Mycobactin M	CH_3	H	CH_3	C_{15-18}	CH_3

110	Mycobactin N	C_2H_5	H	CH_3	C_{15-18}	CH_3
111	Mycobactin R	C_{19}	H	H	C_2H_5	CH_3
112	Mycobactin S	C_{9-19}	H	H	CH_3	H
113	Mycobactin T	C_{17-20}	H	H	CH_3	H
114	Mycobactin Av	C_{11-18}	H	CH_3	C_2H_5	CH_3
115	Mycobactin NA (Nocobactin)	CH_3	H	CH_3	C_{9-11}	CH_3
116	Mycobactin J	C_{15}	H	CH_3	C_2H_5	CH_3
117	Formobactin	H	H	CH_3	C_9	CH_3

1.4.1.2 Carboxymycobactins

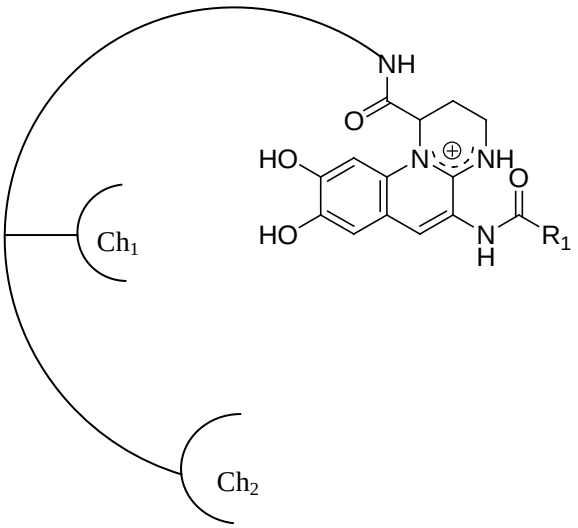


Hydroxamate and 2-Hydroxyphenyloxazoline ligands

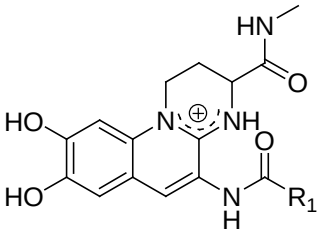
Carboxymycobactin (*M . smegmatis*)				
Code	R	R_3	R_4	R_5
118 (8 isoforms)	$-(CH_2)_nCO_2H$ (n=2-9)	H	CH_3	H
Carboxymycobactins (*M . avium*)				
119 (6 isoforms)	$-(CH_2)_nCO_2H$ (n=2-7)	CH_3	C_2H_5	CH_3
120 (3 isoforms)	$-(CH_2)_nCO_2CH_3$ (n=2-4)	CH_3	C_2H_5	CH_3
121 (9 isoforms)	$-(CH_2)_nCO_2H$ (n=1-9)	CH_3	C_2H_5	CH_3
122 (4 isoforms)	$-(CH_2)_nCO_2CH_3$ (n=2-5)	CH_3	C_2H_5	CH_3

1.4.1.3 Pyoverdins

General structure



Bidentate chelation sites Ch_1 and Ch_2 are placed on a peptide backbone of varied length (6 – 12 amino acids) and create a hexadentate coordination site with the chromophore 5-amino-2,3-dihydro-8,9-dihydroxy-1H-pyrimido [1 ,2] quinoline-1-carboxylic acid. The two bidentate chelation sites can be hydroxamates, α-hydroxycarboxylates or 1 of each type. Isopyoverdines have been isolated from *P . putida* where the carboxylate group is located at C-3 instead of C-1 of the ring system.



Chromophore in isopyoverdines

Side chains R_1 of pyoverdin isoforms include:

$CH_2CH_2CO_2H$

$CH_2CH_2CONH_2$

$CH_2CHOHCO_2H$

$CH_2CHOHCONH_2$

$CH_2CH_2CHNH_2CO_2H$

$CH_2CH_2COCO_2H$

A mixture of these isoforms is common in most isolates.

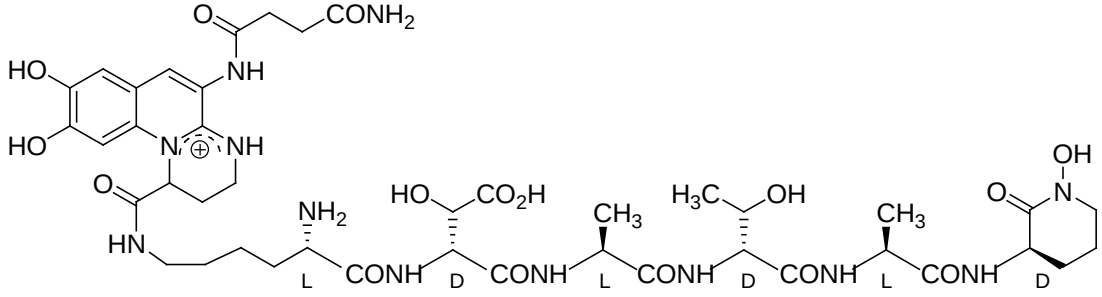
Pyoverdins can be classified according to their chelating functions, macrocyclic structure or molecular size. In this listing we have adopted a numbering system which is based on peptide length and molecular size. The first digit indicates the number of amino acids in the peptide backbone. The second digit is allocated in order of molecular wt.

62 pyoverdins have been sequenced, there are a further 40 known pyoverdins which have been partially characterised but have not been fully sequenced at the present time. There is an excellent comprehensive review describing pyoverdins in “Progress in the Chemistry of Organic Nature Products by Budlzikiewicz (2004).

Pyoverdins with a six amino acid backbone

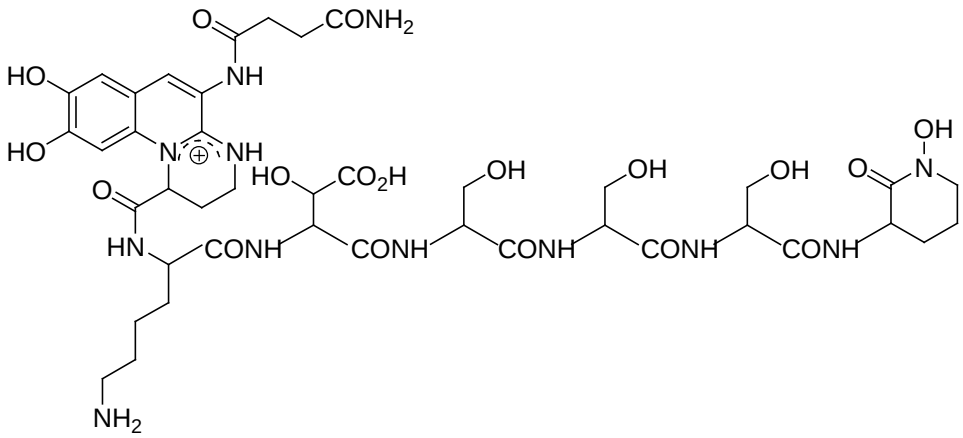
123 Pyoverdin 6.1

(Pseudobactin)



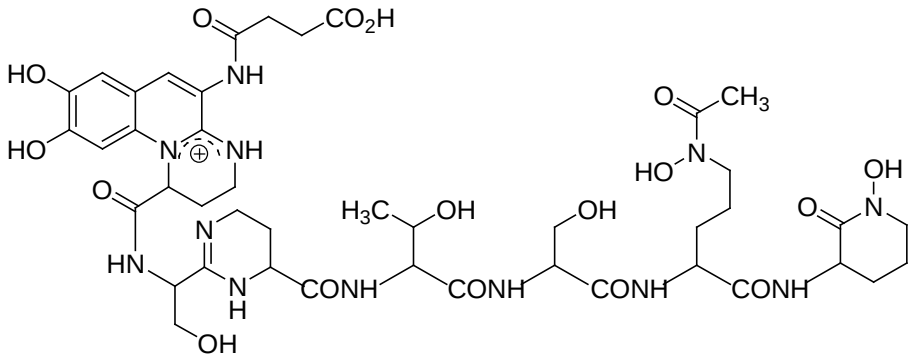
124 Pyoverdin 6.2

(chirality not assigned)



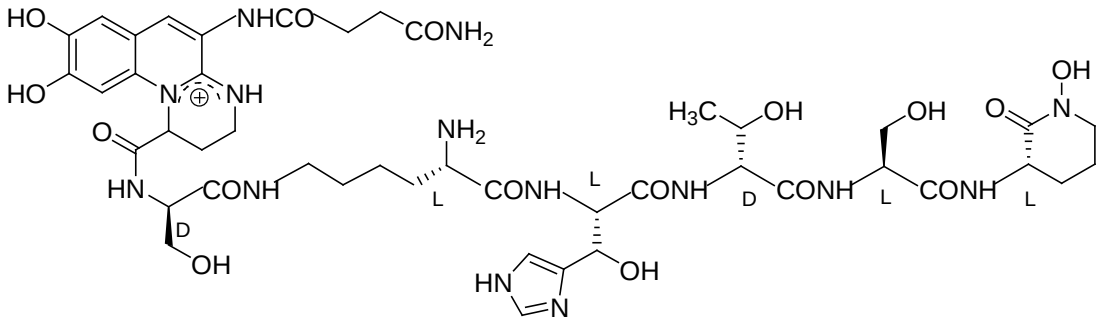
125 Pyoverdin 6.3

(Pyoverdin Thai) (chirality not assigned)



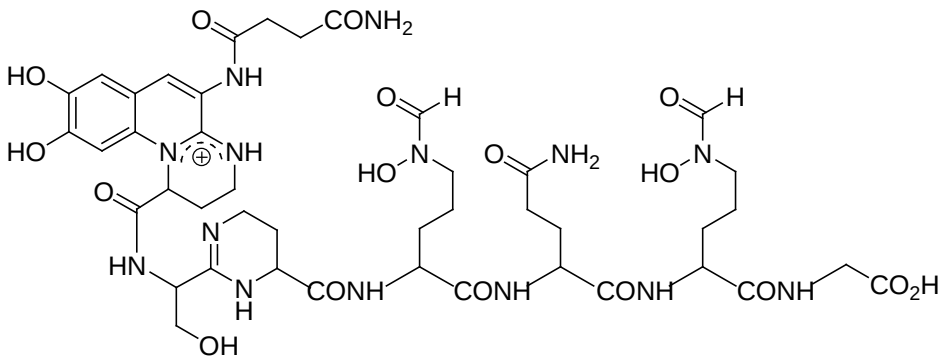
126 Pyoverdin 6.4

(Pyoverdin 9AW)

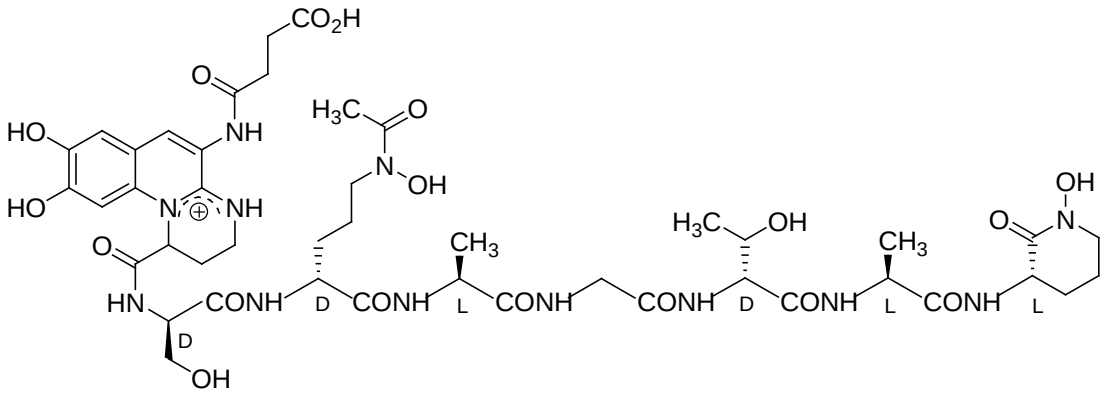


127 Pyoverdin 6.5

(chirality not determinel)

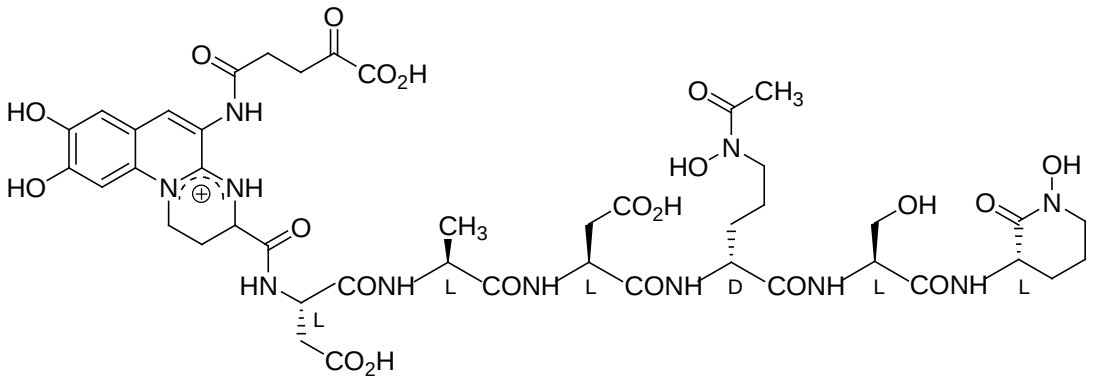


128 Pyoverdin 6.6

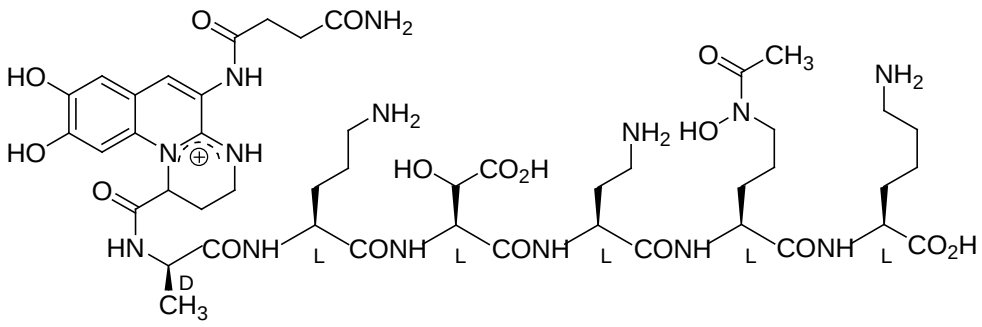


129 Pyoverdin 6.7

(Isopyoverdin BTP1)

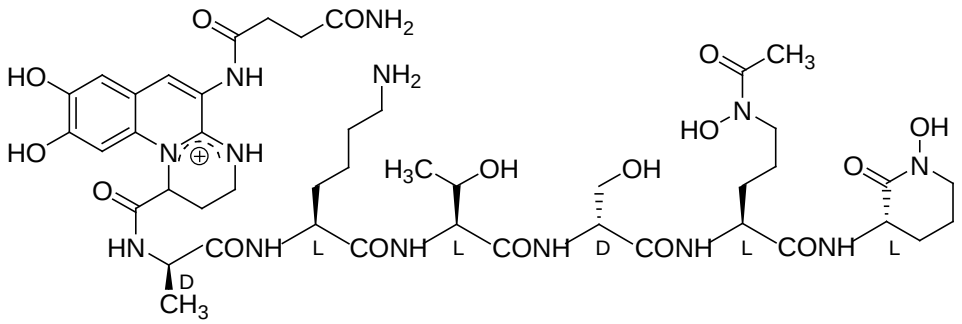


130 Pyoverdin 6.8



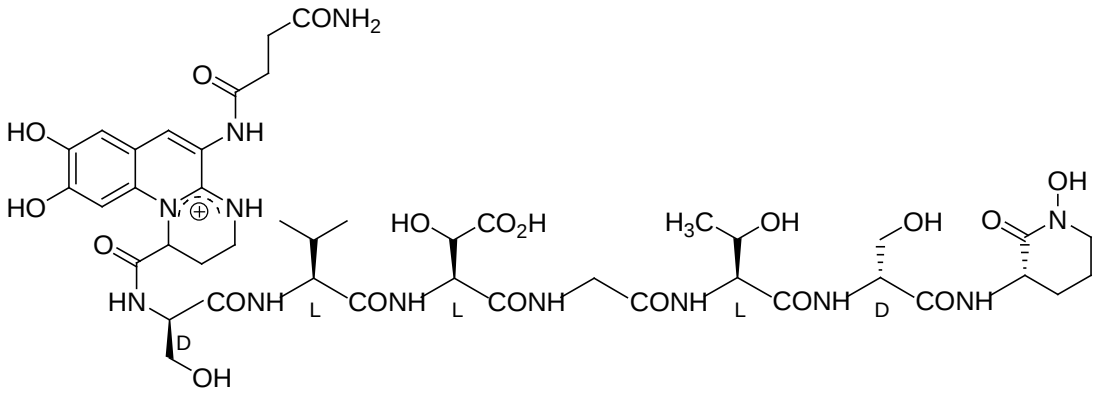
Pyoverdins with a seven amino acid backbone

131 Pyoverdin 7.1



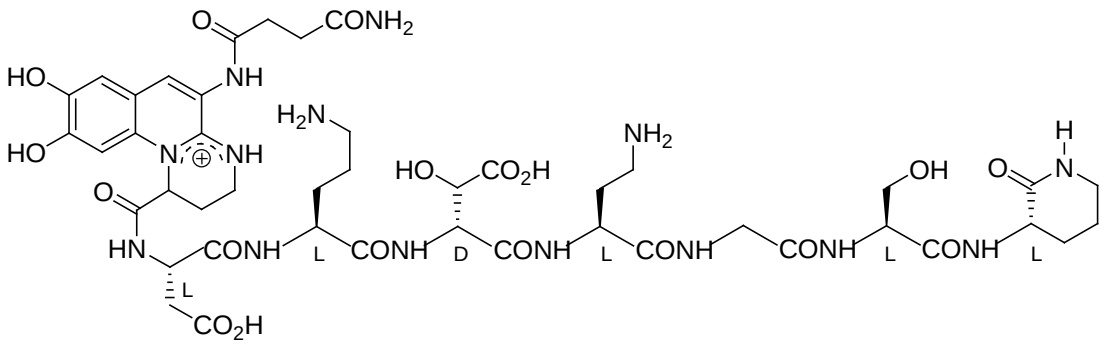
132 Pyoverdin 7.2

(Pyoverdin BTP2)



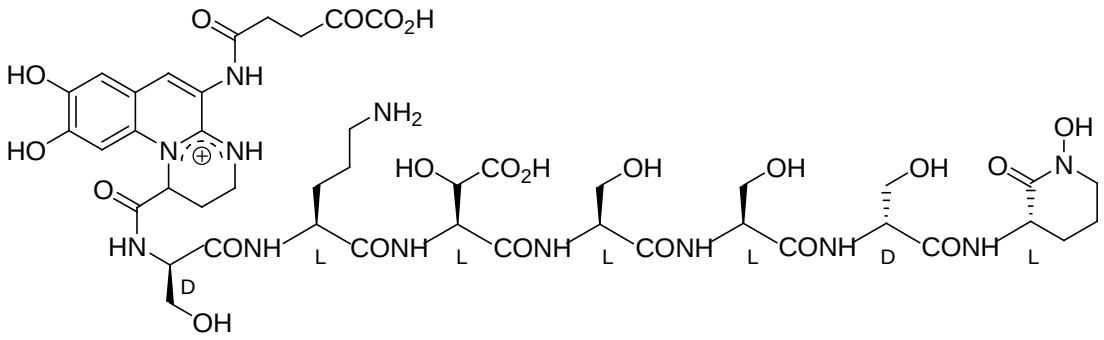
133 Pyoverdin 7.3

(Pyoverdin G + R)



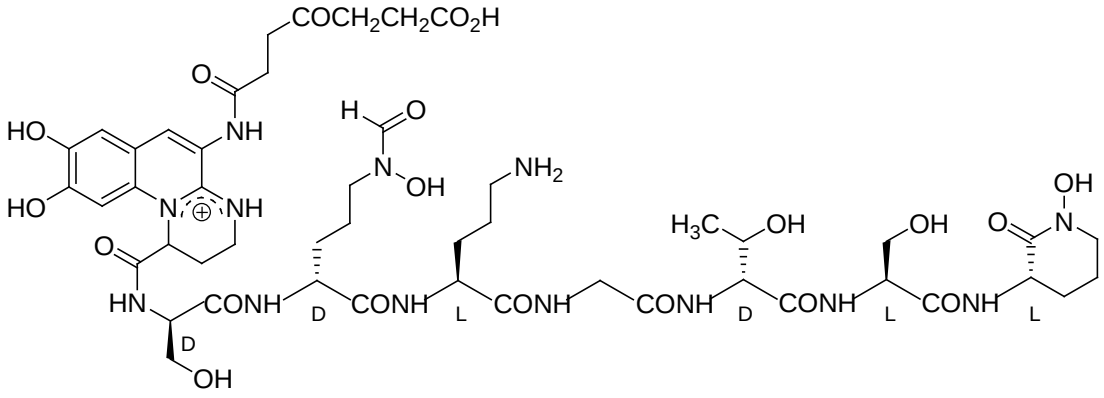
134 Pyoverdin 7.4

(Pyoverdin PVD)



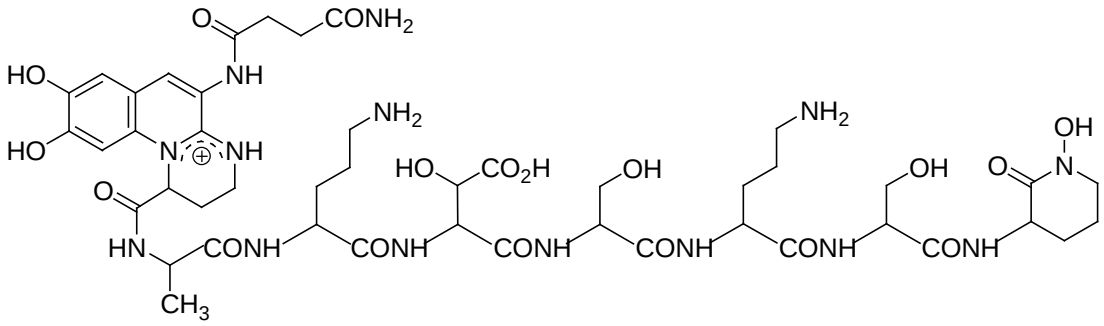
135 Pyoverdin 7.5

(Pyoverdin TII)

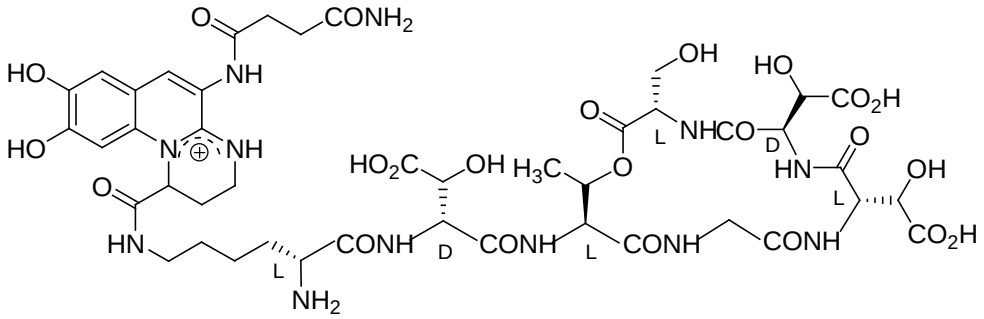


136 Pyoverdin 7.6

(chirality not assigned)

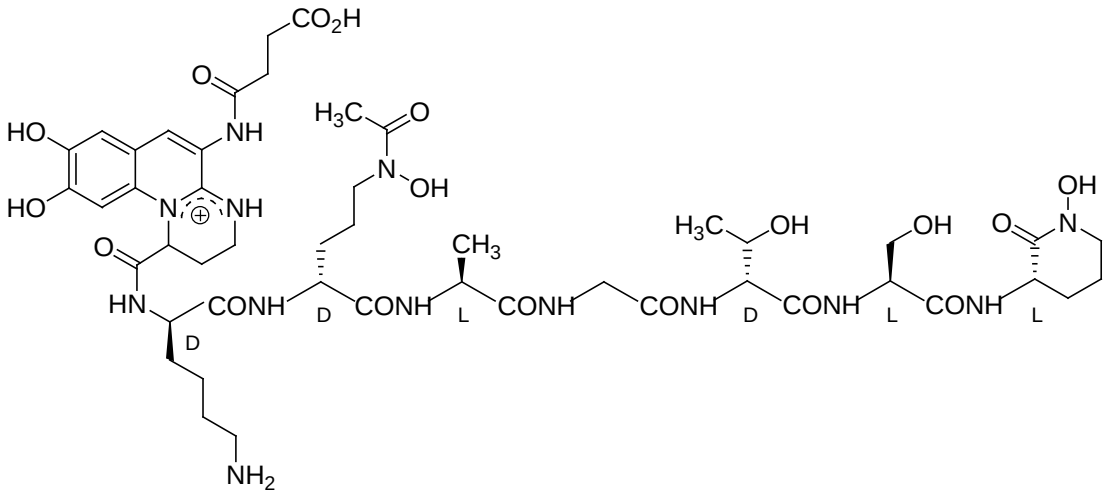


137 Pyoverdin 7.7



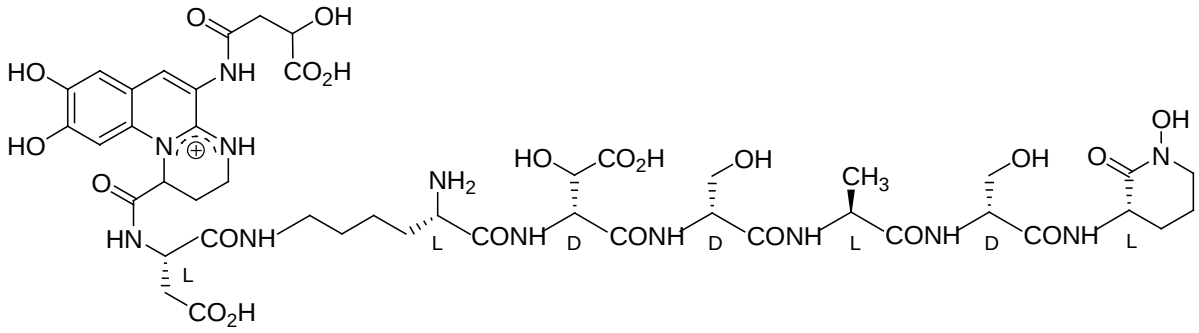
138 Pyoverdin 7.8

(Pyoverdin PL8)



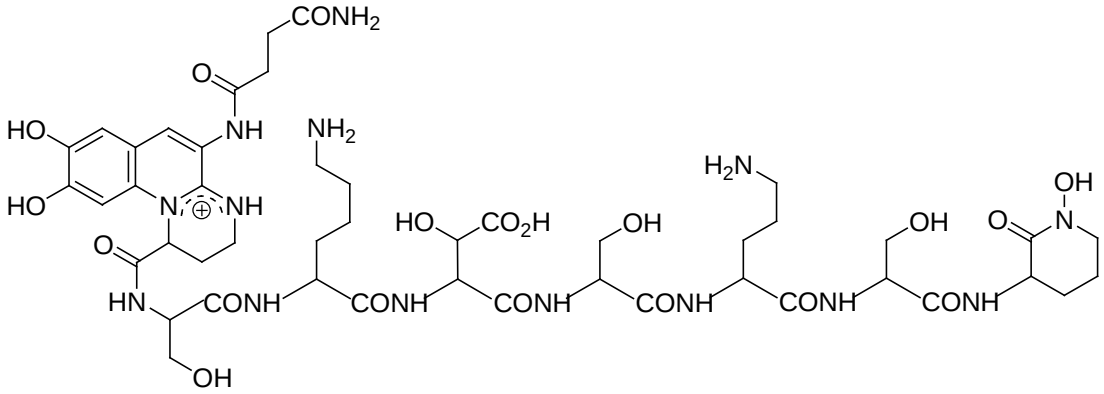
139 Pyoverdin 7.9

(Pyoverdin 11370)



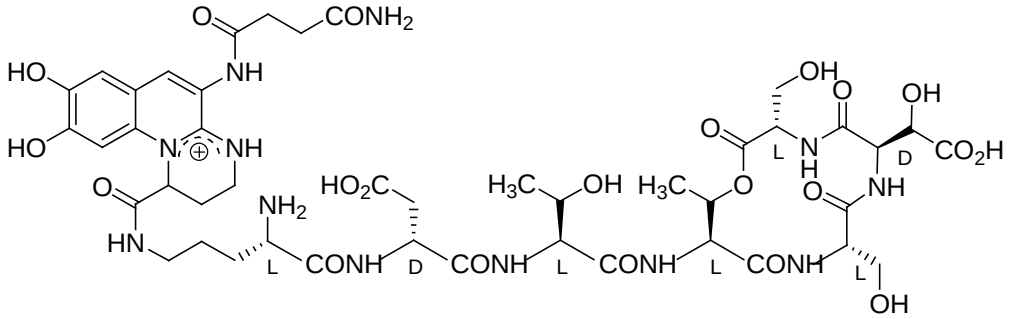
140 Pyoverdin 7.10

(chirality not assigned)



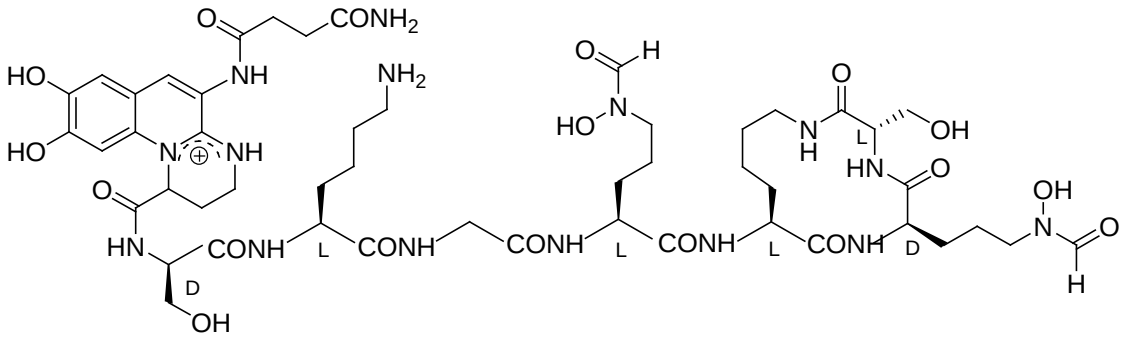
141 Pyoverdin 7.11

(Pyoverdin 19310)



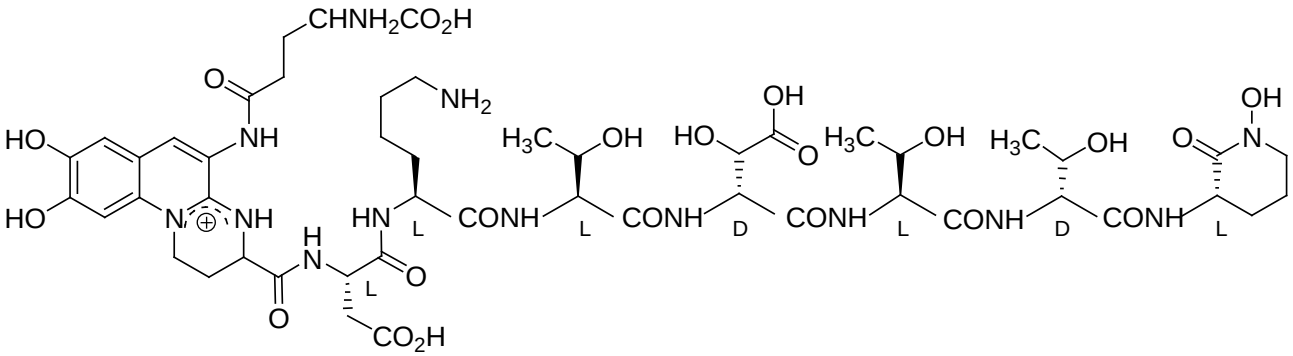
142 Pyoverdin 7.12

(Pyoverdin 13525)



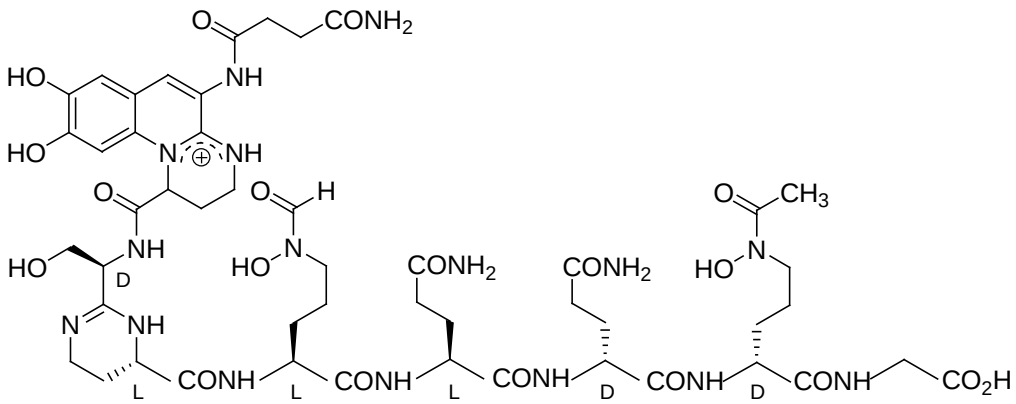
143 Pyoverdin 7.13

(Isopyoverdin 90-33)

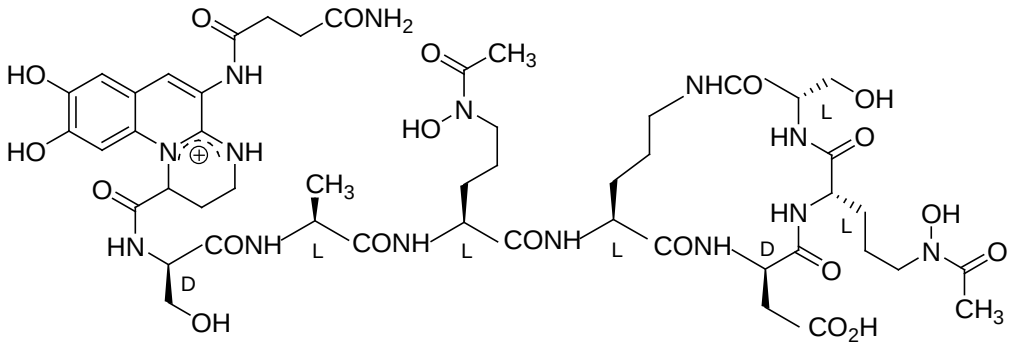


144 Pyoverdin 7.14

(Pyoverdin R`)

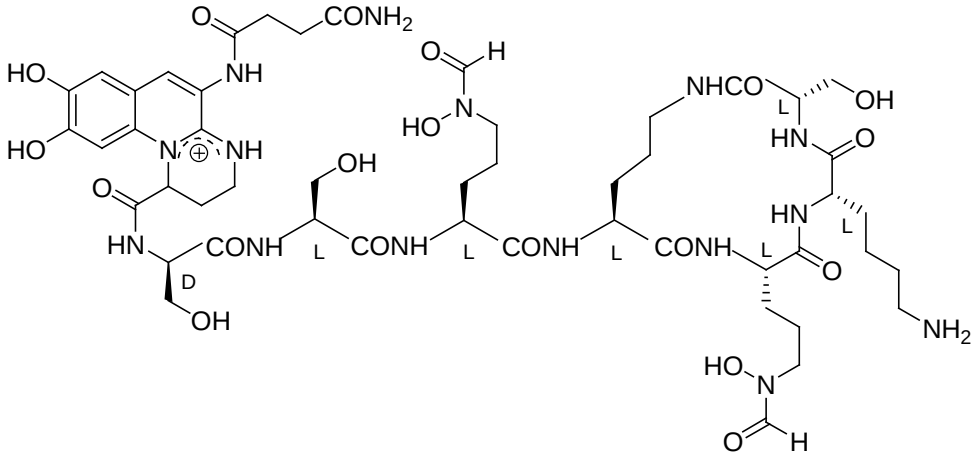


145 Pyoverdin 7.15

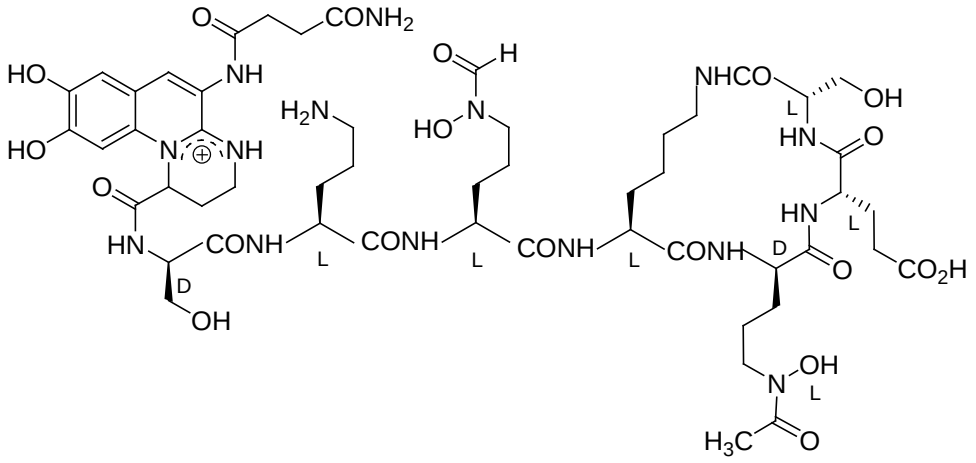


146 Pyoverdin 7.16

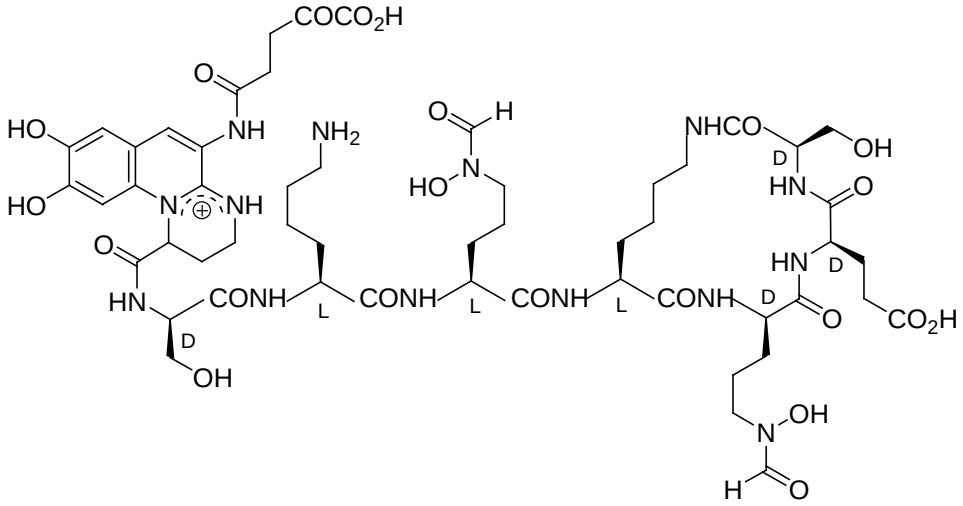
(Pyoverdin 96-312)



147 Pyoverdin 7.17

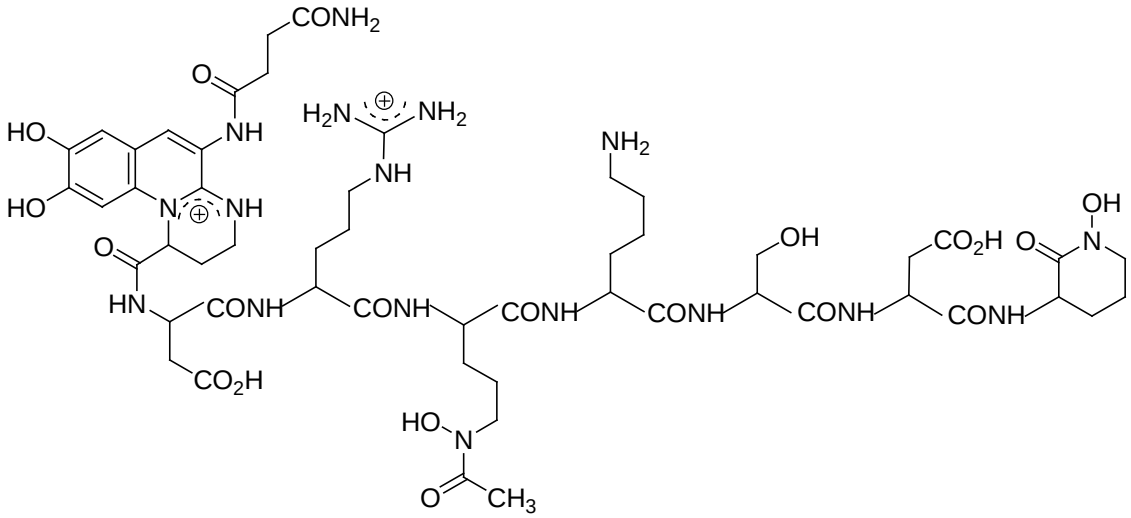


148 Pyoverdin 7.18



149 Pyoverdin 7.19

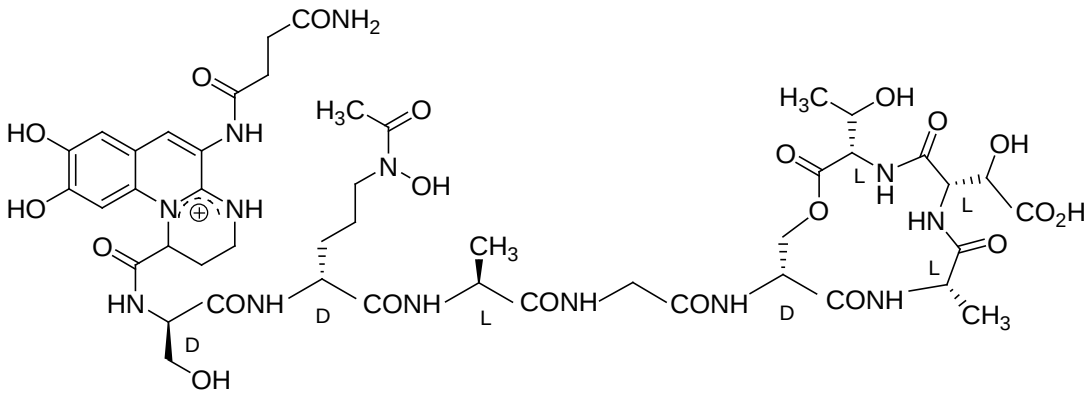
(chirality not assigned)



Pyoverdins with an eight amino acid backbone

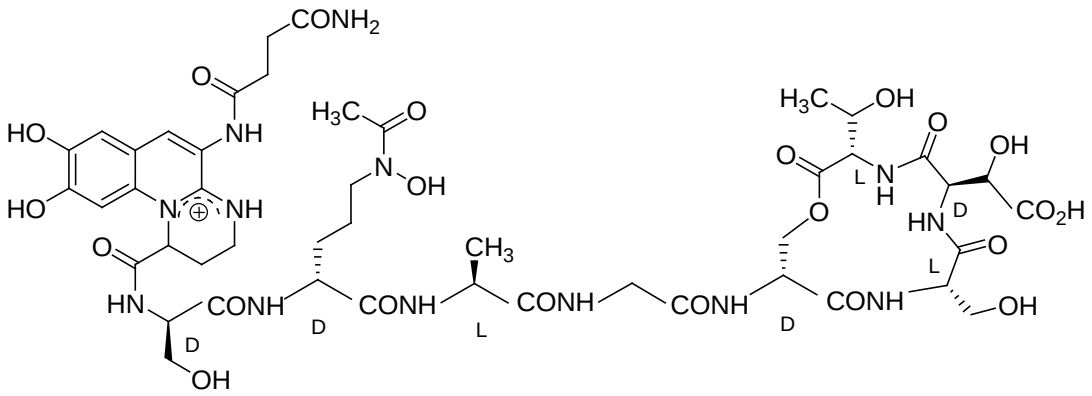
150 Pyoverdin 8.1

(Pyoverdin A214)



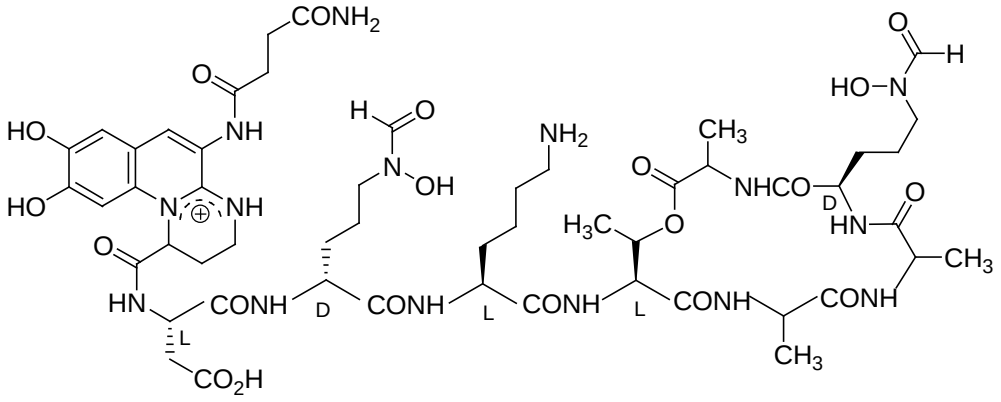
151 Pyoverdin 8.2

(Pyoverdin P19) (chirality of alanines not assigned)



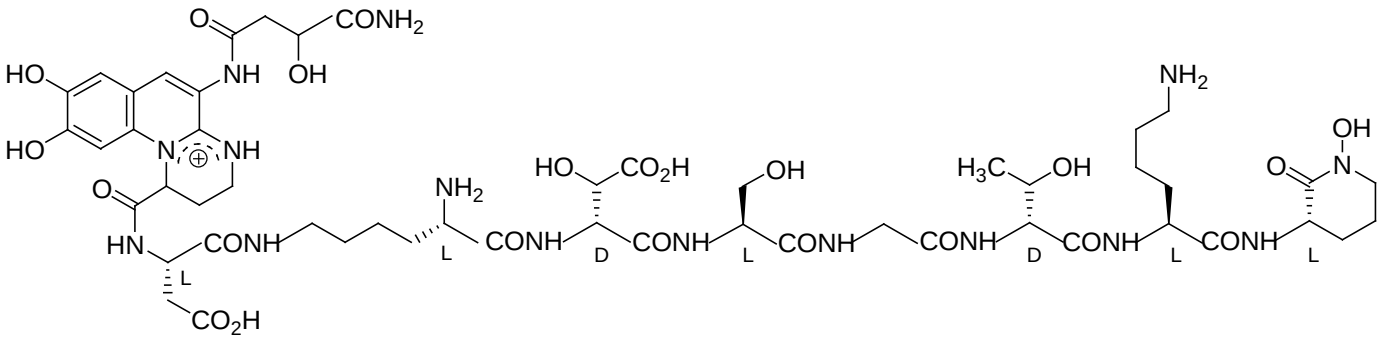
152 Pyoverdin 8.3

(Pyoverdin D-TR133) (chirality of alanines not assigned)



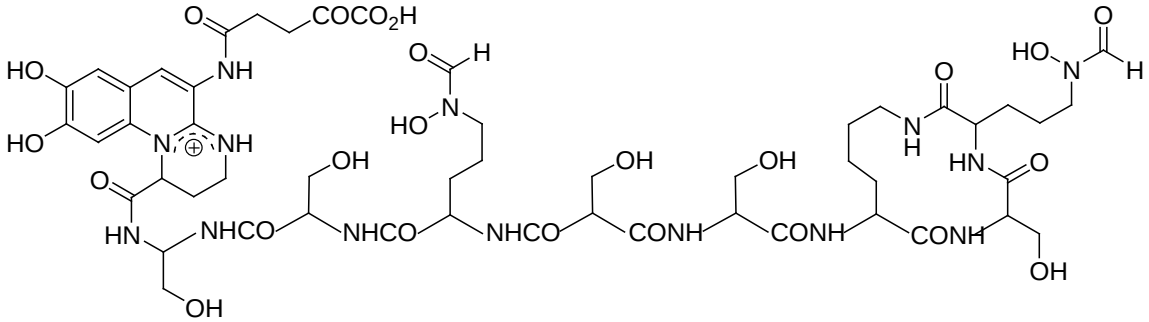
153 Pyoverdin 8.4

(Pyoverdin 90-51)



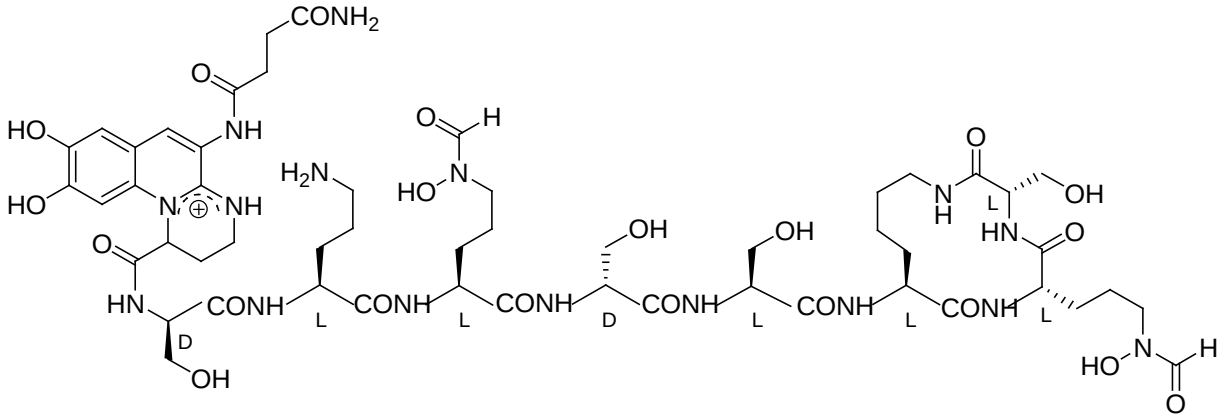
154 Pyoverdin 8.5

(chirality not assigned)



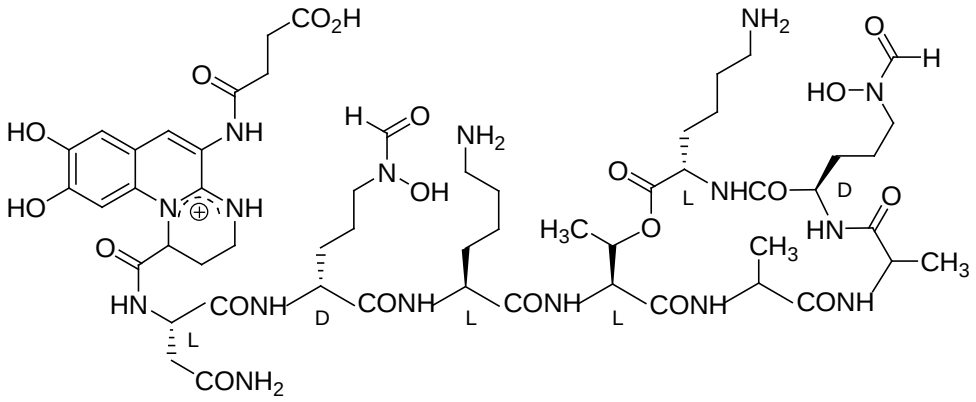
155 Pyoverdin 8.6

(Pyoverdin 96-318) (chirality not assigned)



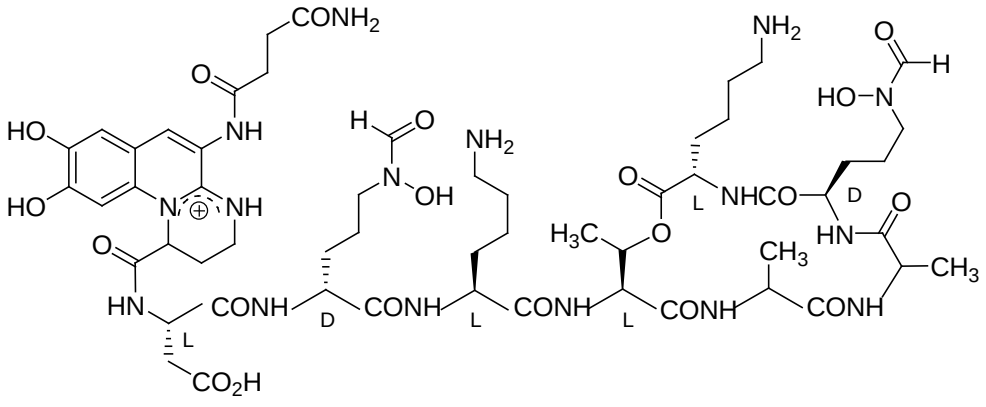
156 Pyoverdin 8.7

(Pyoverdin I-III) (chirality of alanines not determined)



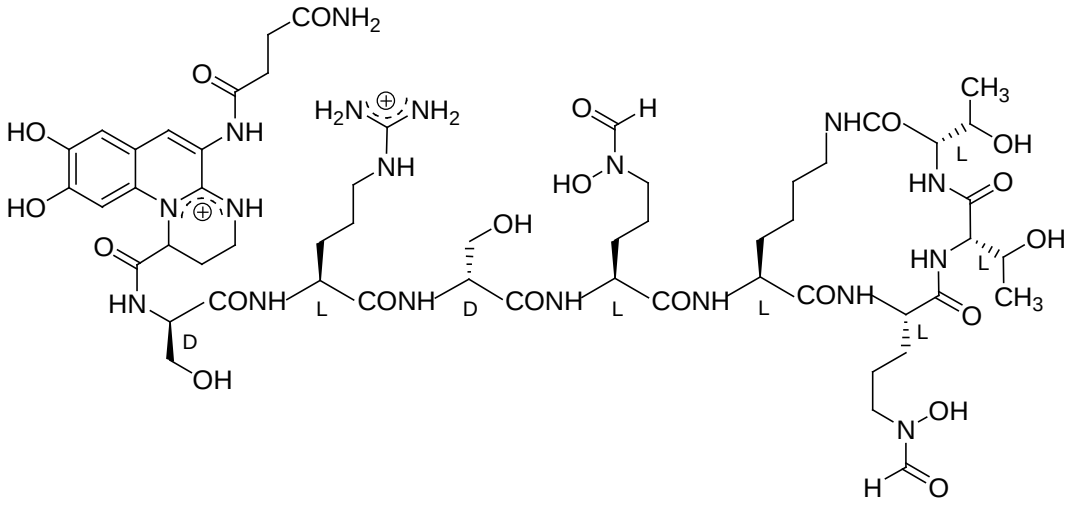
157 Pyoverdin 8.8

(Pyoverdin CHAO) (chirality of alanines not determined)



158 Pyoverdin 8.9

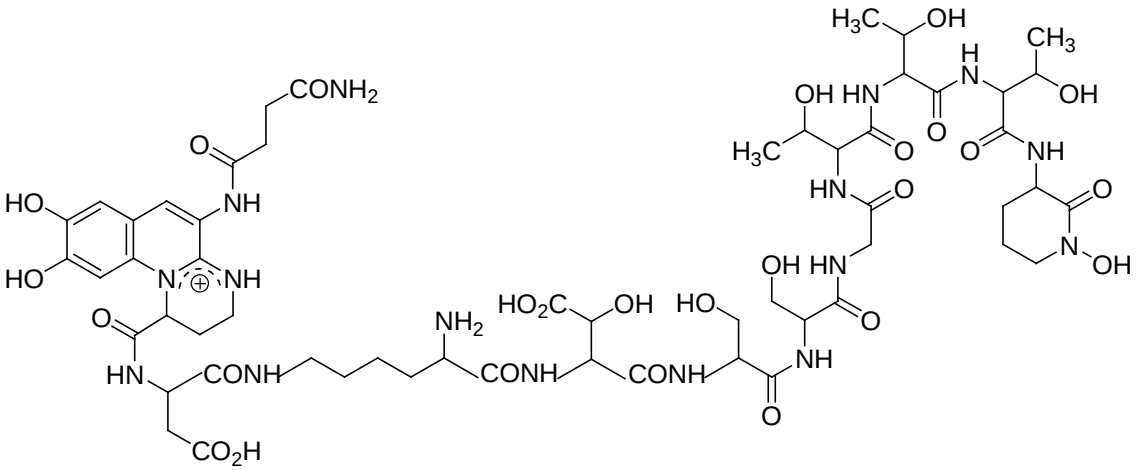
(Pyoverdin E)



Pyoverdins with a nine amino acid backbone

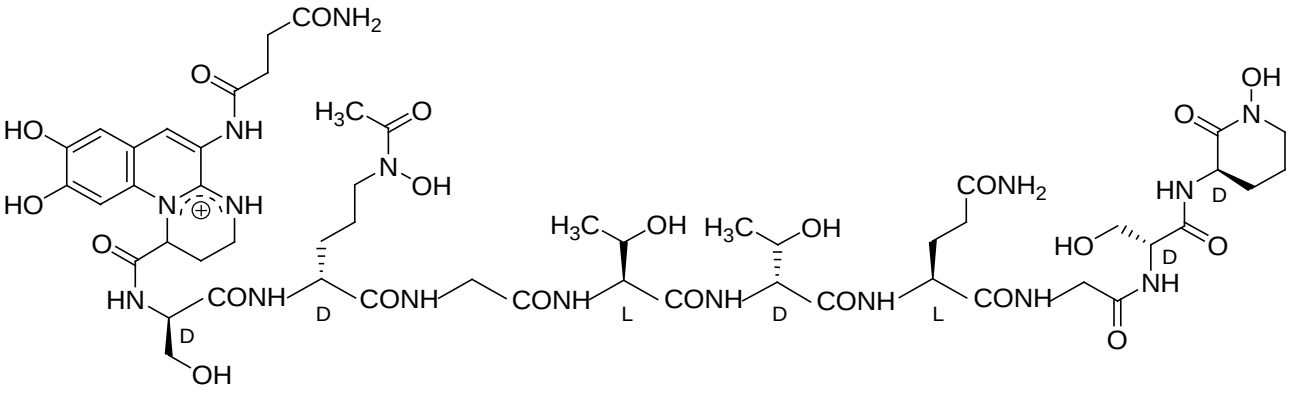
159 Pyoverdin 9.1

(chirality not assigned)



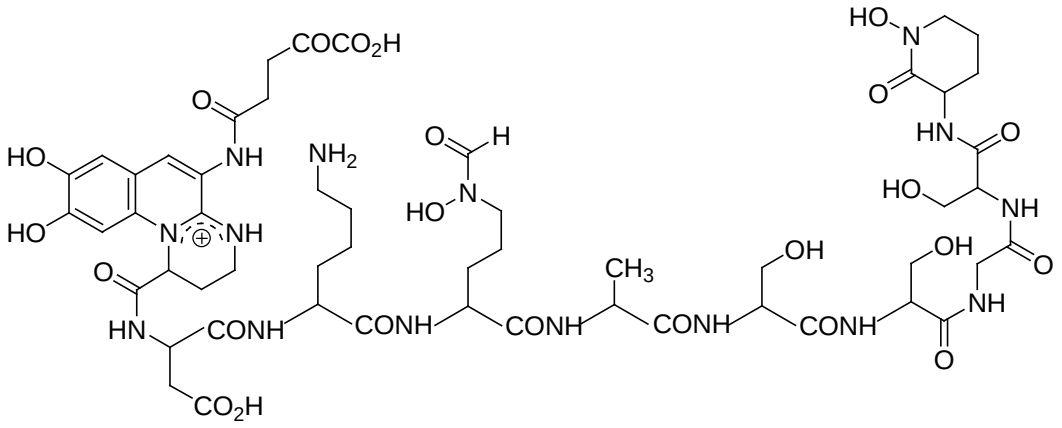
160 Pyoverdin 9.2

(Pyoverdin Pau)



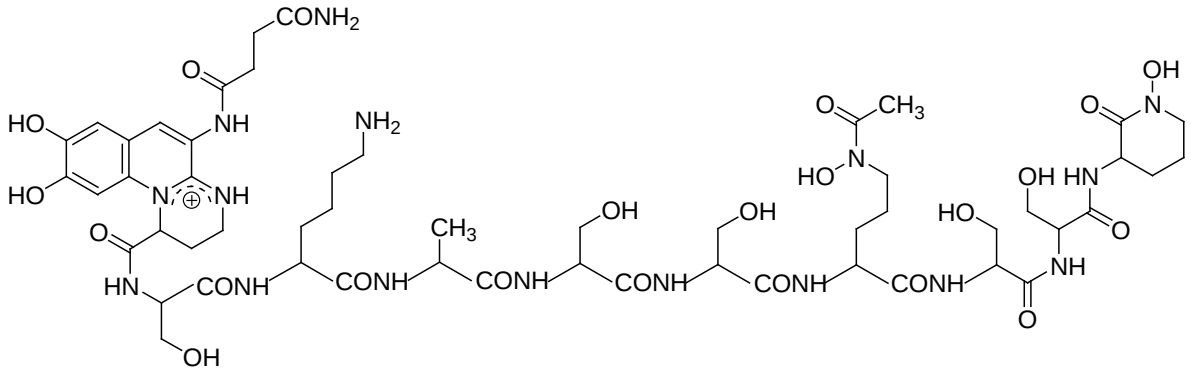
161 Pyoverdin 9.3

(chirality not determined)



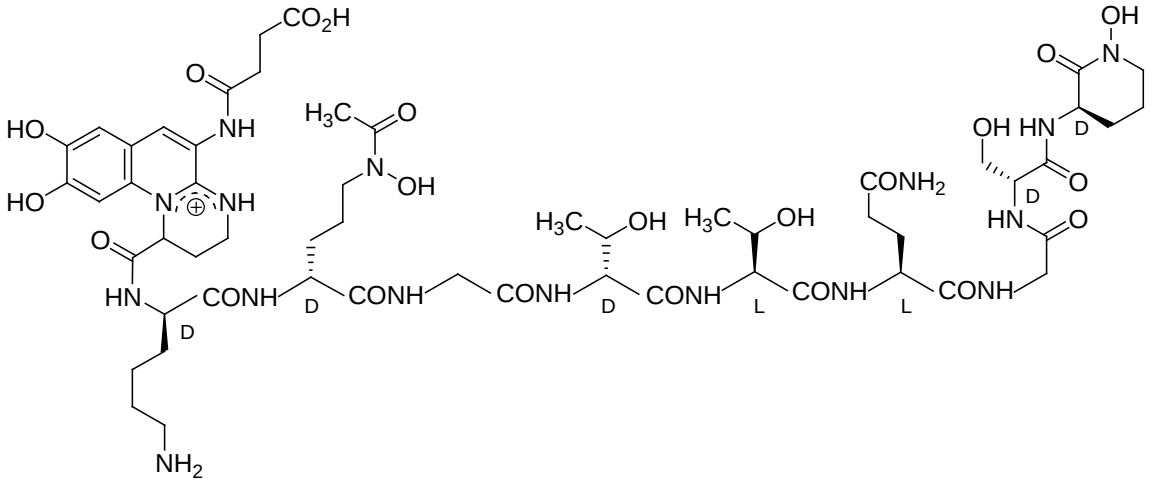
162 Pyoverdin 9.4

(chirality not determined)



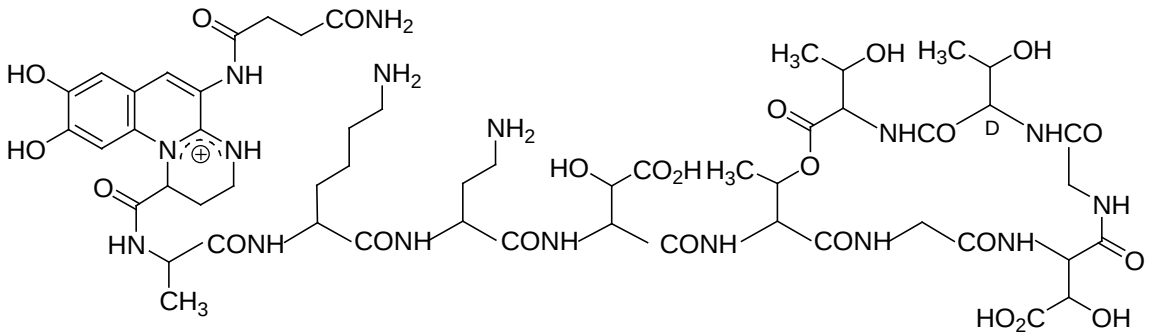
163 Pyoverdin 9.5

(Pyoverdin 2392)



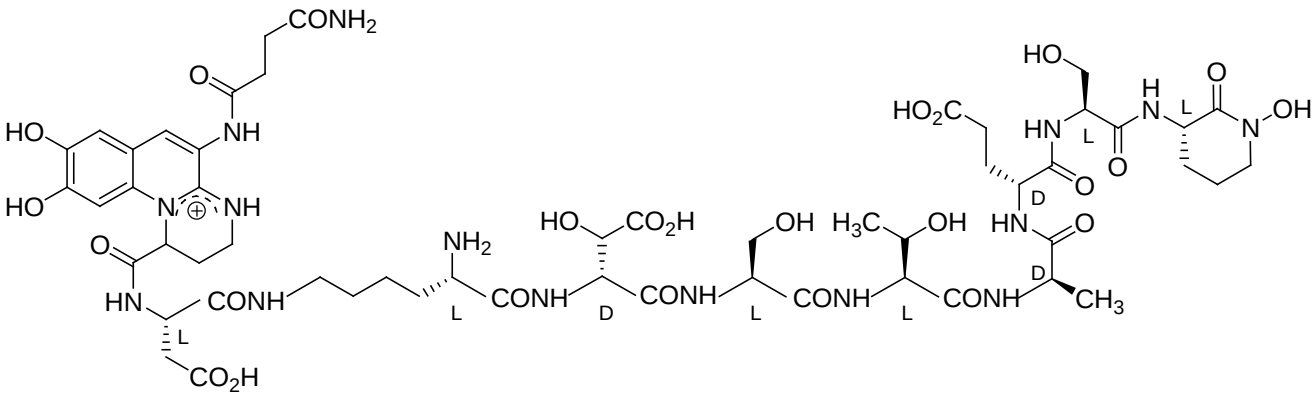
164 Pyoverdin 9.6

(chirality not assigned)



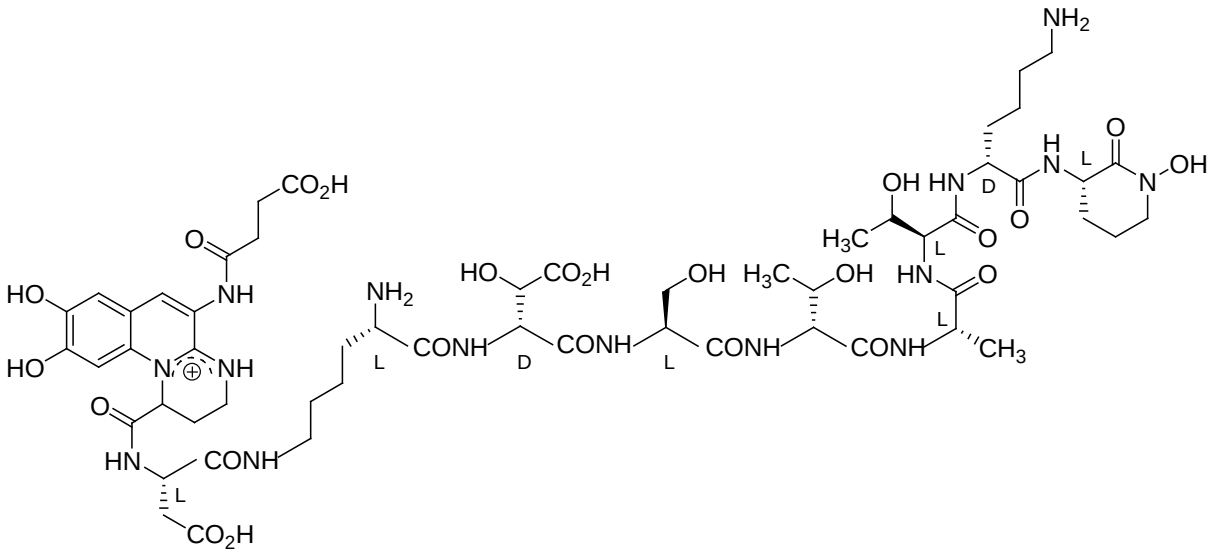
165 Pyoverdin 9.7

(Pseudobactin 589A)

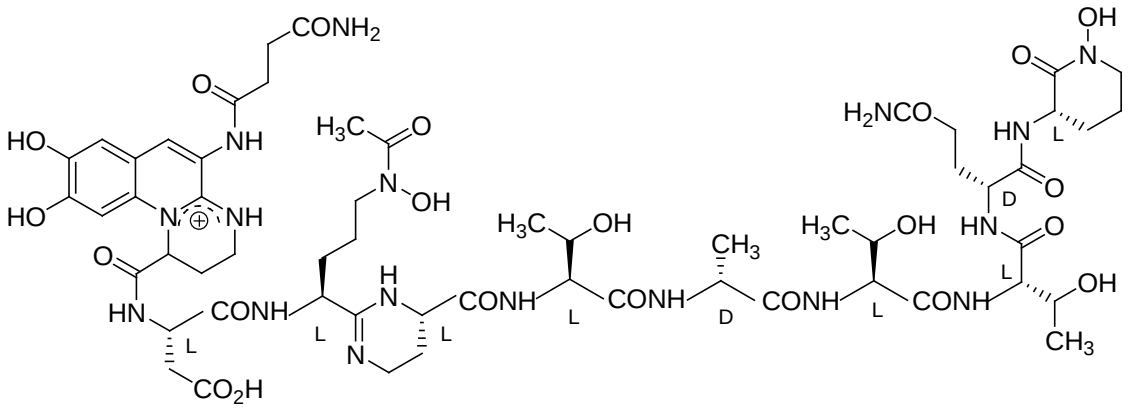


166 Pyoverdin 9.8

(Pyoverdin 2461)

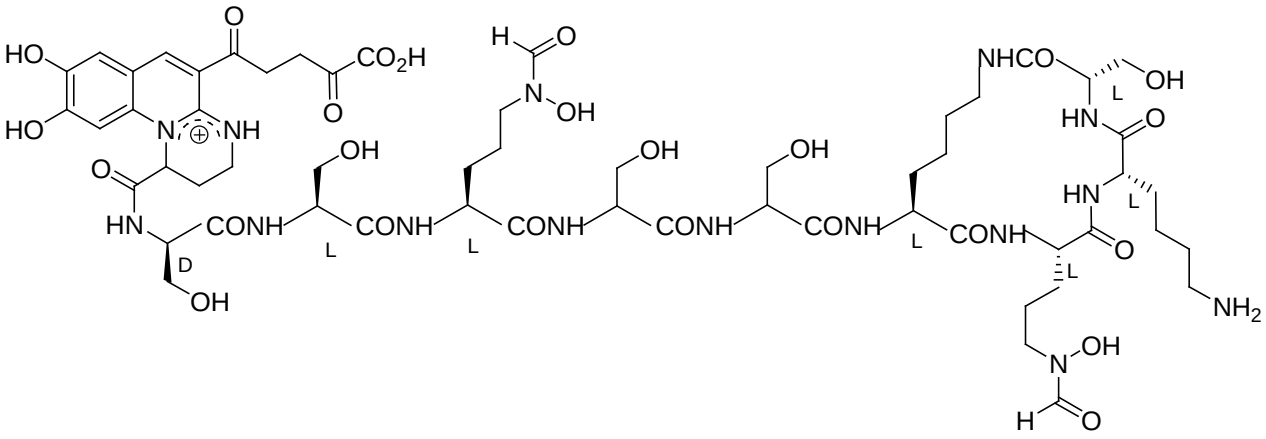


167 Pyoverdin 9.9



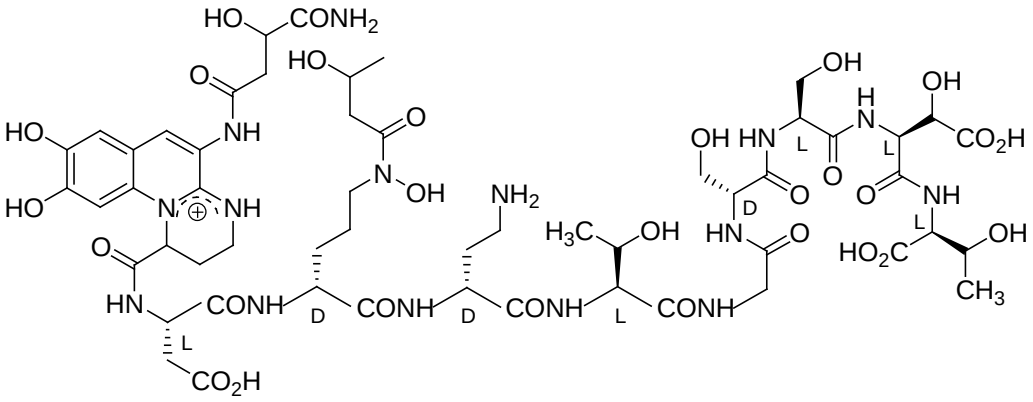
168 Pyoverdin 9.10

(Pyoverdin 95-275) (chirality of serine not established)



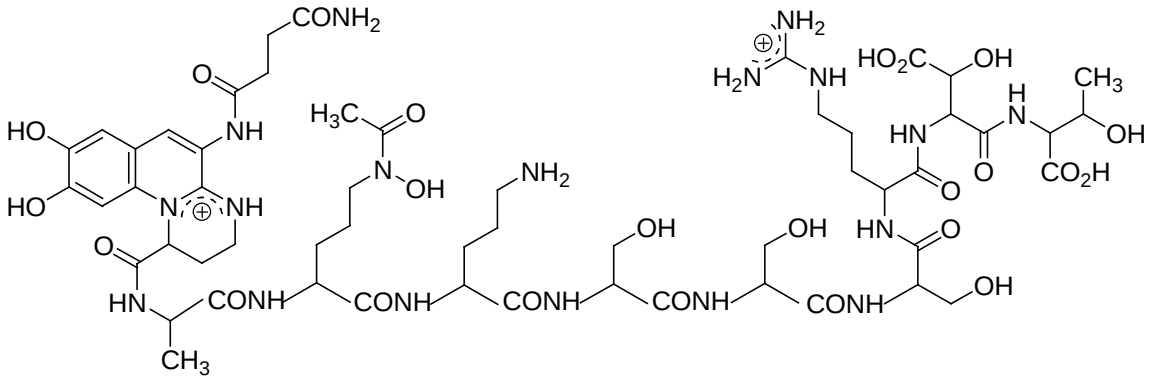
169 Pyoverdin 9.11

(Pyoverdin C)



170 Pyoverdin 9.12

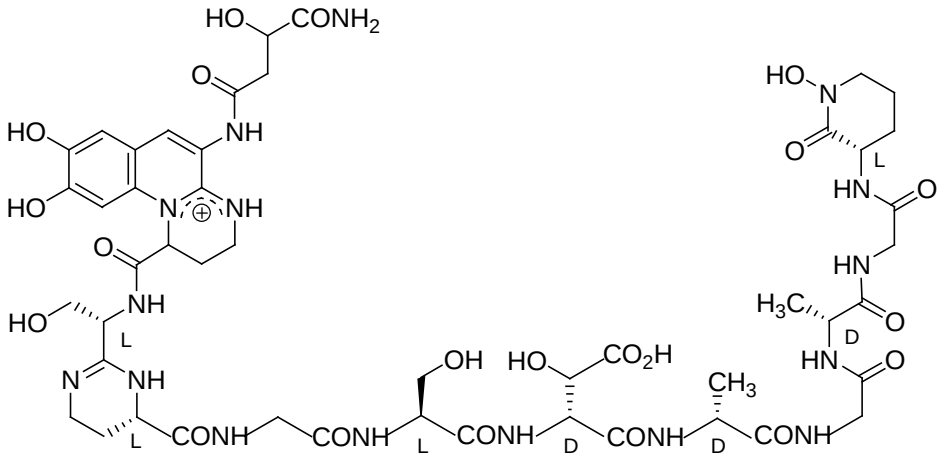
(chirality not determined)



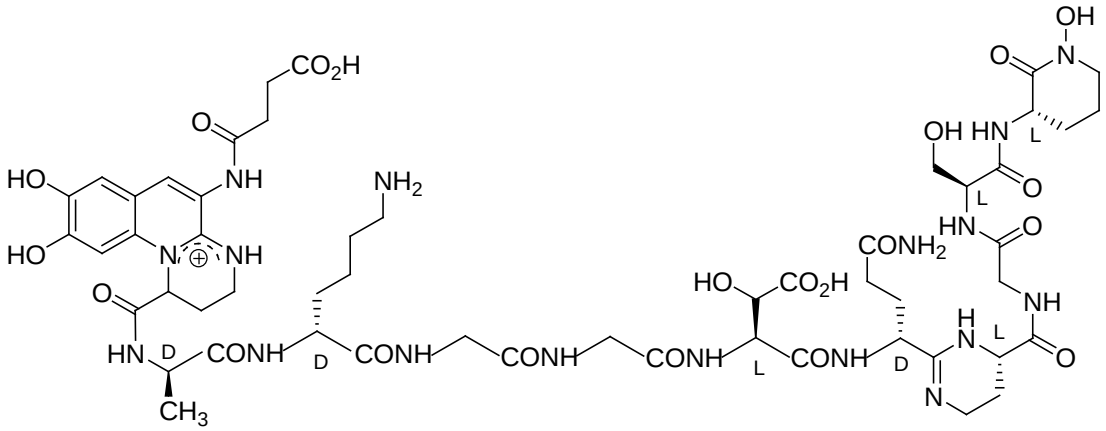
Pyoverdins with a ten amino acid backbone

171 Pyoverdin 10.1

(Pyoverdin 2798)

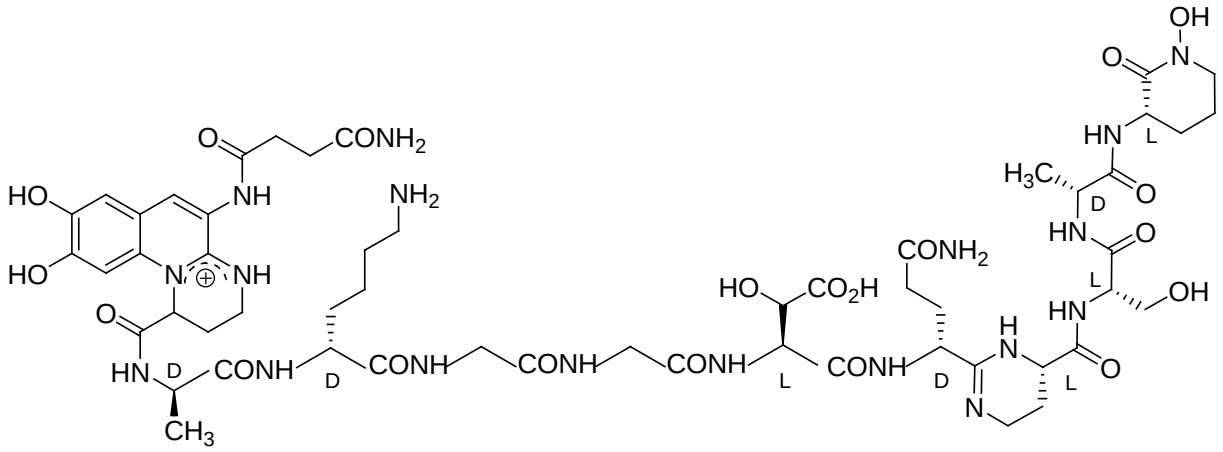


172 Pyoverdin 10.2



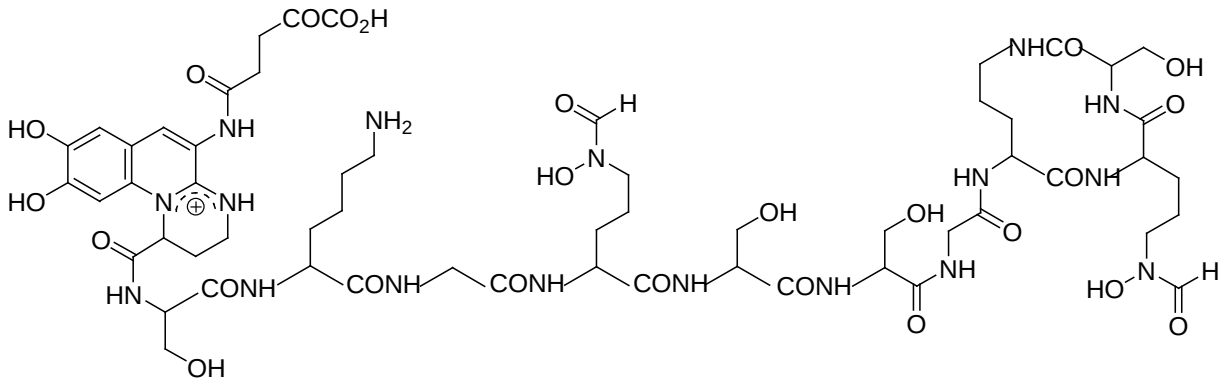
173 Pyoverdin 10.3

(Pyoverdin 17400)



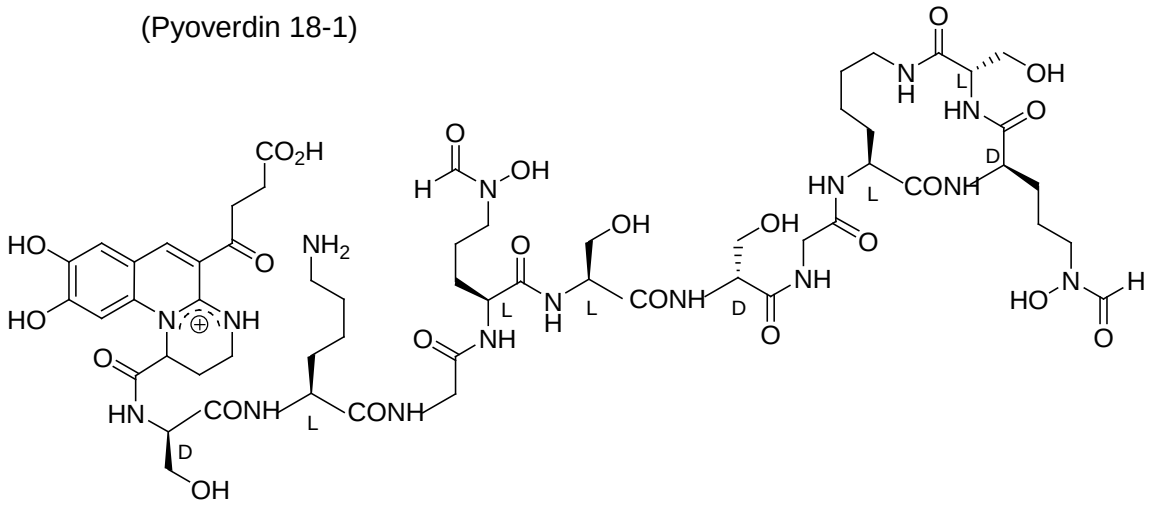
174 Pyoverdin 10.4

(chirality not determined)



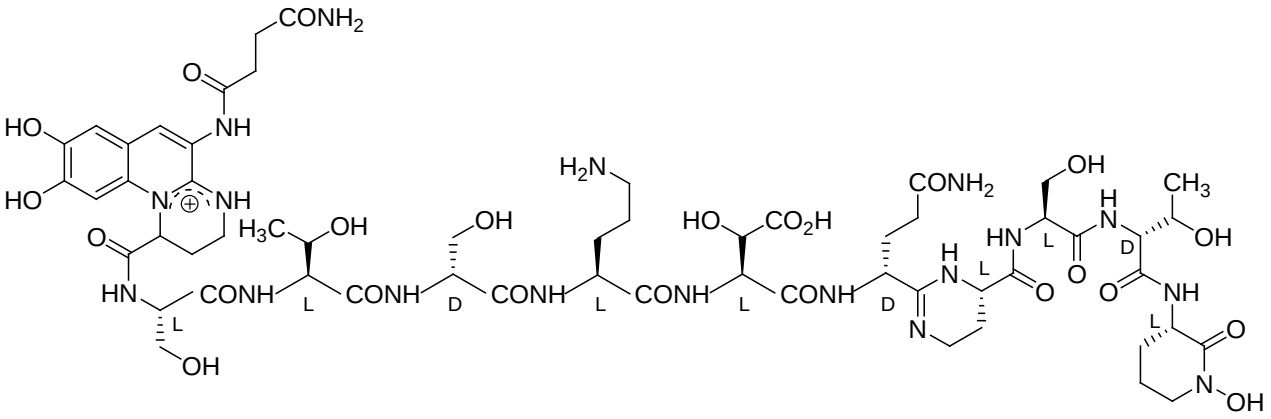
175 Pyoverdin 10.5

(Pyoverdin 18-1)



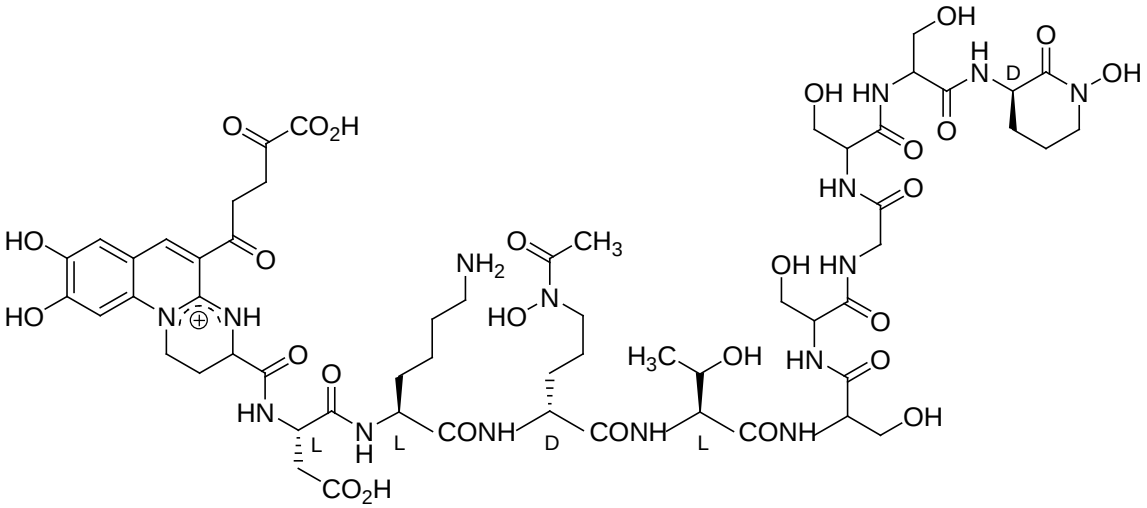
176 Pyoverdin 10.6

(Pyoverdin 1,2)



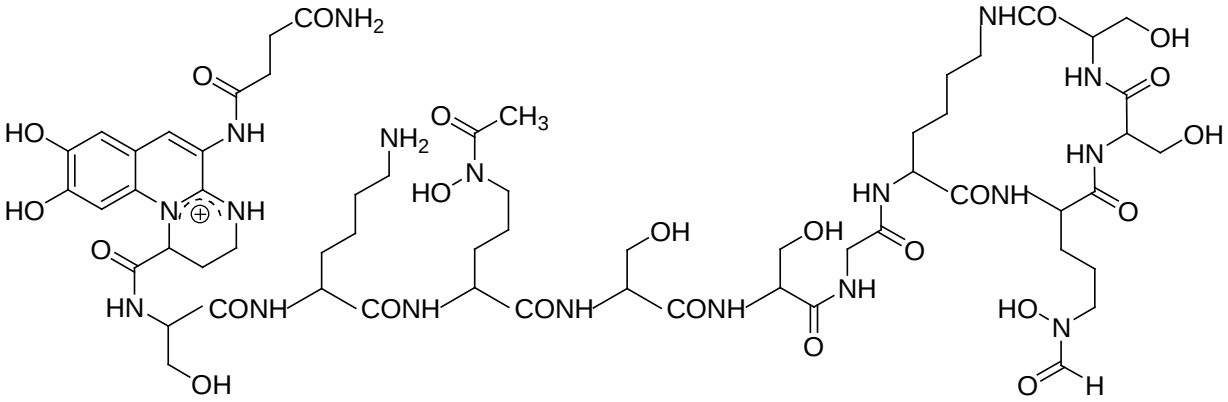
177 Pyoverdin 10.7

(Isopyoverdin 90-44) (chirality of serine not determined)



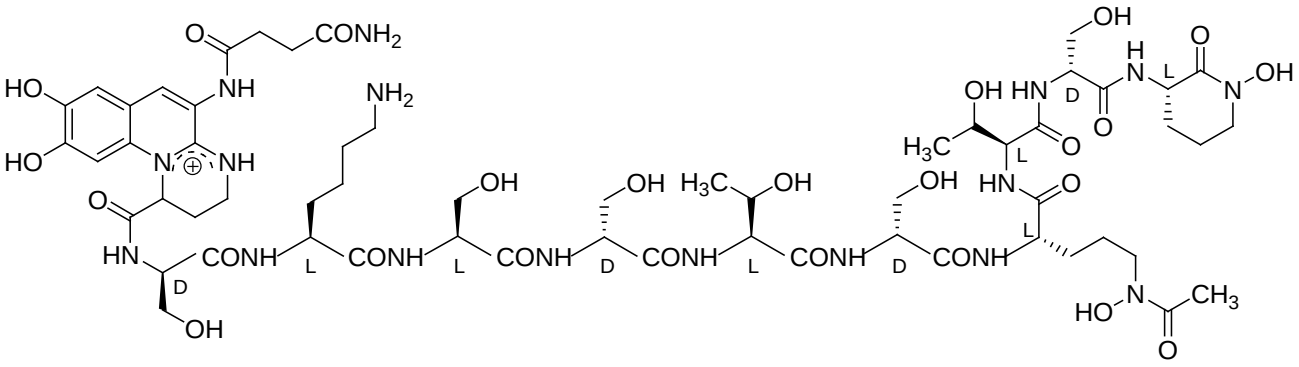
178 Pyoverdin 10.8

(chirality not determined)



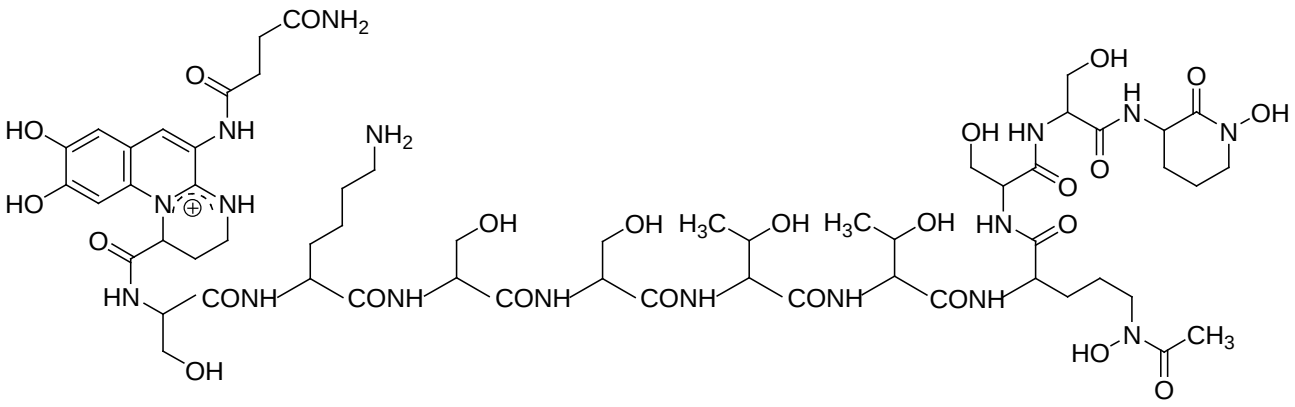
179 Pyoverdin 10.9

(Pyoverdin 2192)



180 Pyoverdin 10.10

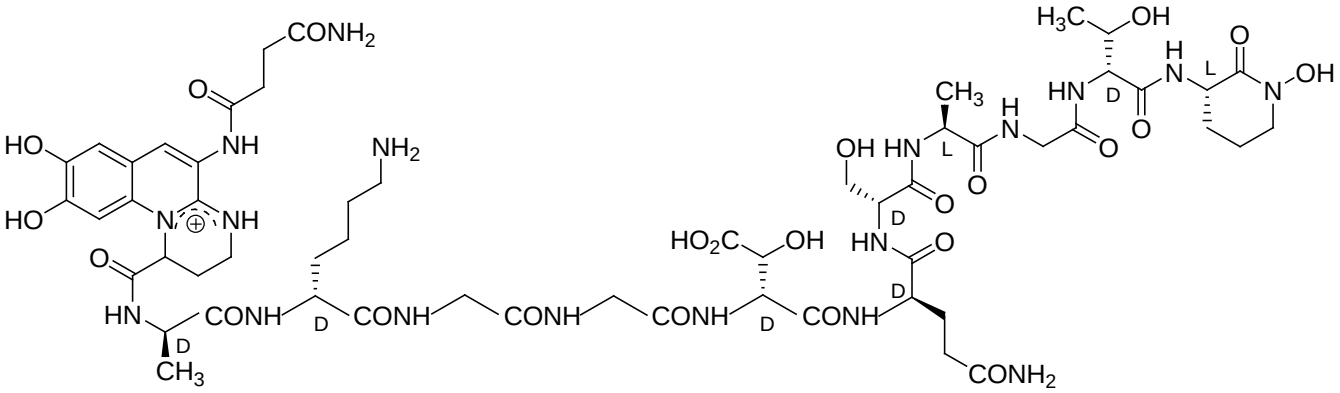
(chirality not determined)



Pyoverdins with an eleven amino acid backbone

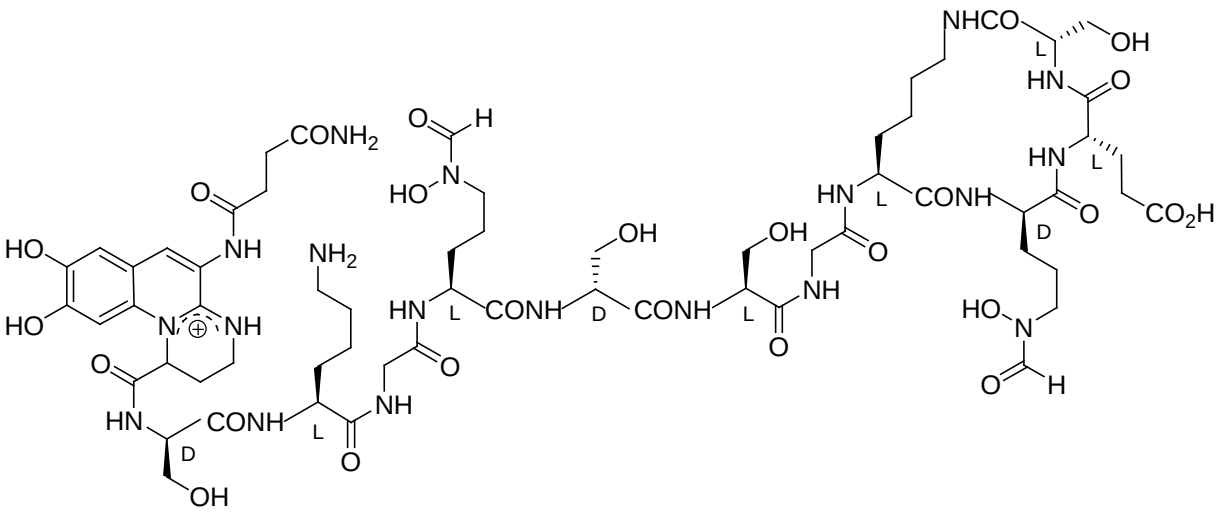
181 Pyoverdin 11.1

(Pyoverdin 51W)



182 Pyoverdin 11.2

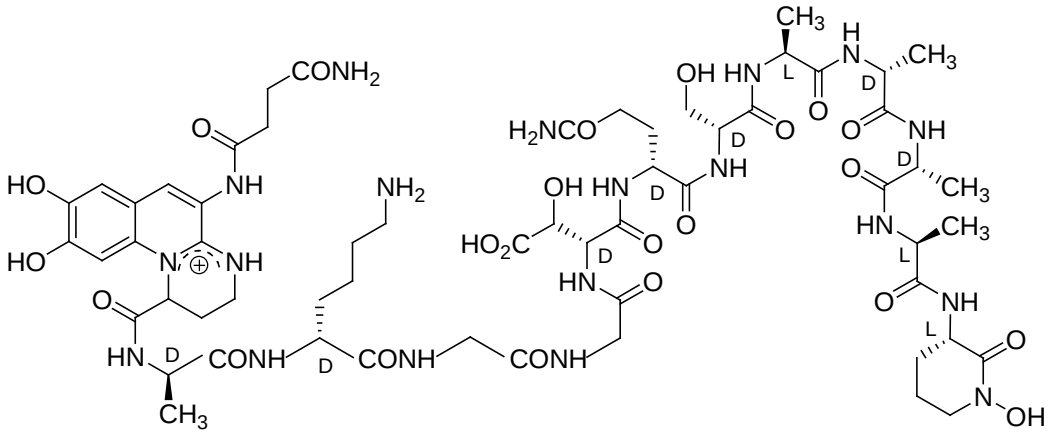
(Pyoverdin 12)



Pyoverdins with a twelve amino acid backbone

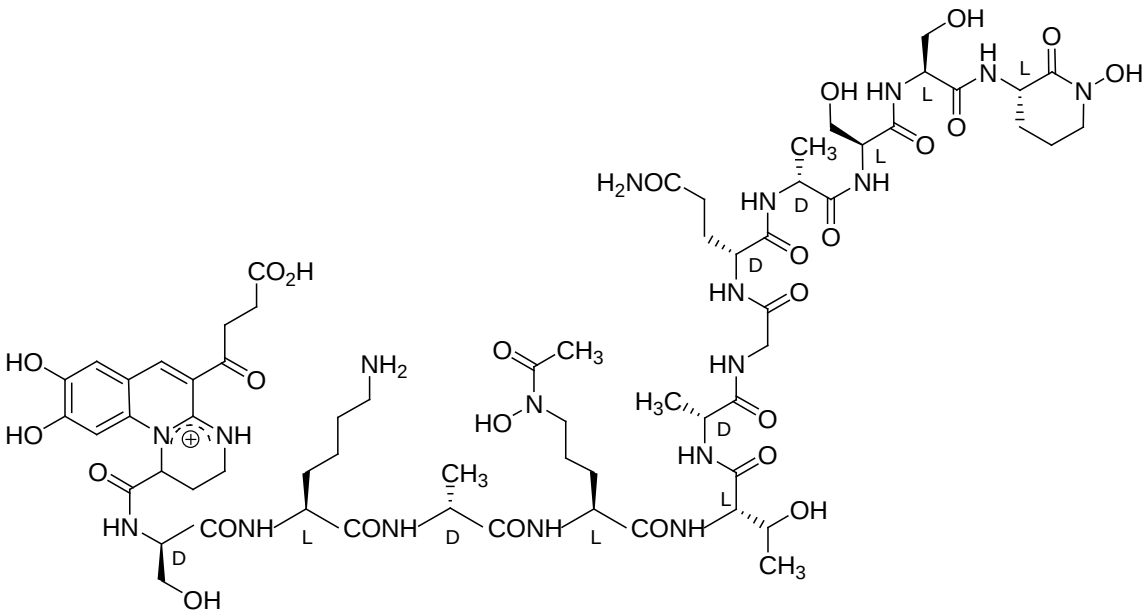
183 Pyoverdin 12.1

(Pyoverdin GM)



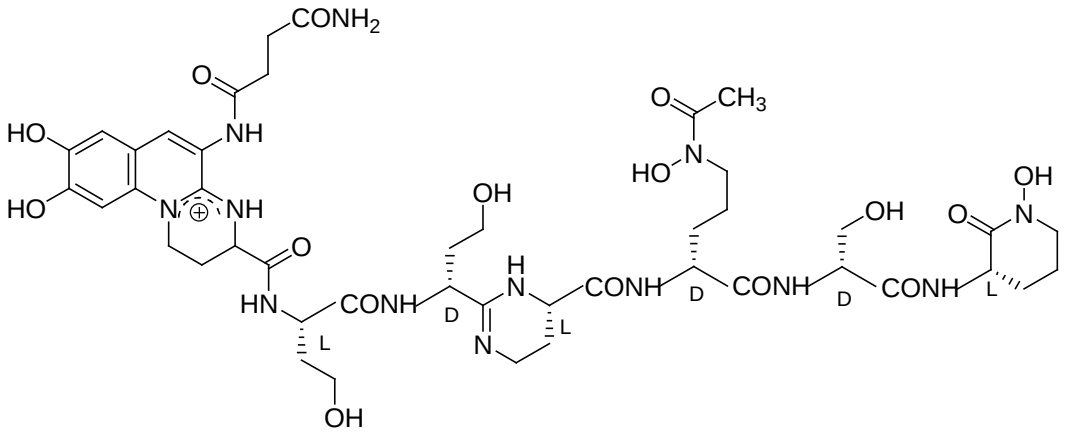
184 Pyoverdin 12.2

(Pyoverdin 1547)



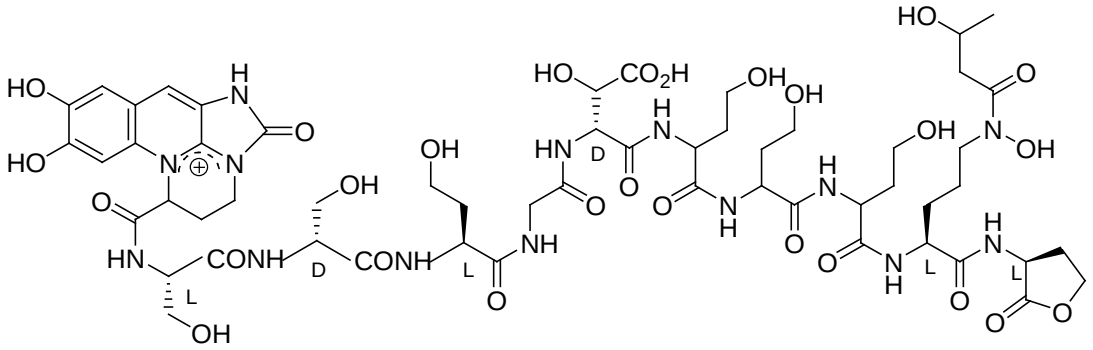
1.4.1.4 Other hexadentate hydroxamate / phenolate siderophores

185 Azoverdin

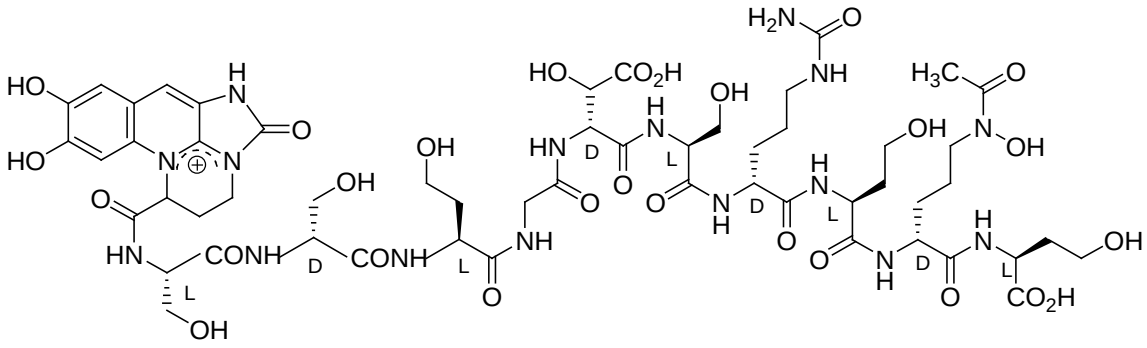


186 Azotobactin 87

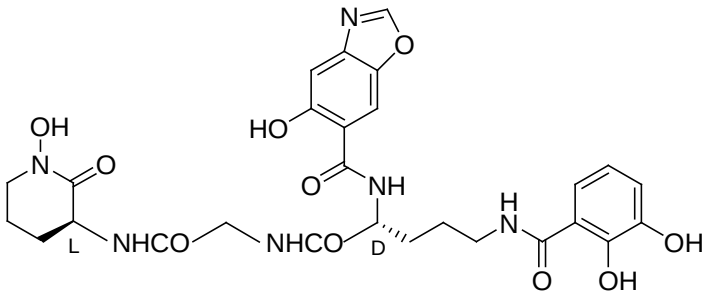
(chirality of homoserine not fully determined)



187 Azotobactin D

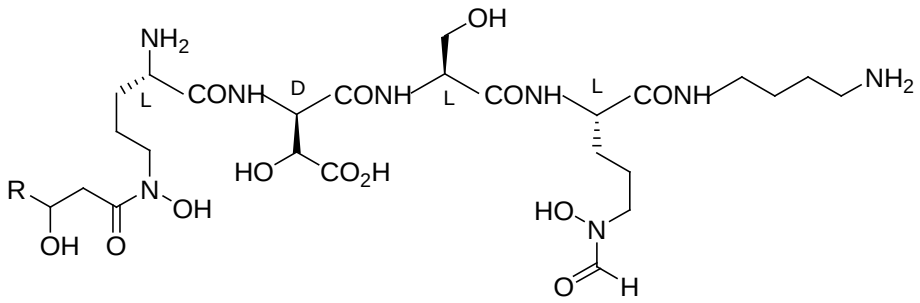


188 Heterobactin A



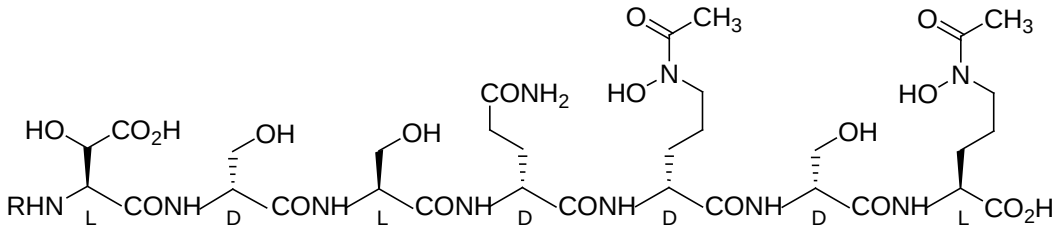
1.4.2 Hydroxamate / α-Hydroxycarboxylate

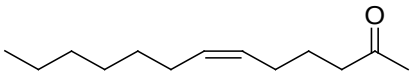
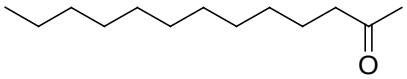
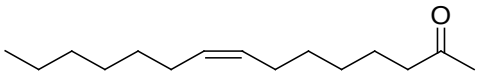
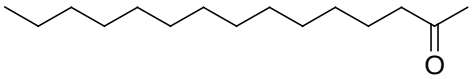
1.4.2.1 Ornibactins



Code	Name	R
189	Ornibactin – C_4	CH_3
190	Ornibactin – C_6	$CH_3CH_2CH_2$
191	Ornibactin – C_8	$CH_3CH_2CH_2CH_2CH_2$

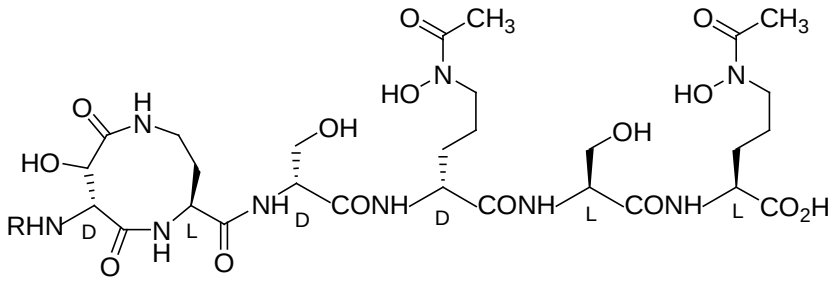
1.4.2.2 Aquachelins

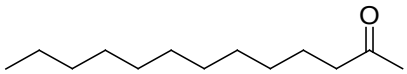
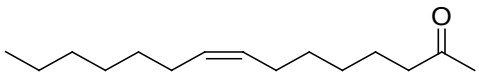
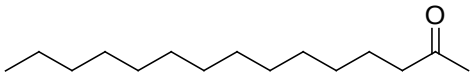
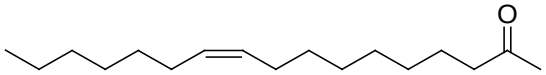
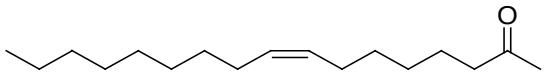
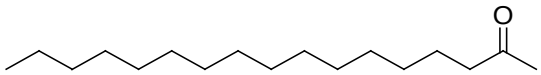


Code	Name	R
192	Aquachelin A	
193	Aquachelin B	
194	Aquachelin C	
195	Aquachelin D	
196	Aquachelin I	
197	Aquachelin J	

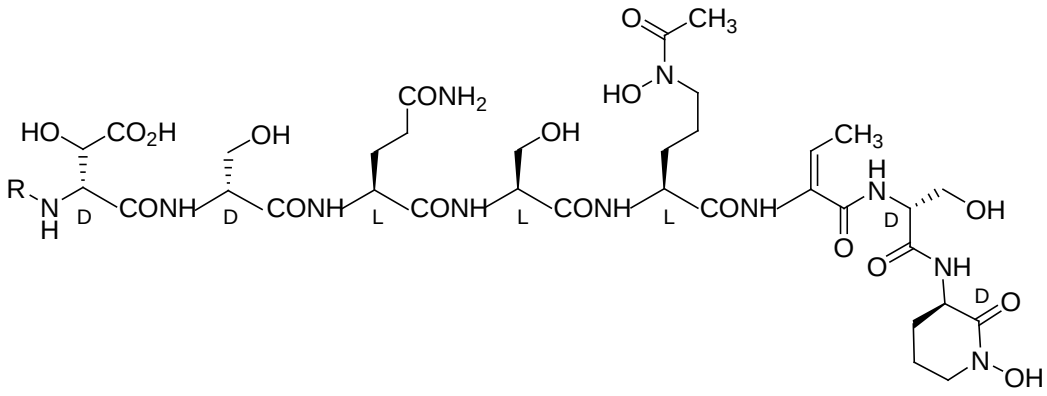
1.4.2.3 Marinobactins

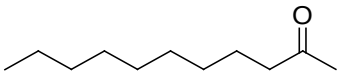
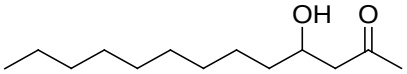
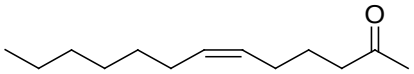
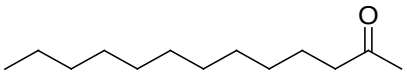
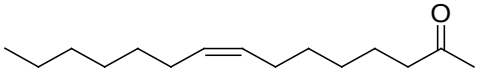
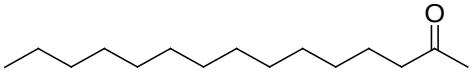
(α-Hydroxycarboxyamide / hydroxamate)



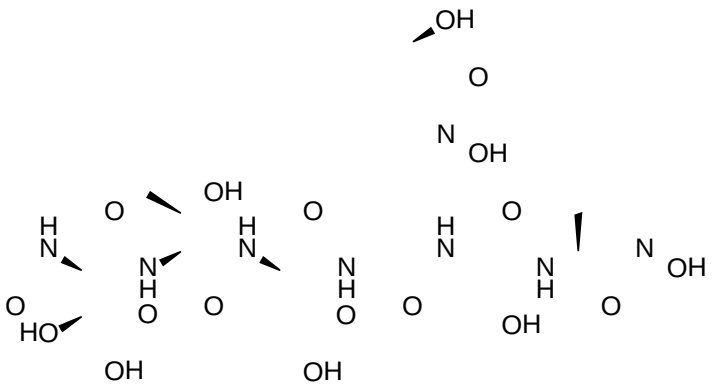
Code	Name	R
198	Marinobactin A	
199	Marinobactin B	
200	Marinobactin C	
201	Marinobactin D_1	
202	Marinobactin D_2	
203	Marinobactin E	

1.4.2.4 Loihichelins

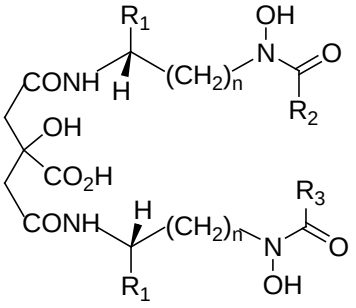


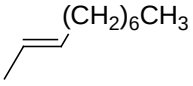
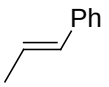
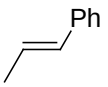
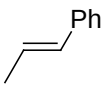
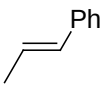
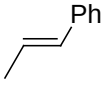
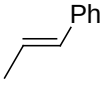
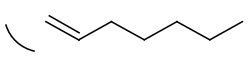
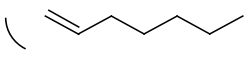
Code	Name	R
204	Loihichelin A	
205	Loihichelin B	
206	Loihichelin C	
207	Loihichelin D	
208	Loihichelin E	
209	Loihichelin F	

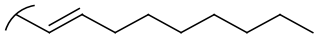
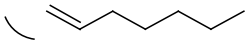
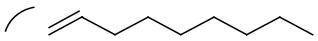
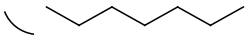
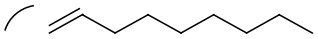
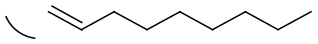
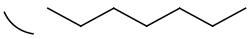
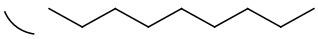
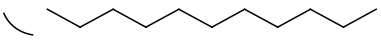
210 Taiwachelin



1.4.2.5 Other hexadentate hydroxamate / α-hydroxycarboxylate

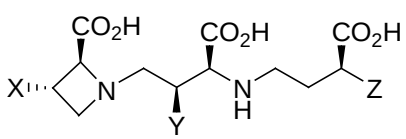


Code	Name	R_1	R_2	R_3	n
211	Schizokinen	H	CH_3	CH_3	2
212	Aerobactin	CO_2H	CH_3	CH_3	4
213	Arthrobactin	H	CH_3	CH_3	4
214	Rhizobactin 1021	H	CH_3		2
215	Nannochelin A	CO_2CH_3			4
216	Nannochelin B	CO_2CH_3 and CO_2H			4
217	Nannochelin C	CO_2H			4
218	Acinetoferrin	H	R_2		2
			R_3		

219	Ochrobactin A	CO_2H	R_2		4
			R_3		
220	Ochrobactin B	CO_2H	R_2		4
			R_3		
221	Ochrobactin C	CO_2H	R_2		4
			R_3		
222	Snychobactin A	H	R_2	CH_3	3
			R_3		
223	Snychobactin B	H	R_2	CH_3	3
			R_3		
224	Snychobactin C	H	R_2	CH_3	3
			R_3		

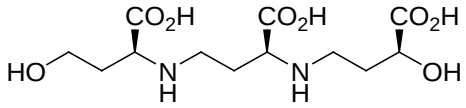
1.4.3 α-Hydroxycarboxylate / α-aminocarboxylate

Mugineic acids

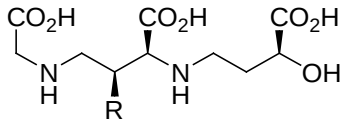


Code	Name	X	Y	Z
225	Mugineic acid	H	OH	OH
226	3-Hydroxymugineic acid	OH	OH	OH
227	2-Deoxymugineic acid	H	H	OH

228 Avenic acid

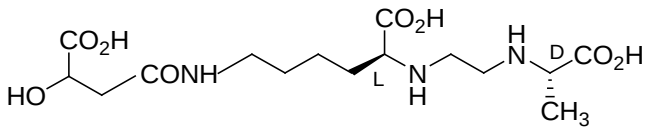


Distichonic acids

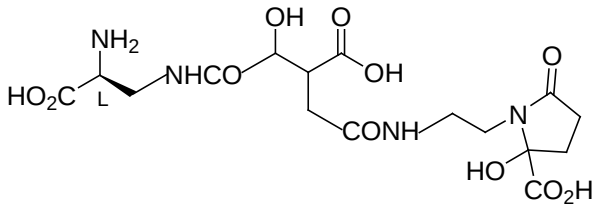


Code	Name	R
229	Distichonic acid	OH
230	Deoxydistichonic acid	H

231 Rhizobactin

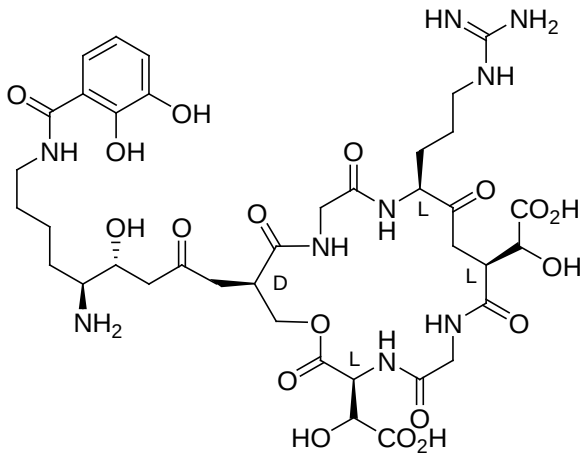


232 Staphyloferrin B

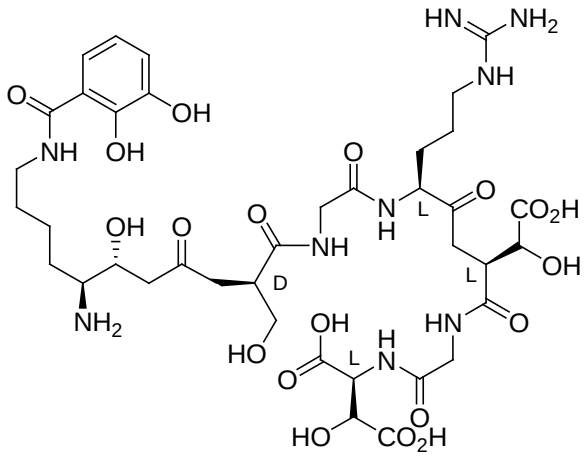


1.4.4 Phenol / α-hydroxycarboxylate

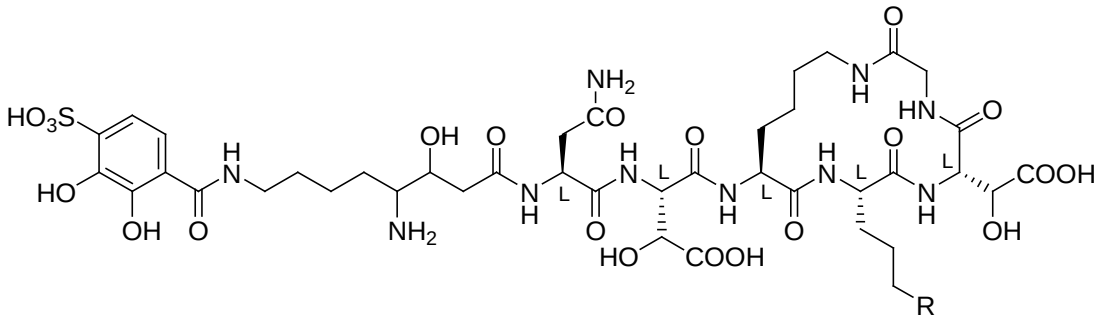
233 Alterobactin A

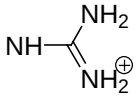


234 Alterobactin B

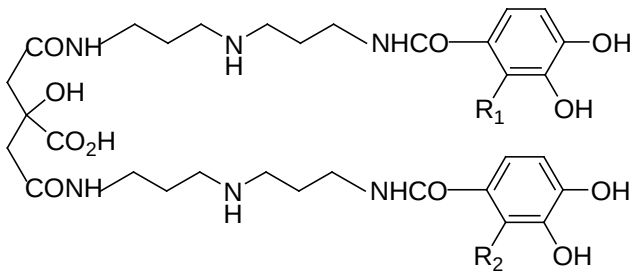


Pseudoalterobactins



Code	Name	R
235	Pseudoalterobactin A	CH_2NH_2
236	Pseudoalterobactin B	

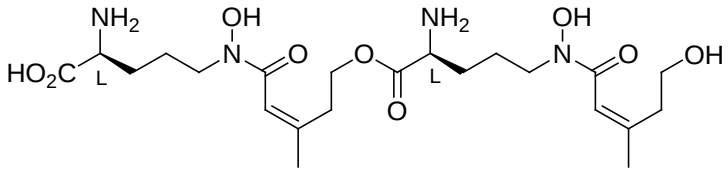
Petrobactins



Code	Name	R_1	R_2
237	Petrobactin	H	H
238	Petrobactin sulphonate	SO_3H	H
239	Petrobactin disulphonate	SO_3H	SO_3H

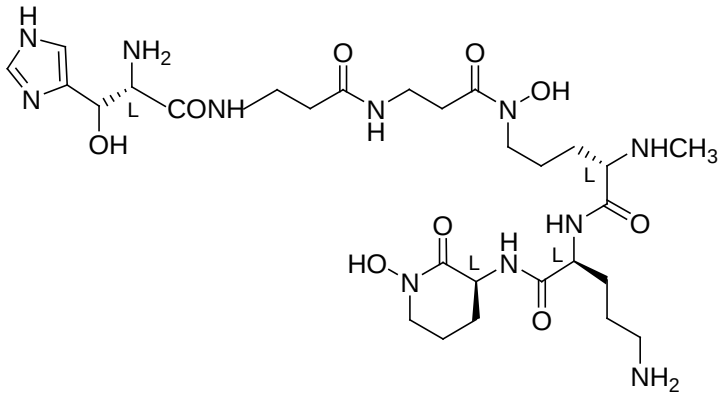
1.4.5 Hydroxamate / α-aminocarboxylate

240 Fusarinine A



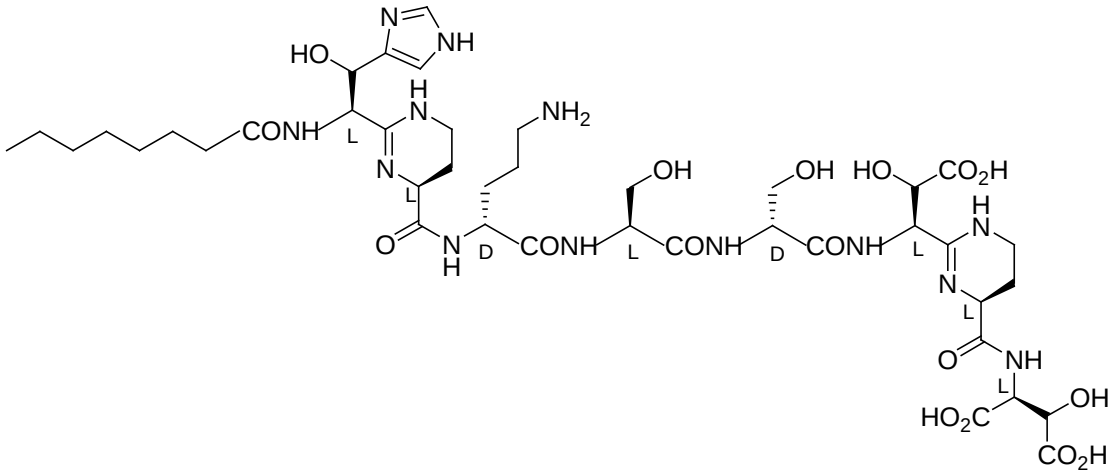
1.4.6 Hydroxamate / β-hydroxyhistidine

241 Exochelin MN



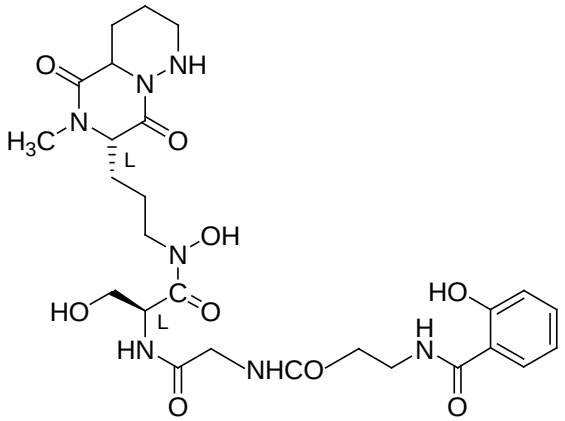
1.4.7 α-Hydroxycarboxylate / β-hydroxyhistidine

242 Ornicorrugatin



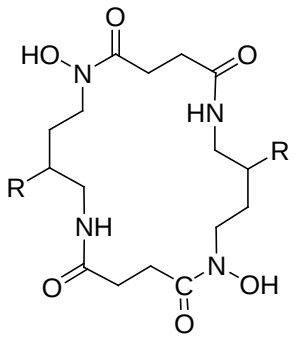
1.4.8 Salicylate / hydroxamate / pyridazine

243 Maduraferrin



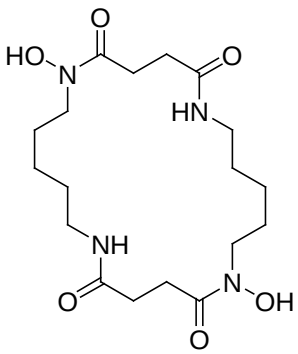
2. Tetradentate siderophores

2.1 Hydroxamates

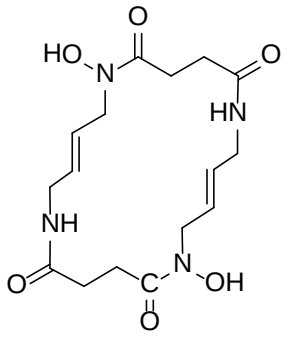


Code	Name	R
244	Alcaligin	OH
245	Putrebactin	H

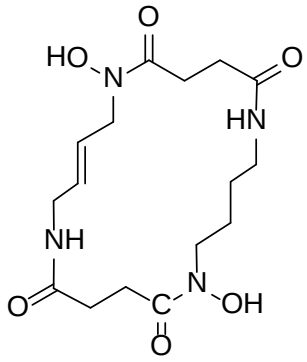
246 Bisucaberin

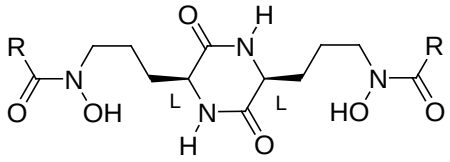


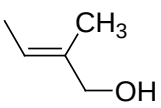
247 E,E-putrebactene



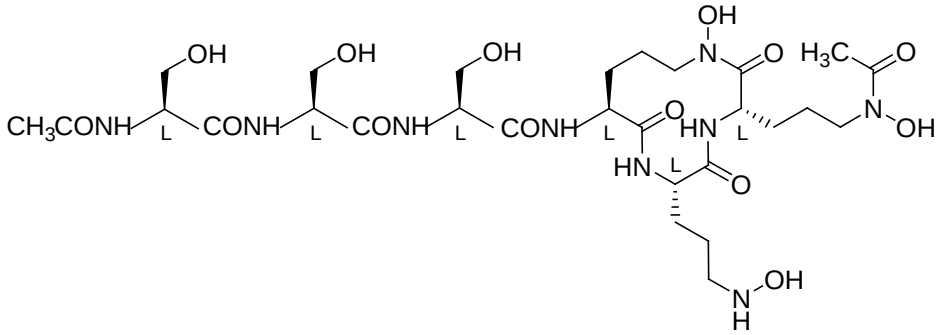
248 E-putrebactene



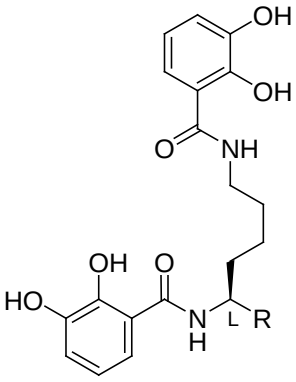


Code	Name	R
249	Rhodotrulic acid	CH_3
250	Dimerum acid	

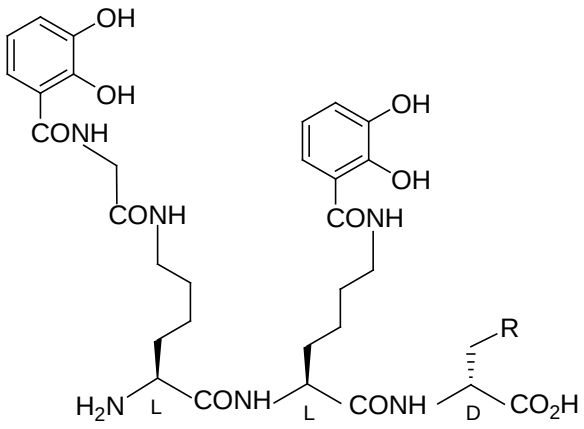
251 Amycolachrom

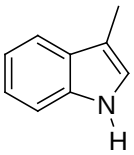


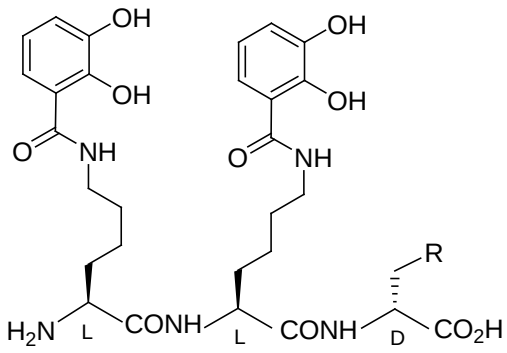
2.2 Catecholates and Phenolates

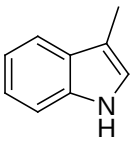


Code	Name	R
252	Azotochelin	CO_2H
253	Myxochelin	CH_2OH

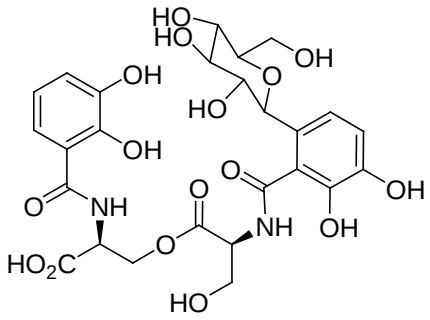


Code	Name	R
254	Amonabactin T789	
255	Amonabactin P750	

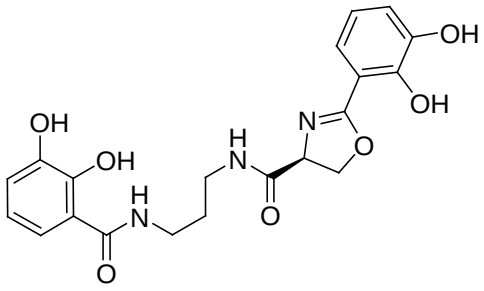


Code	Name	R
256	Amonabactin T732	
257	Amonabactin P693	

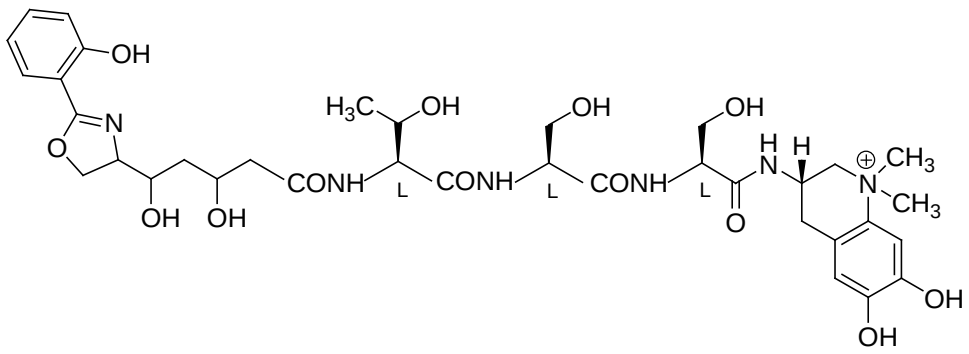
258 Salmochelin S1



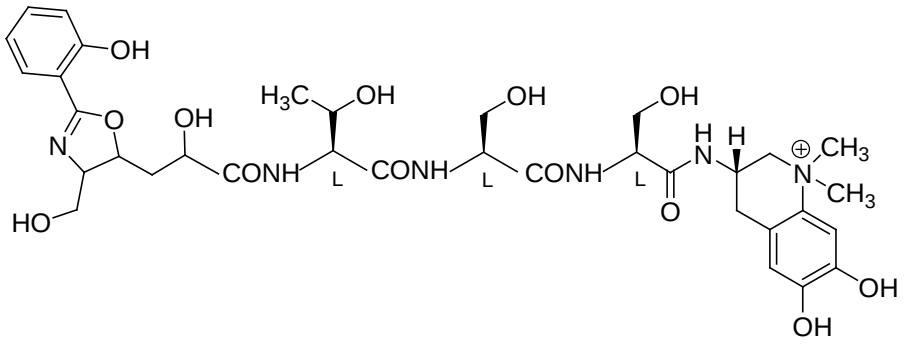
259 Serratiochelin



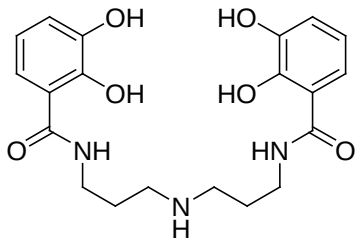
260 Anachelin 1



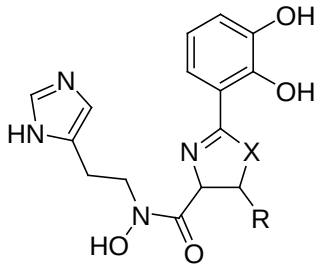
261 Anachelin 2



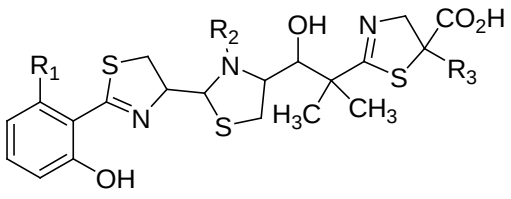
262 Pistillarin



2.3 Mixed Function Tetradentate Siderophores

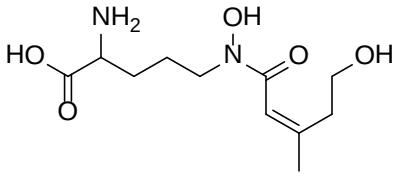


Code	Name	R	X	
263	Anguibactin	H	S	Phenolic / Hydroxamate
264	Acinetobactin	CH_3	O	Phenolic / Hydroxamate



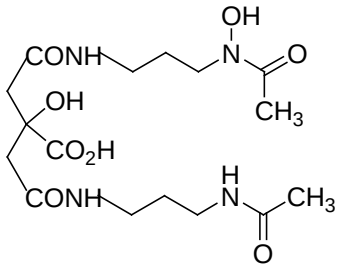
Code	Name	R_1	R_2	R_3	
265	Yersiniabactin	H	H	OH	2 Hydroxyphenyl thiazoline / α-hydroxycarboxylate
266	Micacocidin	$CH_3CH_2CH_2CH_2CH_2$	CH_3	CH_3	2 Hydroxyphenyl thiazoline / thiazolecarboxylate

267 Fusarinine (monomer)



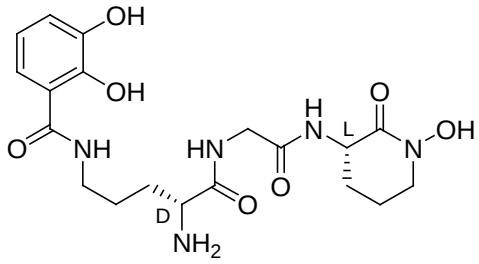
268 Deoxyschizokinen

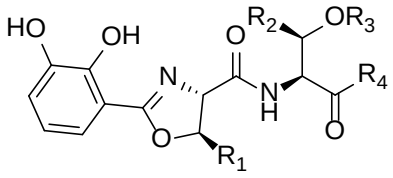
(Hydroxamate / α-hydroxycarboxylate)

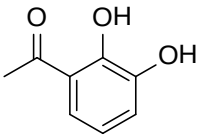
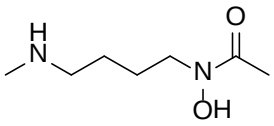
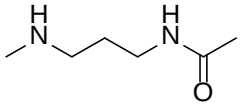
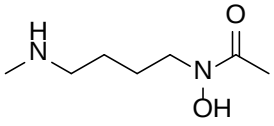


269 Heterobactin B

(Catecholato / hydroxamate)



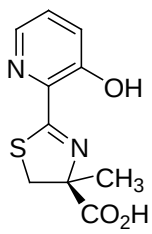


Code	Name	R_1	R_2	R_3	R_4
270	Fimsbactin A	H	H		
271	Fimsbactin B	Me	H		
272	Fimsbactin C	Me	Me		
273	Fimsbactin D	H	H		
274	Fimsbactin E	H	H		OH
275	Fimsbactin F	H	H	H	

3. Tridentate Siderophores

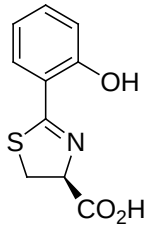
276 Desferrithiocin

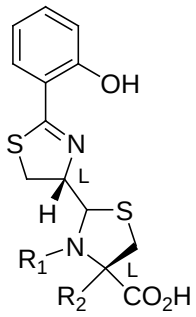
(Hydroxyphenylthiazolone / carboxylate)



277 Aeruginic acid

(Hydroxyphenylthiazolone / carboxylate)

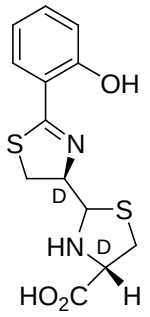




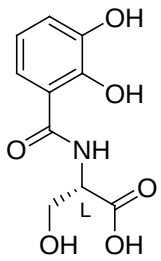
Code	Name	R_1	R_2	
278	Pyochelin	H	H	Hydroxyphenylthiazolone / carboxylate
279	Thiazostatin	CH_3	CH_3	Hydroxyphenylthiazolone / carboxylate

280 Enantio-Pyochelin

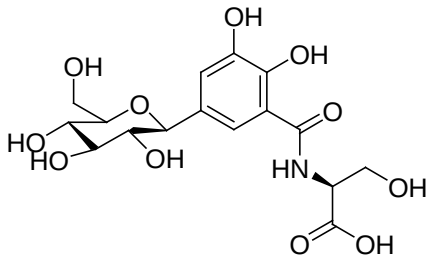
(Hydroxyphenylthiazolone / carboxylate)



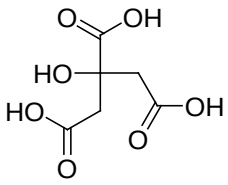
281 2,3-Dihydroxybenzoylserine



282 Salmochelin SX

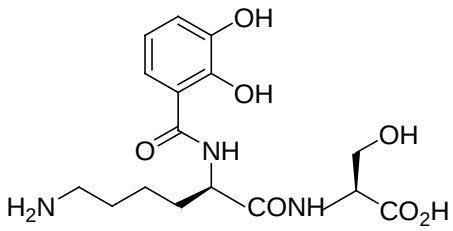


283 Citrate

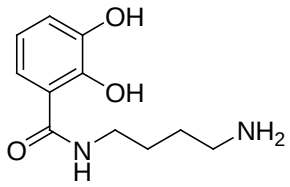


4. Bidentate Siderophores

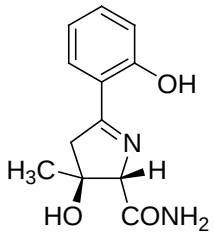
284 Chrysobactin



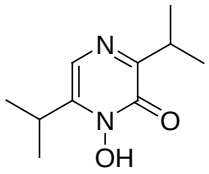
285 Aminochelin



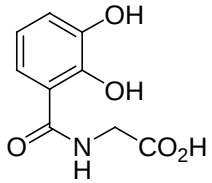
286 Siderochelin A



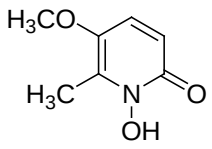
287 Aspergillic acid



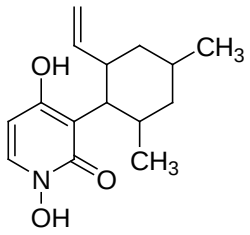
288 Itoic acid



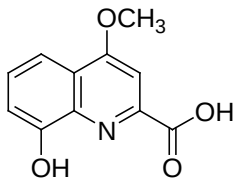
289 Cepabactin



290 Pyridoxatin

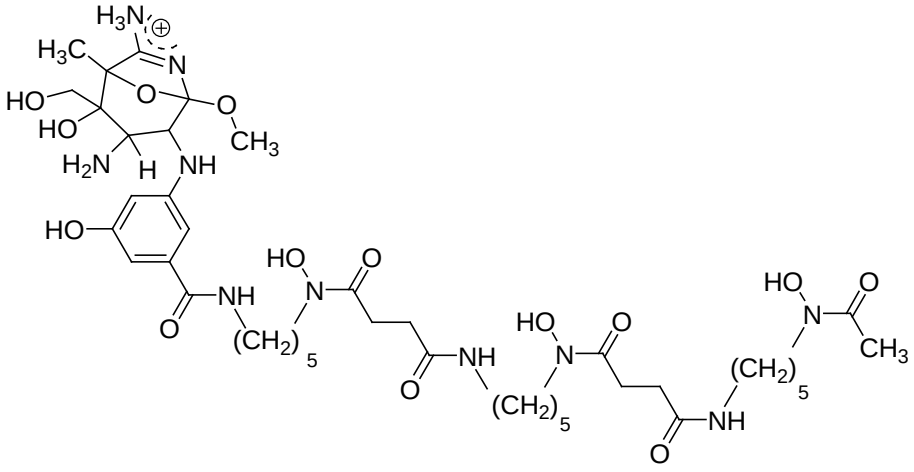


291 Quinolobactin

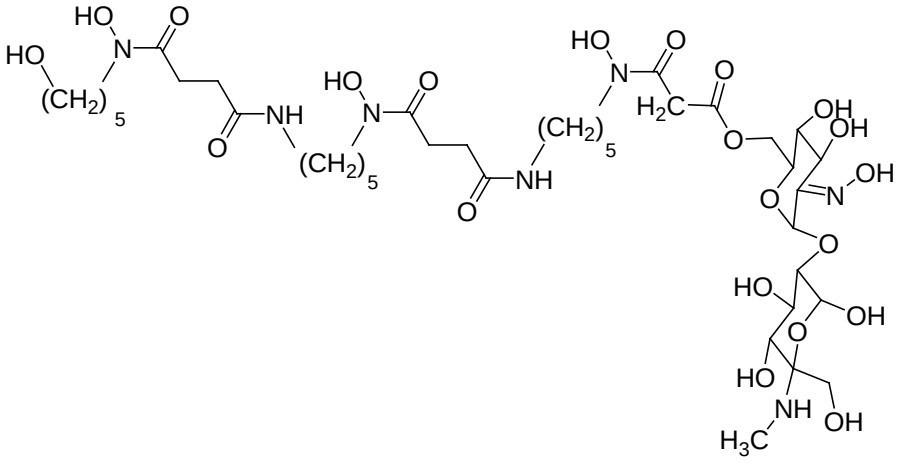


5. Antibiotic-based Siderophores

292 Ferrimycin

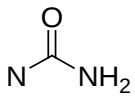


293 Salmycin A

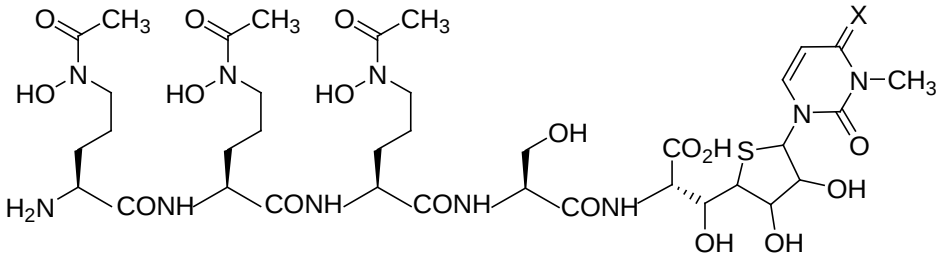


294 Albomycin δ_1 X = O

Albomycin δ_2 X =



Albomycin ε X = NH



References for original structural elucidation

Code	Name	Organism	Key Reference
1	Desferrioxamine A_{1A}	*Nocardia*, sp, *Streptomyces* sp	Keller-Schierlein, W., Mertens, P., Prelog, V., Walser, A. (1964) *Helv. Chim. Acta* **48**, 710-723
2	Desferrioxamine A_{1B}	*Salinispora, tropica*	Ejje, N., Soe, C. Z., Gu, J., Codd, R. (2013) *Metallomics* **5**, 1519-1528.
3	Desferrioxamine A_2	*Nocardia*, sp, *Streptomyces* sp	Keller-Schierlein, W., Mertens, P., Prelog, V., Walser, A. (1964) *Helv. Chim. Acta* **48**, 710-723
4	Desferrioxamine B	*Nocardia*, sp, *Streptomyces* sp	Prelog, V., Walser, A. (1962) *Helv. Chim. Acta* **45**, 631-637
5	Desferrioxamine D_1	*Nocardia*, sp, *Streptomyces* sp	Keller-Schierlein, W., Prelog, V., (1961) *Helv. Chim. Acta* **44**, 709-713
6	Desferrioxamine D_2	*Nocardia*, sp, *Streptomyces* sp	Keller-Schierlein, W., Mertens, P., Prelog, V., Walser, A. (1964) *Helv. Chim. Acta* **48**, 710-723
7	Desferrioxamine E	*Nocardia*, sp, *Streptomyces* sp	Keller-Schierlein, W., Prelog, V., (1963) *Helv. Chim. Acta* **44**, 1981-1983
8	Desferrioxamine G_1	*Nocardia*, sp, *Streptomyces* sp	Reissbrodt, R., Rabsch, W., Chapeaurouge, A., Jung, G., Winkelmann (1990) *Biometals.* **3**, 54-60
9	Desferrioxamine G_{2A}	*Erwinia amylovora*	Feistner, G. J., Gabrik, A. H., Beer, S. V. (1993) *Org. Mass. Spectrom.* **28**, 163-175
10	Desferrioxamine G_{2B}	*Erwinia amylovora*	Feistner, G. J., Gabrik, A. H., Beer, S. V. (1993) *Org. Mass. Spectrom.* **28**, 163-175
11	Desferrioxamine G_{2C}	*Erwinia amylovora*	Feistner, G. J., Gabrik, A. H., Beer, S. V. (1993) *Org. Mass. Spectrom.* **28**, 163-175
12	Desferrioxamine H	*Streptomyces spp*	Adapa, S., Huber, P., Keller-Schierlein, W. (1982) *Helv. Chim. Acta* **65**, 1818-1824

13	Desferrioxamine N	*Salinispora, tropica*	Ejje, N., Soe, C. Z., Gu, J., Codd, R. (2013) *Metallomics* **5**, 1519-1528.
14	Desferrioxamine T_1	*Erwinia amylovora*	Feistner, G. J., Gabrik, A. H., Beer, S. V. (1993) *Org. Mass. Spectrom.* **28**, 163-175
15	Desferrioxamine T_2	*Erwinia amylovora*	Feistner, G. J., Gabrik, A. H., Beer, S. V. (1993) *Org. Mass. Spectrom.* **28**, 163-175
16	Desferrioxamine T_3	*Erwinia amylovora*	Feistner, G. J., Gabrik, A. H., Beer, S. V. (1993) *Org. Mass. Spectrom.* **28**, 163-175
17	Desferrioxamine T_7	*Erwinia amylovora*	Feistner, G. J., Gabrik, A. H., Beer, S. V. (1993) *Org. Mass. Spectrom.* **28**, 163-175
18	Desferrioxamine T_8	*Erwinia amylovora*	Feistner, G. J., Gabrik, A. H., Beer, S. V. (1993) *Org. Mass. Spectrom.* **28**, 163-175
19	Desferrioxamine X_1	*Erwinia amylovora*	Meives, J., Fiedler, H-P., Zahner, H., Konetschny-Rapp, S., Jung, G. (1990) *Appl. Microbiol. Biotechnol.* **32**, 505-510
20	Desferrioxamine X_2	*Erwinia amylovora*	Meives, J., Fiedler, H-P., Zahner, H., Konetschny-Rapp, S., Jung, G. (1990) *Appl. Microbiol. Biotechnol.* **32**, 505-510
21	Desferrioxamine X_3	*Erwinia amylovora*	Meives, J., Fiedler, H-P., Zahner, H., Konetschny-Rapp, S., Jung, G. (1990) *Appl. Microbiol. Biotechnol.* **32**, 505-510
22	Desferrioxamine X_4	*Erwinia amylovora*	Meives, J., Fiedler, H-P., Zahner, H., Konetschny-Rapp, S., Jung, G. (1990) *Appl. Microbiol. Biotechnol.* **32**, 505-510
23A	Desferrioxamine Et_1	*Streptomyces olivaceus*	Fiedler, H-P., Meiwes, J., Werner, I., Konetschny-Rapp, S., Jung, G. (1990) *J. Chromat.* **513**, 255-262
23B	Desferrioxamine Et_2	*Streptomyces olivaceus*	Fiedler, H-P., Meiwes, J., Werner, I., Konetschny-Rapp, S., Jung, G. (1990) *J. Chromat.* **513**, 255-262
23C	Desferrioxamine Et_3	*Streptomyces olivaceus*	Fiedler, H-P., Meiwes, J., Werner, I., Konetschny-Rapp, S., Jung, G. (1990) *J. Chromat.* **513**, 255-262
23D	Desferrioxamine Te_1	*Streptomyces olivaceus*	Fiedler, H-P., Meiwes, J., Werner, I., Konetschny-Rapp, S., Jung, G. (1990) *J. Chromat.* **513**, 255-262

23E	Desferrioxamine Te_2	*Streptomyces olivaceus*	Fiedler, H-P., Meiwes, J., Werner, I., Konetschny-Rapp, S., Jung, G. (1990) *J. Chromat.* **513**, 255-262
23F	Desferrioxamine Te_3	*Streptomyces olivaceus*	Fiedler, H-P., Meiwes, J., Werner, I., Konetschny-Rapp, S., Jung, G. (1990) *J. Chromat.* **513**, 255-262
24	Desferrioxamine P_1	*Streptomyces olivaceus*	Fiedler, H-P., Meiwes, J., Werner, I., Konetschny-Rapp, S., Jung, G. (1990) *J. Chromat.* **513**, 255-262
25	Ferrichrome	*Aspergillus,Penicillium, Ustilago* sp	Emery, T., Neilands J. B. (1961) *J. Amer. Chem. Soc.* **83**, 1626-1628
26	Ferrichrome C	*Aspergillus, Cryptococcus, Neurospora* sp	Llinas, M., Neilands J. B. (1976) *Biophys. Struct. Mech.* **2**, 105-117
27	Ferricrocin	*Aspergillus, Neurospora* sp	Keller-Schierlein, W., Deėr, A. (1963) *Helv. Chim. Acta* **46**, 1907-1920
28	Sake Colorant A	*Aspergillus* sp	Llinas, M., Neilands J. B. (1976) *Biophys. Struct. Mech.* **2**, 105-117
29	Ferrichrysin	*Aspergillus* sp	Tadenuma, M., Sato, S., (1967) *Agr. Biol. Chem.* **31**, 1482-1489
30	Ferrichrome A	*Ustilago* sp	Garibaldi, J. A., Neilands J. B. (1955) *J. Amer. Chem. Soc.* **77**, 2429-2430
31	Ferrirubin	*Penicillium* sp	Keller-Schierlein, W. (1963) **46**, 1920-1929
32	Ferrirhodin	*Aspergillus* sp	Keller-Schierlein, W. (1963) **46**, 1920-1929
33	Malonichrome	*Fusarium* sp	Emery, T. (1980) *Biochim. Biophys. Acta* **629**, 382-390
34	Asperchrome A	*Aspergillus ochraceous*	Jalal M. A. F., Mocharla, R., Barnes, C. L., Hossain, M. B., Powell, D. R., Eng-Wilmot, D. L., Grayson, S. L., Benson, B. A., van der Helm, D. (1984) *J. Bacteriol.* **158**, 683-688
35	Asperchrome B_1	*Aspergillus ochraceous*	J Jalal M. A. F., Mocharla, R., Barnes, C. L., Hossain, M. B., Powell, D. R., Eng-Wilmot, D. L., Grayson, S. L., Benson, B. A., van der Helm, D. (1984) *J. Bacteriol.* **158**, 683-688

36	Asperchrome B_2	*Aspergillus ochraceous*	Jalal M. A. F., Mocharla, R., Barnes, C. L., Hossain, M. B., Powell, D. R., Eng-Wilmot, D. L., Grayson, S. L., Benson, B. A., van der Helm, D. (1984) *J. Bacteriol.* **158**, 683-688
37	Asperchrome B_3	*Aspergillus ochraceous*	Jalal M. A. F., Mocharla, R., Barnes, C. L., Hossain, M. B., Powell, D. R., Eng-Wilmot, D. L., Grayson, S. L., Benson, B. A., van der Helm, D. (1984) *J. Bacteriol.* **158**, 683-688
38	Asperchrome C	*Aspergillus ochraceous*	Jalal M. A. F., Mocharla, R., Barnes, C. L., Hossain, M. B., Powell, D. R., Eng-Wilmot, D. L., Grayson, S. L., Benson, B. A., van der Helm, D. (1984) *J. Bacteriol.* **158**, 683-688
39	Asperchrome D_1	*Aspergillus ochraceous*	Jalal M. A. F., Mocharla, R., Barnes, C. L., Hossain, M. B., Powell, D. R., Eng-Wilmot, D. L., Grayson, S. L., Benson, B. A., van der Helm, D. (1984) *J. Bacteriol.* **158**, 683-688
40	Asperchrome D_2	*Aspergillus ochraceous*	Jalal M. A. F., Mocharla, R., Barnes, C. L., Hossain, M. B., Powell, D. R., Eng-Wilmot, D. L., Grayson, S. L., Benson, B. A., van der Helm, D. (1984) *J. Bacteriol.* **158**, 683-688
41	Asperchrome D_3	*Aspergillus ochraceous*	Jalal M. A. F., Mocharla, R., Barnes, C. L., Hossain, M. B., Powell, D. R., Eng-Wilmot, D. L., Grayson, S. L., Benson, B. A., van der Helm, D. (1984) *J. Bacteriol.* **158**, 683-688
42	Asperchrome E	*Aspergillus ochraceous*	Jalal, M. A. F., Mocharla, R., van der Helm, D. (1984) *J. Chromat.* **301**, 247-252
43	Asperchrome F_1	*Aspergillus* sp	Holinsworth, B., Martin, J. D. (2009) *Biometals*. **22**, 625-632
44	Asperchrome F_2	*Aspergillus* sp	Holinsworth, B., Martin, J. D. (2009) *Biometals*. **22**, 625-632
45	Asperchrome F_3	*Aspergillus* sp	Holinsworth, B., Martin, J. D. (2009) *Biometals*. **22**, 625-632
46	Tetraglycine ferrichrome	*Neovossia indica*	Deml, G., Voges, K., Jung, G., Winkelmann, G. (1984) *FEBS. Letts.* **173**, 53-57
47	Des(diserylglycyl)-ferrirhodin	*Aspergillus ochraceus*	Jalal, M. A. F., Galles, J. L., van der Helm, D. (1985) *J. Org. Chem.* **50**, 5642-5645
48	Basidiochrome	*Ceratobasidium, Rhizoctonia* sp	Haselwandter, K., Passler, V., Reiter, S., Schmid, D. G., Nicholson, G., Hentschel, P., Albert, K., Winkelmann, G. (2006) *Biometals.* **19**, 335-343
49	Triacetylfusarine	*Penicillium* sp	Moore, R. E., Emery, T. (1976) *Biochem.* **15**, 2719-2723

50	Fusarinine C	*Fusarium* sp	Diekmann, H., Zähner, H. (1967) *Eur. J. Biochem.* **3**, 213-218
51	Fusarinine B	*Fusarium* sp	Sayer, J. M., Emery, T. (1968) *Biochem.* **7**, 184-188
52	Neurosporin	*Neurospora crassa*	Eng-Wilmot, D. L., Rahman, A., Mendenhall, J. V., Grayson, S. L., van der Helm, D. (1984) *J. Amer. Chem. Soc.* **106**, 1285-1290
53	Coprogen	*Neurospora, Penicillium* sp	Pidacks, C., Whitehill, A. R., Pruess, L. M., Hesseltine, C. W., Hutchings, B. L., Bohonos, N., Williams, J. H. (1953) *J. Amer. Chem. Soc.* **75**, 6064-6065
54	Coprogen B (Desacetylcoprogen)	*Fusarium, Neurospora* sp	Diekmann, H. (1970) *Arch. Mikrobiol* **73**, 65-76
55	Triornicin (Isoneocoprogen I)	*Epicoccum purpurascens*	Frederick, C. B., Bently, M. D., Shire, W. (1981) *Biochem.* **20**, 2436-2438
56	Isotriornicin (Neocoprogen I)	*Epicoccum purpurascens*	Frederick, C. B., Bently, M. D., Shire, W. (1982) *Biochem. Biophys. Res. Comm.* **105**, 133-138
57	Neocoprogen II	*Curvularia* sp	Hossain, M. B., Jalal, M. A. F., Benson, B. A., Barnes, C. L., van der Helm, D. (1987) *J. Amer. Chem. Soc.* **109**, 4948-4954
58	Dimethylcoprogen	*Alternaria, Fusarium* sp	Jalal, M. A. F., Love, S. K., van der Helm, D. (1988) *Biometals,* **1**, 4-8
59	Dimethylneocoprogen I	*Alternaria longipes*	Jalal, M. A. F., Love, S. K., van der Helm, D. (1988) *Biometals*, **1**, 4-8
60	Dimethyltriornicin	*Alternaria longipes*	Jalal, M. A. F., Love, S. K., van der Helm, D. (1988) *Biometals*, **1**, 4-8
61	Hydroxycopropen	*Neurospora* sp	Hollinswood, B., Martin, J. D. (2009) *Biometals*. **22**, 625-632
62	Hydroxy-neocoprogen I	*Neurospora* sp	Hollinswood, B., Martin, J. D. (2009) *Biometals*. **22**, 625-632
63	Hydroxyisoneocoprogen I	*Neurospora* sp	Hollinswood, B., Martin, J. D. (2009) *Biometals*. **22**, 625-632
64	Palmitoylcoprogen	*Neurospora* sp	Hollinswood, B., Martin, J. D. (2009) *Biometals*. **22**, 625-632

65	Amphibactin B	*Vibrio* sp	Martinez, J. S., Carter-Franklin, J. N., Mann, E. L., Martin, J. D., Haygood, M. G., Butler, A. (2003) *Proc. Natl. Acad. Sci. (USA)* **100**, 3754-3759
66	Amphibactin C	*Vibrio* sp	Martinez, J. S., Carter-Franklin, J. N., Mann, E. L., Martin, J. D., Haygood, M. G., Butler, A. (2003) *Proc. Natl. Acad. Sci. (USA)* **100**, 3754-3759
67	Amphibactin D	*Vibrio* sp	Martinez, J. S., Carter-Franklin, J. N., Mann, E. L., Martin, J. D., Haygood, M. G., Butler, A. (2003) *Proc. Natl. Acad. Sci. (USA)* **100**, 3754-3759
68	Amphibactin E	*Vibrio* sp	Martinez, J. S., Carter-Franklin, J. N., Mann, E. L., Martin, J. D., Haygood, M. G., Butler, A. (2003) *Proc. Natl. Acad. Sci. (USA)* **100**, 3754-3759
69	Amphibactin F	*Vibrio* sp	Martinez, J. S., Carter-Franklin, J. N., Mann, E. L., Martin, J. D., Haygood, M. G., Butler, A. (2003) *Proc. Natl. Acad. Sci. (USA)* **100**, 3754-3759
70	Amphibactin G	*Vibrio* sp	Martinez, J. S., Carter-Franklin, J. N., Mann, E. L., Martin, J. D., Haygood, M. G., Butler, A. (2003) *Proc. Natl. Acad. Sci. (USA)* **100**, 3754-3759
71	Amphibactin H	*Vibrio* sp	Martinez, J. S., Carter-Franklin, J. N., Mann, E. L., Martin, J. D., Haygood, M. G., Butler, A. (2003) *Proc. Natl. Acad. Sci. (USA)* **100**, 3754-3759
72	Amphibactin I	*Vibrio* sp	Martinez, J. S., Carter-Franklin, J. N., Mann, E. L., Martin, J. D., Haygood, M. G., Butler, A. (2003) *Proc. Natl. Acad. Sci. (USA)* **100**, 3754-3759
73	Amphibactin S		Kem, M. P., Zane, H. K., Springer, S. D., Gauglitz, J. M. and Butler, A. (2014) *Metallomics* **6**, 1150-1155.
74	Amphibactin T		Kem, M. P., Zane, H. K., Springer, S. D., Gauglitz, J. M. and Butler, A. (2014) *Metallomics* **6**, 1150-1155.
75	Moanachelins gly-B		Kem, M. P., Zane, H. K., Springer, S. D., Gauglitz, J. M. and Butler, A. (2014) *Metallomics* **6**, 1150-1155.
76	Moanachelins ala-B		Kem, M. P., Zane, H. K., Springer, S. D., Gauglitz, J. M. and Butler, A. (2014) *Metallomics* **6**, 1150-1155.
77	Moanachelins gly-D		Kem, M. P., Zane, H. K., Springer, S. D., Gauglitz, J. M. and Butler, A. (2014) *Metallomics* **6**, 1150-1155.

78	Moanachelins ala-D		Kem, M. P., Zane, H. K., Springer, S. D., Gauglitz, J. M. and Butler, A. (2014) *Metallomics* **6**, 1150-1155.
79	Moanachelins gly-E		Kem, M. P., Zane, H. K., Springer, S. D., Gauglitz, J. M. and Butler, A. (2014) *Metallomics* **6**, 1150-1155.
80	Ferrocin A	*Pseudomonas fluorescens*	Katayama, N., Nozaki, Y., Okonogi, K., Harada, S., Ono, H. (1993) *J. Antibiot.* **46**, 65-70
81	Coelichelin	*Streptomyces aizunensis*	Lautru, S., Deeth, R. J., Bailey, L. M., Challis, G. L. (2005) *Nat. Chem. Biol.* **1**, 265-269
82	Exochelin MS	*Mycobacterium smegmatis*	Sharman, G. J., Williams, D. H., Ewing, D. F., Ratledge, C. (1995) *Biochem. J.* **305**, 187-196
83	Vicibactin	*Rhizobium leguminosarum*	Dilworth, M. J., Carson, K. C., Giles, R. G. F., Byrne, L. T., Glenn, A. R. (1998) *Microbiology.* **144**, 781-791
84	Enterobactin (Enterochelin)	*Klebisella*, sp, *Enterobacter, Erwinia* sp	Pollock, J. R., Neilands, J. B. (1970) *Biochem. Biophys. Res. Comm.* **38**, 989-992 O Brian, G., Gibson, F. (1970) *Biochim. Biophys. Acta* **215**, 393-402
85	Agrobactin	*Agrobacterium* sp	Peterson, T., Falk, K. E., Leong, S. A., Klein, M. P., Neilands, J. B. (1980) *J. Amer. Chem. Soc.* **102**, 7715-7718
86	Parabactin	*Paracoccus denitrificans*	Peterson, T., Falk, K. E., Leong, S. A., Klein, M. P., Neilands, J. B. (1980) *J. Amer. Chem. Soc.* **102**, 7715-7718
87	Fluvibactin	*Vibrio fluvialis*	Yamamoto, S., Okujo, N., Fujita, Y., Saito, M., Yoshida, T., Shinoda, S. (1993) *J. Biochem (Tokyo).* **113**, 538-544
88	Agrobactin A	*Agrobacterium tumefaciens*	Peterson, T., Falk, K. E., Leong, S. A., Klein, M. P., Neilands, J. B. (1980) *J. Amer. Chem. Soc.* **102**, 7715-7718
89	Parabactin A	*Paracoccus denitrificans*	Tait, G. H. (1975) *Biochem. J.* **146**, 191-204
90	Vibriobactin	*Vibrio cholerae*	Griffiths, G. L., Sigel, S. P., Payne, S. M., Neilands, J. B. (1984) *J. Biol. Chem.* **259**, 383-385
91	Vulnibactin	*Vibrio vulnificus*	Okujo, N., Saito, M., Yamamoto, S., Yoshida, T., Miyoshi, S., Shinoda. (1994) *Biometals.* **7**, 109-116

92	Protochelin	*Azotobacter vinelandii*	Taraz, K., Ehlert, G., Geiseh, K., Budzikiewicz, H., Korth, H., Pulverer, G. (1990) *Z. Naturforsch.* **45b**, 1325-1332
93	Corynebactin	*Corynebacterium glutamicum*	Budzikievicz, H., Bossenkamp, A., Taraz, K., Pandey, A., Meyer, J-M. (1997) *Z. Naturforsch.* **52c**, 551-554
94	Bacillibactin	*Bacillus subtilis*	May, J. J., Wendrich, T. M., Marahiel, M. A. (2001) *J. Biol. Chem.* **276**, 7209-7217
95	Salmochelin S4	*Escherichia coli*, *Salmonella enterica*	Bister, B., Bischoff, D., Nicholson, G. J., Valdebenito, M., Schneider, K., Winkelmann, G., Hanke, K., Sussmuth, R. D. (2004) *Biometals.* **17**, 471-481
96	Salmochelin S2	*Escherichia coli*, *Salmonella enterica*	Bister, B., Bischoff, D., Nicholson, G. J., Valdebenito, M., Schneider, K., Winkelmann, G., Hanke, K., Sussmuth, R. D. (2004) *Biometals.* **17**, 471-481
97	Monoglucosylated Enterobactin (MGE)	*Synthetic Origin*	Zheng, T., Bullock, J. L., Nolan, E. M. (2012) *J. Am. Chem. Soc.* **134**, 18388-18400.
98	Amphi-enterobactin	*Vibrio harveyi*	Zane, H. K., Naka, H., Rosconi, F., Sandy, M., Haygood, M. G. (2014) *J. Am. Chem. Soc.* **136**, 5615-5618.
99	Amphi-enterobactin C12-OH	*Vibrio harveyi*	Zane, H. K., Naka, H., Rosconi, F., Sandy, M., Haygood, M. G. (2014) *J. Am. Chem. Soc.* **136**, 5615-5618.
100	Rhizoferrin	*Zygomycetes* sp	Thieken, A., Winkelmann, G. (1992) *FEMS. Microbiol. Lett.* **94**, 37-42
100A -100E	Rhizoferrin analogues	*Cunninghamella elegans*	Drechsel, H., Tschierske, M., Thieken, A., Jung, G., Zähner, H., Winkelmann, G. (1995) *J. Industr. Microbiol.* **14**, 105-112
101	Enantio Rhizoferrin	*Ralstonia pickettii*	Münzinger, M., Taraz, K., Budzikiewicz, H., Drechsel, H., Heymann, P., Winkelmann, G., Meyer, J-M. (1999) *Biometals*. **12**, 189-193
102	Staphyloferrin A	*Staphylococcus aureus*	Meiwes, J., Fiedler, H-P., Haag, H., Zähner, H., Konetschny-Rapp, S., Jung, G. (1990) *FEMS. Microbiol. Lett.* **67**, 201-206
103	Vibrioferrin	*Vibrio parahaemolyticus*	Yamamoto, S., Okujo, N., Yoshida, T., Matsuura, S., Shinoda, S. (1994) *J. Biochem(Tokyo).* **115**, 868-874
104	Achromobactin	*Pectobacterium* sp	Schmelz, S., Kadi, N., McMahon, S. A., Song, L., Oves-Costales, D., Oke, M., Liu, H., Johnson,

			K. A., Carter, L. G., Botting, C. H., White, M. F., Challis, G. L., Naismith, J. H. (2009) *Nat. Chem. Biol.* **5**, 174-182
105	Mycobactin P	*Mycobacterium phlei*	Snow, G. A. (1954) *J. Chem. Soc.* 2588-2596; 4080-4093
106	Mycobactin A	*Mycobacterium aurum*	Snow, G. A. (1970) *Bacterial Rev.* **34**, 99-125 Barclay, R., Ewing, D. F., Ratledge, C. (1985) *J. Bacteriol.* **164**, 896-903
107	Mycobactin F	*Mycobacterium fortuitum*	Snow, G. A. (1970) *Bacterial Rev.* **34**, 99-125 Barclay, R., Ewing, D. F., Ratledge, C. (1985) *J. Bacteriol.* **164**, 896-903
108	Mycobactin H	*Mycobacterium thermoresistible*	Snow, G. A. (1970) *Bacterial Rev.* **34**, 99-125 Barclay, R., Ewing, D. F., Ratledge, C. (1985) *J. Bacteriol.* **164**, 896-903
109	Mycobactin M	*Mycobacterium marinum*	Snow, G. A. (1970) *Bacterial Rev.* **34**, 99-125 Barclay, R., Ewing, D. F., Ratledge, C. (1985) *J. Bacteriol.* **164**, 896-903
110	Mycobactin N	*Mycobacterium marinum*	Snow, G. A. (1970) *Bacterial Rev.* **34**, 99-125 Barclay, R., Ewing, D. F., Ratledge, C. (1985) *J. Bacteriol.* **164**, 896-903
111	Mycobactin R	*Mycobacterium terrae*	Snow, G. A. (1970) *Bacterial Rev.* **34**, 99-125 Barclay, R., Ewing, D. F., Ratledge, C. (1985) *J. Bacteriol.* **164**, 896-903
112	Mycobactin S	*Mycobacterium smegmatis*	Snow, G. A. (1970) *Bacterial Rev.* **34**, 99-125 Barclay, R., Ewing, D. F., Ratledge, C. (1985) *J. Bacteriol.* **164**, 896-903
113	Mycobactin T	*Mycobacterium tuberculosis*	Snow, G. A. (1970) *Bacterial Rev.* **34**, 99-125 Barclay, R., Ewing, D. F., Ratledge, C. (1985) *J. Bacteriol.* **164**, 896-903
114	Mycobactin Av	*Mycobacterium avium*	Snow, G. A. (1970) *Bacterial Rev.* **34**, 99-125 Barclay, R., Ewing, D. F., Ratledge, C. (1985) *J. Bacteriol.* **164**, 896-903
115	Mycobactin NA (Nocobactin)	*Nocardia asteroides*	Snow, G. A. (1970) *Bacterial Rev.* **34**, 99-125 Barclay, R., Ewing, D. F., Ratledge, C. (1985) *J. Bacteriol.* **164**, 896-903
116	Mycobactin J	*Mycobacterium paratuberculosis*	Luo, M., Fadeev, E. A., Groves, J. T. (2005) *Nat. New. Biol.* **1**, 149-153
117	Formobactin	*Nocardia* sp	Snow, G. A. (1970) *Bacterial Rev.* **34**, 99-125

			Barclay, R., Ewing, D. F., Ratledge, C. (1985) *J. Bacteriol.* **164**, 896-903
118	Carboxymycobactin	*Mycobacterium smegmatis*	Lane, S. J., Marshall, P. S., Upton, R. J., Ratledge, C. (1998) *Biometals.* **11**, 13-20
119	Carboxymycobactin 1	*Mycobacterium avium*	Lane, S. J., Marshall, P. S., Upton, R. J., Ratledge, C., Ewing, M. (1995) *Tetrahedron. Letts.* **36**, 4129-4132 Wong, D. K., Gobin, J., Horwitz, M. A., Gibson, B. W. (1996) *J. Bacteriol.* **178**, 6394-6398.
120	Carboxymycobactin 2	*Mycobacterium avium*	Lane, S. J., Marshall, P. S., Upton, R. J., Ratledge, C., Ewing, M. (1995) *Tetrahedron. Letts.* **36**, 4129-4132
121	Carboxymycobactin 3	*Mycobacterium avium*	Lane, S. J., Marshall, P. S., Upton, R. J., Ratledge, C., Ewing, M. (1995) *Tetrahedron. Letts.* **36**, 4129-4132
122	Carboxymycobactin 4	*Mycobacterium avium*	Lane, S. J., Marshall, P. S., Upton, R. J., Ratledge, C., Ewing, M. (1995) *Tetrahedron. Letts.* **36**, 4129-4132
123	Pyoverdin 6.1 (Pseudobactin)	*Pseudomonas* sp	Teintze, M., Houssain, M. B., Barnes, C. L., Leong, J., van der Helm, D. (1981) *Biochem.* **20**, 6446-6457
124	Pyoverdin 6.2	*Pseudomonas putida*	Meyer, J-M., Gruffaz, C., Raharinosy, V., Bezverbnaya, I., Schäfer, M., Budzikiewicz, H. (2008) *Biometals.* **21**, 259-271
125	Pyoverdin 6.3 (Pyoverdin Thai)	*Pseudomonas putida*	Ruangviriyachai, C., Uria-Fernandez, D., Schäfer, M., Budzikiewicz, H. (2004) *Spectroscopy.* **18**, 453-458
126	Pyoverdin 6.4 (Pyoverdin 9AW)	*Pseudomonas fluorescens*	Budzikiewicz, H., Kilz, S., Taraz, K., Meyer, J-M. (1997) *Z. Naturforsch.* **52c**, 721-728
127	Pyoverdin 6.5	*Pseudomonas aeruginosa*	Ruangviriyachai, C., Fernandez, D. U., Fuchs, R., Meyer, J-M. (2001) *Z. Naturforsch.* **56c**, 933-938
128	Pyoverdin 6.6	*Pseudomonas fluorescens*	Barelmann, I., Taraz, K., Budzikiewicz, H., Geoffroy, V. A., Meyer, J-M. (2002) *Z. Naturforsch* **57c**, 9-16
129	Isopyoverdin 6.7 (Isopyoverdin BTP1)	*Pseudomonas putida*	Jacques, P., Ongena, M., Gwose, I., Seinsche, D., Schroder, H., Delfosse, P., Thonard, P., Taraz, K., Budzikiewicz, H. (1995) *Z. Naturforsch.* **50c**, 622-629

130	Pyoverdin 6.8	*Pseudomonas* sp	Budzikiewicz, H., Schäfer, M., Fernandez, D. U., Meyer, J-M. (2006) *Z. Naturforsch.* **61c**,815-820
131	Pyoverdin 7.1	*Pseudomonas fluorescens*	Budzikiewicz, H., Schroder, H., Taraz, K. (1992) *Z. Naturforsch.* **47c**, 26-32
132	Pyoverdin 7.2 (Pyoverdin BTP2)	*Pseudomonas fluorescens*	Ongena, M., Jacques, P., Thonart, P., Gwose, I., Fernandez, D. U., Schäfer, M., Budzikiewicz, H. (2001) *Tetrahedron Letts.* **42**, 5849-5851
133	Pyoverdin 7.3 (Pyoverdin G + R)	*Pseudomonas putida*	Salah-el-Din, A. L. M., Kyslic, P., Stephan, D., Abdallah, M. A. (1997) *Tetrahedron* **53**, 12539-12552
134	Pyoverdin 7.4 (Pyoverdin PVD)	*Pseudomonas* sp	Vossen, W., Taraz, K. (1999) *Biometals.* **12**, 323-329
135	Pyoverdin 7.5 (Pyoverdin TII)	*Pseudomonas aeruginosa*	Tappe, R., Taraz, K., Budzikiewicz, H., Meyer, J-M., Lefevre, J. F. (1993) *J. Prakt. Chem.* **335**, 83-87
136	Pyoverdin 7.6	*Pseudomonas libanensis*	Meyer, J-M., Gruffaz, C., Raharinosy, V., Bezverbnaya, I., Schäfer, M., Budzikiewicz, H. (2008) *Biometals.* **21**, 259-271
137	Pyoverdin 7.7	*Pseudomonas cichorii*	Bultreys, A., Gheyse, I., Wathelet, B., Schafer, M., Budzikiewicz, H. (2004) *Z. Naturforsch.* **59c**, 613-618
138	Pyoverdin 7.8 (Pyoverdin PL8)	*Pseudomonas fluorescens*	Barelmann, I., Taraz, K., Budzikiewicz, H., Geoffroy, V. A., Meyer, J-M. (2002) *Z. Naturforsch* **57c**, 9-16
139	Pyoverdin 7.9 (Pyoverdin 11370)	*Pseudomonas putida*	Budzikiewicz, H., Fernandez, D. U., Fuchs, R., Michalke, R., Taraz, K., Ruangviriyachai, C. (1999) *Z. Naturforsch.* **54c**, 1021-1026
140	Pyoverdin 7.10	*Pseudomonas* sp	Meyer, J-M., Gruffaz, C., Raharinosy, V., Bezverbnaya, I., Schäfer, M., Budzikiewicz, H. (2008) *Biometals.* **21**, 259-271
141	Pyoverdin 7.11 (Pyoverdin 19310)	*Pseudomonas syringae*	Jülich, M., Taraz, K., Budzikiewicz, H., Geoffroy, V., Meyer, J-M., Gardan, L. (2001) *Z. Naturforsch.* **56c**, 687-694
142	Pyoverdin 7.12 (Pyoverdin 13525)	*Pseudomonas fluorescens*	Hohineicher, U., Hartmann, R., Taraz, K., Budzikiewicz, H. (1995) *Z. Naturforsch.* **50c**, 337-344

143	Isopyoverdin 7.13 (Isopyoverdin 90-33)	*Pseudomonas putida*	Sultana, R., Siddiqui, B. S., Taraz, K., Budzikiewicz, H., Meyer, J-M. (2001) *Tetrahedron* **57**, 1019-1023
144	Pyoverdin 7.14 (Pyoverdin R`)	*Pseudomonas aeruginosa*	Gipp, S., Hahn, J., Taraz, K., Budzikiewicz, H. (1991) *Z. Naturforsch.* **46c**, 534-541
145	Pyoverdin 7.15	*Pseudomonas fluorescens*	Uria-Fernandez, D., Fuchs, R., Schäfer, M., Budzikiewicz, H. (2003) *Z. Naturforsch.* **58c**, 1-10
146	Pyoverdin 7.16 (Pyoverdin 96-312)	*Pseudomonas* sp	Schlegel, K., Fuchs, R., Schäfer, M., Taraz, K., Budzikiewicz, H. (2001) *Z. Naturforsch.* **56c**, 680-686
147	Pyoverdin 7.17	*Pseudomonas* sp	Schäfer, M., Fuchs, R., Budzikiewicz, H., Springer, A., Meyer, J-M., Linscheid, M. (2006) *J. Mass. Spectrom.* **41**, 1162-1170
148	Pyoverdin 7.18	*Pseudomonas* sp	Weber, M., Taraz, K., Budzikiewicz, H., Geoffroy, V., Meyer, J-M. (2000) *Biometals.* **13**, 301-309
149	Pyoverdin 7.19	*Pseudomonas* sp	Uria-Fernandez, D., Geoffroy, V., Schäfer, M., Meyer, J-M., Budzikiewicz, H. (2003) *Monatsh. Chem.* **134**, 1421-1431
150	Pyoverdin 8.1 (Pyoverdin A214)	*Pseudomonas putida*	Uria-Fernandez, D., Geoffroy, V., Schäfer, M., Meyer, J-M., Budzikiewicz, H. (2003) *Monatsh. Chem.* **134**, 1421-1431
151	Pyoverdin 8.2 (Pyoverdin P19)	*Pseudomonas fluorescens*	Uria-Fernandez, D., Fuchs, R., Schäfer, M., Budzikiewicz, H. (2003) *Z. Naturforsch.* **58c**, 1-10
152	Pyoverdin 8.3 (Pyoverdin D-TR133)	*Pseudomonas chlororaphis*	Barelmann, I., Fernandez, D. U., Budzikiewicz, H., Meyer, J-M. (2003) *Biometals.* **16**, 263-270
153	Pyoverdin 8.4 (Pyoverdin 90-51)	*Pseudomonas putida*	Sultana, R., Siddiqui, B. S., Taraz, K., Budzikiewicz, H., Meyer, J-M. (2000) *Biometals.* **13**, 147-152
154	Pyoverdin 8.5	*Pseudomonas* sp	Meyer, J-M., Gruffaz, C., Raharinosy, V., Bezverbnaya, I., Schäfer, M., Budzikiewicz, H. (2008) *Biometals.* **21**, 259-271
155	Pyoverdin 8.6 (Pyoverdin 96-318)	*Pseudomonas* sp	Schlegel, K., Fuchs, R., Schäfer, M., Taraz, K., Budzikiewicz, H., Geoffroy, V., Meyer, J-M. (2001) *Z. Naturforsch.* **56c**, 680-686

156	Pyoverdin 8.7 (Pyoverdin I-III)	*Pseudomonas fluorescens*	Budzikiewicz, H. (2004) *Prog. Chem. Org. Nat. Prod.* **87**, 81-237
157	Pyoverdin 8.8 (Pyoverdin CHAO)	*Pseudomonas fluorescens*	Wong-Lun-Sang, S., Bernardini, J. J., Hennard, C., Kyslic, P., Dell, A., Abdallah, M. A. (1996) *Tetrahedron. Letts.* **37**, 3329-3332
158	Pyoverdin 8.9 (Pyoverdin E)	*Pseudomonas aeruginosa*	Briskot, G., Taraz, K., Budzikiewicz, H. (1989) *Liebigs Ann. Chem.* 375-384
159	Pyoverdin 9.1	*Pseudomonas* sp	Meyer, J-M., Gruffaz, C., Raharinosy, V., Bezverbnaya, I., Schäfer, M., Budzikiewicz, H. (2008) *Biometals.* **21**, 259-271
160	Pyoverdin 9.2 (Pyoverdin Pau)	*Pseudomonas aureofaciens*	Beiderbeck, H., Risse, D., Budzikiewicz, H., Taraz, K. (1999) *Z. Naturforsch.* **54c**, 1-5
161	Pyoverdin 9.3	*Pseudomonas monteilii*	Meyer, J-M., Gruffaz, C., Raharinosy, V., Bezverbnaya, I., Schäfer, M., Budzikiewicz, H. (2008) *Biometals.* **21**, 259-271
162	Pyoverdin 9.4	*Pseudomonas fluorescens*	Meyer, J-M., Gruffaz, C., Raharinosy, V., Bezverbnaya, I., Schäfer, M., Budzikiewicz, H. (2008) *Biometals.* **21**, 259-271
163	Pyoverdin 9.5 (Pyoverdin 2392)	*Pseudomonas fluorescens*	Beiderbeck, H., Taraz, K., Meyer, J-M. (1999) *Biometals.* **12**, 331-338
164	Pyoverdin 9.6	*Pseudomonas putida*	Meyer, J-M., Gruffaz, C., Raharinosy, V., Bezverbnaya, I., Schäfer, M., Budzikiewicz, H. (2008) *Biometals.* **21**, 259-271
165	Pyoverdin 9.7 (Pseudobactin 589A)	*Pseudomonas putida*	Persmark, M., Frejd, T., Mattiasson, B. (1990) *Biochem*. **29**, 7348-7356
166	Pyoverdin 9.8 (Pyoverdin 2461)	*Pseudomonas putida*	Budzikiewicz, H. (2004) *Prog. Chem. Org. Nat. Prod.* **87**, 81-237
167	Pyoverdin 9.9	*Pseudomonas putida*	Budzikiewicz, H. (2004) *Prog. Chem. Org. Nat. Prod.* **87**, 81-237
168	Pyoverdin 9.10 (Pyoverdin 95-275)	*Pseudomonas fluorescens*	Sultana, B., Fuchs, R., Schmickler, H., Schlegel, K., Budzikiewicz, H., Siddiqui, B. S., Geoffroy, V., Meyer, J-M. (2000) *Z. Naturforsch.* **55c**, 857-865

169	Pyoverdin 9.11 (Pyoverdin C)	*Pseudomonas putida*	Seinsche, D., Taraz, K., Budzikiewicz, H., Gondol, D. (1993) *J. Prakt. Chem.* **335**, 157-168
170	Pyoverdin 9.12	*Pseudomonas fluorescens*	Meyer, J-M., Gruffaz, C., Raharinosy, V., Bezverbnaya, I., Schäfer, M., Budzikiewicz, H. (2008) *Biometals.* **21**, 259-271
171	Pyoverdin 10.1 (Pyoverdin 2798)	*Pseudomonas fluorescens*	Demange, P., Bateman, A., Mertz, C., Dell, A., Piemont, Y., Abdullah, M. (1990) *Biochem.* **29**, 11041-11051
172	Pyoverdin 10.2	*Pseudomonas fluorescens*	Georgias, H., Taraz, K., Budzikiewicz, H., Geoffroy, V., Meyer, J-M. (1999) *Z. Naturforsch.* **54c**, 301-308
173	Pyoverdin 10.3 (Pyoverdin 17400)	*Pseudomonas fluorescens*	Demange, P., Bateman, A., Mertz, C., Dell, A., Piemont, Y., Abdullah, M. (1990) *Biochem.* **29**, 11041-11051
174	Pyoverdin 10.4	*Pseudomonas fluorescens*	Meyer, J-M., Gruffaz, C., Raharinosy, V., Bezverbnaya, I., Schäfer, M., Budzikiewicz, H. (2008) *Biometals.* **21**, 259-271
175	Pyoverdin 10.5 (Pyoverdin 18-1)	*Pseudomonas fluorescens*	Amann, C., Taraz, K., Budzikiewicz, H., Meyer, J-M. (2000) *Z. Naturforsch.* **55c**, 671-680
176	Pyoverdin 10.6 (Pyoverdin 1, 2)	*Pseudomonas fluorescens*	Gwose, J., Taraz, K., (1992) *Z. Naturforsch.* **47c**, 487-502
177	Isopyoverdin 10.7 (Isopyoverdin 90-44)	*Pseudomonas putida*	Sultana, R., Siddiqui, B. S., Taraz, K., Budzikiewicz, H., Meyer, J-M. (2001) *Z. Naturforsch.* **56c**, 303-307
178	Pyoverdin 10.8	*Pseudomonas rhodesiae*	Budzikiewicz, H. (2004) *Prog. Chem. Org. Nat. Prod.* **87**, 81-237
179	Pyoverdin 10.9 (Pyoverdin 2192)	*Pseudomonas tolaasii*	Demange, P., Bateman, A., Mertz, C., Dell, A., Piemont, Y., Abdullah, M. (1990) *Biochem.* **29**, 11041-11051
180	Pyoverdin 10.10	*Pseudomonas putida*	Meyer, J-M., Gruffaz, C., Raharinosy, V., Bezverbnaya, I., Schäfer, M., Budzikiewicz, H. (2008) *Biometals.* **21**, 259-271
181	Pyoverdin 11.1 (Pyoverdin 51W)	*Pseudomonas fluorescens*	Voss, J., Taraz, K., Budzikiewicz, H. (1999) *Z. Naturforsch.* **54c**, 156-162

182	Pyoverdin 11.2 (pyoverdin 12)	*Pseudomonas fluorescens*	Geisen, K., Taraz, K., Budzikiewicz, H. (1992) *Monatsh. Chem.* **123**, 151-178
183	Pyoverdin 12.1 (Pyoverdin GM)	*Pseudomonas fluorescens*	Mohn, G., Taraz, K., Budzikiewicz, H. (1990) *Z. Naturforsch.* **45b**, 1437-1450
184	Pyoverdin 12.2 (Pyoverdin 1547)	*Pseudomonas fluorescens*	Ruangviriyachai, C., Barelmann, I., Fuchs, R., Budzikiewicz, H. (2000) *Z. Naturforsch.* **55c**, 323-327
185	Azoverdin	*Azomonas macrocytogenes*	Budzikiewicz, H. (2004) *Prog. Chem. Org. Nat. Prod.* **87**, 81-237
186	Azotobactin 87	*Azotobacter agile*	Budzikiewicz, H. (2004) *Prog. Chem. Org. Nat. Prod.* **87**, 81-237
187	Azotobactin D	*Azotobacter vinelandi*	Budzikiewicz, H. (2004) *Prog. Chem. Org. Nat. Prod.* **87**, 81-237
188	Heterobactin A	*Rhodococcus erythropolis*	Carrano, C. J., Jordan, M., Drechsel, H., Schmid, D. G., Winkelmann, G. (2001) *Biometals.* **14**, 119-125
189	Ornibactin – C_4	*Burkholderia cepacia*	Holger, S., Freund, S., Meyer, J-M., Winkelmann, G., Jung, G. (1993) *Liebigs. Ann. Chem.* 43-48
190	Ornibactin – C_6	*Burkholderia cepacia*	Holger, S., Freund, S., Meyer, J-M., Winkelmann, G., Jung, G. (1993) *Liebigs. Ann. Chem.* 43-48
191	Ornibactin – C_8	*Burkholderia cepacia*	Holger, S., Freund, S., Meyer, J-M., Winkelmann, G., Jung, G. (1993) *Liebigs. Ann. Chem.* 43-48
192	Aquachelin A	*Halomonas aquamarina*	Martinez, J. S., Carter-Franklin, J. N., Mann, E. L., Martin, J. D., Haygood, M. G., Butler, A. (2003) *Proc. Natl. Acad. Sci. (USA)* **100**, 3754-3759
193	Aquachelin B	*Halomonas aquamarina*	Martinez, J. S., Carter-Franklin, J. N., Mann, E. L., Martin, J. D., Haygood, M. G., Butler, A. (2003) *Proc. Natl. Acad. Sci. (USA)* **100**, 3754-3759
194	Aquachelin C	*Halomonas aquamarina*	Martinez, J. S., Carter-Franklin, J. N., Mann, E. L., Martin, J. D., Haygood, M. G., Butler, A. (2003) *Proc. Natl. Acad. Sci. (USA)* **100**, 3754-3759
195	Aquachelin D	*Halomonas aquamarina*	Martinez, J. S., Carter-Franklin, J. N., Mann, E. L., Martin, J. D., Haygood, M. G., Butler, A. (2003) *Proc. Natl. Acad. Sci. (USA)* **100**, 3754-3759

196	Aquachelin I		Kem, M. P., Zane, H. K., Springer, S. D., Gauglitz, J. M. and Butler, A. (2014) *Metallomics* **6**, 1150
197	Aquachelin J		Kem, M. P., Zane, H. K., Springer, S. D., Gauglitz, J. M. and Butler, A. (2014) *Metallomics* **6**, 1150
198	Marinobactin A	*Marinobacter* sp	Martinz, J. S., Zhang, G. P., Holt, P. D., Jung, H-T, Carrano, C. J., Haygood, M. G., Butler, A. (2000) *Science* **287**, 1245-1247
199	Marinobactin B	*Marinobacter* sp	Martinz, J. S., Zhang, G. P., Holt, P. D., Jung, H-T, Carrano, C. J., Haygood, M. G., Butler, A. (2000) *Science* **287**, 1245-1247
200	Marinobactin C	*Marinobacter* sp	Martinz, J. S., Zhang, G. P., Holt, P. D., Jung, H-T, Carrano, C. J., Haygood, M. G., Butler, A. (2000) *Science* **287**, 1245-1247
201	Marinobactin D_1	*Marinobacter* sp	Martinz, J. S., Zhang, G. P., Holt, P. D., Jung, H-T, Carrano, C. J., Haygood, M. G., Butler, A. (2000) *Science* **287**, 1245-1247
202	Marinobactin D_2	*Marinobacter* sp	Martinz, J. S., Zhang, G. P., Holt, P. D., Jung, H-T, Carrano, C. J., Haygood, M. G., Butler, A. (2000) *Science* **287**, 1245-1247
203	Marinobactin E	*Marinobacter* sp	Martinz, J. S., Zhang, G. P., Holt, P. D., Jung, H-T, Carrano, C. J., Haygood, M. G., Butler, A. (2000) *Science* **287**, 1245-1247
204	Loihichelin A	*Halomonas LOB-5*	Homann, V. V., Sandy, M., Tincu, A., Templeton, A., Tebo, B., Butler, A. (2009) *J. Nat. Prod.* **72**, 884-888
205	Loihichelin B	*Halomonas LOB-5*	Homann, V. V., Sandy, M., Tincu, A., Templeton, A., Tebo, B., Butler, A. (2009) *J. Nat. Prod.* **72**, 884-888
206	Loihichelin C	*Halomonas LOB-5*	Homann, V. V., Sandy, M., Tincu, A., Templeton, A., Tebo, B., Butler, A. (2009) *J. Nat. Prod.* **72**, 884-888
207	Loihichelin D	*Halomonas LOB-5*	Homann, V. V., Sandy, M., Tincu, A., Templeton, A., Tebo, B., Butler, A. (2009) *J. Nat. Prod.* **72**, 884-888
208	Loihichelin E	*Halomonas LOB-5*	Homann, V. V., Sandy, M., Tincu, A., Templeton, A., Tebo, B., Butler, A. (2009) *J. Nat. Prod.* **72**, 884-888

209	Loihichelin F	*Halomonas LOB-5*	Homann, V. V., Sandy, M., Tincu, A., Templeton, A., Tebo, B., Butler, A. (2009) *J. Nat. Prod.* **72**, 884-888
210	Taiwachelin	*Cupriavidos taiwanensis*	Kreutzer, M. F., Nett, M. (2012) *Org. Biomol. Chem.* **10**, 9338-9343.
211	Schizokinen	*Bacillus megaterium*	Mullis, K. B., Pollack, J. R., Neilands, J. B. (1971) *Biochem.* **10**, 4894-4898
212	Aerobactin	*Aerobacter aerogenes*	Gibson, F., Magrath, D. I. (1969) *Biochim. Biophys. Acta* **192**, 175-184
213	Arthrobactin	*Arthrobacter pascens*	Linke, W. D., Crueger, A., Diekmann, H. (1972) *Arch. Mikrobiol.* **85**, 44-50
214	Rhizobactin 1021	*Rhizobium meliloti*	Persmark, M., Pittman, P., Buyer, J. S., Schwyn, B., Gill, P. R., Neilands, J. B. (1993) *J. Amer. Chem. Soc.* **115**, 3950-3956
215	Nannochelin A	*Nannocystis exedens*	Kunze, B., Trowitzsch, W., Höfle, G., Reichenbach, H. (1992) *J. Antibiot.* **45**, 147-150
216	Nannochelin B	*Nannocystis exedens*	Kunze, B., Trowitzsch, W., Höfle, G., Reichenbach, H. (1992) *J. Antibiot.* **45**, 147-150
217	Nannochelin C	*Nannocystis exedens*	Kunze, B., Trowitzsch, W., Höfle, G., Reichenbach, H. (1992) *J. Antibiot.* **45**, 147-150
218	Acinetoferrin	*Acinetobacter haemolyticus*	Okujo, N., Sakakibara, Y., Yoshida, T., Yamamoto, S. (1994) *Biometals.* **7**, 170-176
219	Ochrobactin A	*Ochrobactrum SP18*	Martin, J. D., Ito, Y., Homann, V. V., Haygood, M. G., Butler, A. (2006) *J. Biol. Inorg. Chem.* **11**, 633-641
220	Ochrobactin B	*Ochrobactrum SP18*	Martin, J. D., Ito, Y., Homann, V. V., Haygood, M. G., Butler, A. (2006) *J. Biol. Inorg. Chem.* **11**, 633-641
221	Ochrobactin C	*Ochrobactrum SP18*	Martin, J. D., Ito, Y., Homann, V. V., Haygood, M. G., Butler, A. (2006) *J. Biol. Inorg. Chem.* **11**, 633-641
222	Snychobactin A	*Synechococcus PCC7002*	Ito, Y., Butler, A. (2005) *Limnol. Oceanogr.* **50**, 1918-1923
223	Snychobactin B	*Synechococcus PCC7002*	Ito, Y., Butler, A. (2005) *Limnol. Oceanogr.* **50**, 1918-1923

224	Snychobactin C	*Synechococcus PCC7002*	Ito, Y., Butler, A. (2005) *Limnol. Oceanogr.* **50**, 1918-1923
225	Mugineic acid	*Hordium vulgare*	Takemota, T., Nomoto, K., Fushiya, S., Ouchi, R., Kusano, G., Hikino, H., Takagi, S., Matsuura, Y., Kakudo, M. (1978) *Proc. Japan. Acad.* **54B**, 469-473
226	3-Hydroxymugineic acid	*Hordium vulgare*	Nomoto, K., Ohfune, Y. (1982) *J. Syn. Org. Chem. Japan* **40**, 401-406
227	2`-Deoxymugineic acid	*Triticum aestivum*	Nomoto, K., Yoshioka, H., Arima, M., Takemoto, T., Fushiya, S., Takagi, S. (1981) *Chimia.* **35**, 249-254
228	Avenic acid	*Avena sativa*	Fushiya, S., Sato, Y., Nozoe, S., Nomoto, K., Takemoto, T., Takagi, S. (1980) *Tetrahedron Letts.* **21**, 3071-3072
229	Distichonic acid	*Hordium vulgare*	Nomoto, K., Ohfune, Y. (1982) *J. Syn. Org. Chem. Japan* **40**, 401-406
230	Deoxydistichonic acid	*Oriza sativa*	Klair, S., Hider, R. C., Adams, M. Z., Leigh, R. A. (1996) *J. Plant. Nutrit.* **19**, 1295-1307
231	Rhizobactin	*Rhizobium meliloti*	Smith, M. J., Shoolery, J. N., Schwyn, B., Holden, I., Neilands, J. B. (1985) *J. Amer. Chem. Soc.* **107**, 1739-1743
232	Staphyloferrin B	*Staphylococcus hyicus*	Drechsel, H., Freund, S., Nicholson, G., Haag, H., Zähner, H., Hanke, K., Jung, G. (1993) *Biometals.* **6**, 185-192
233	Alterobactin A	*Alteromonas luteoviolacea*	Reid, R. T., Live, D. H., Faulkner, D. J., Butler, A. (1993) *Nature* **366**, 455-458
234	Alterobactin B	*Alteromonas luteoviolacea*	Reid, R. T., Live, D. H., Faulkner, D. J., Butler, A. (1993) *Nature* **366**, 455-458
235	Pseudoalterobactin A	*Pseuodoalteromonas* sp	Kanoh, K., Kamino, K., Leleo, G., Adachi, K., Shizuri, Y. (2003) *J. Antibiot.* **10**, 871-875
236	Pseudoalterobactin B	*Pseuodoalteromonas* sp	Kanoh, K., Kamino, K., Leleo, G., Adachi, K., Shizuri, Y. (2003) *J. Antibiot.* **10**, 871-875
237	Petrobactin	*Marinobacter hydrocarbonoclasticus*	Barbeau, K., Zhang, G., Live, D. H., Butler, A. (2002) *J. Amer. Chem. Soc.* **124**, 378-379

238	Petrobactin sulphonate	*Marinobacter hydrocarbonoclasticus*	Hickford, S. J. H., Küpper, F. C., Zhang, G., Carrano, C. J., Blunt, J. W., Butler, A. (2004) *J. Nat. Prod.* **67**, 1897-1899
239	Petrobactin disulphonate	*Marinobacter hydrocarbonoclasticus*	Homann, V. V., Edwards, K. J., Webb, E. A., Butler, A. (2009) *Biometals.* **22**, 565-571
240	Fusarinine A	*Fusarium roseum*	Sayer, J. M., Emery, T. F. (1968) *Biochem.* **7**, 184-190
241	Exochelin MN	*Mycobacterium neoaurum*	Sharman, G., Willians, D. H., Ewing, D. F., Ratledge, C. (1995) *Chem. Biol.* **2**, 553-561
242	Ornicorrugatin	*Pseudomonas fluorescens*	Matthijs, S., Budzikiewicz, H., Schäfer, M., Wathelet, B., Cornelis, P. (2008) *Z. Naturforsch* **63c**, 8-12
243	Maduraferrin	*Actinomadura madurae*	Keller-Schierlein, W., Hagmann, L., Zähner, H., Huhn, W. (1988) *Helv. Chim. Acta* **71**, 1528-1540
244	Alcaligin	*Bordetella pertussis*	Moore, C. H., Foster, L-A., Gerbig, D. G., Dyer, D. W., Gibson, B. W. (1995) *J. Bacter.* **177**, 1116-1118
245	Putrebactin	*Shewanella putrefaciens*	Ledyard, K. M., Butler, A. (1997) *J. Biol. Inorg. Chem.* **2**, 93-97
246	Bisucaberin	*Alteromonas haloplanktis*	Kameyama, T., Takahashi, A., Kurasawa, S., Ishizuka, M., Okami, Y., Takechi, T., Umezawa, U. (1987) *J. Antibiot.* **40**, 1664-1669
247	E,E-putrebactene	*Shewanella, putrefaciens*	Soe, C. Z., Codd, R. (2014) *ACS Chem. Biol.* **9**, 945
248	E-putrebactene	*Shewanella, putrefaciens*	Soe, C. Z., Codd, R. (2014) *ACS Chem. Biol.* **9**, 945
249	Rhodotrulic acid	*Rhodotorula pilimanae*	Atkin, C. L., Neilands, J. B. (1968) *Biochem.* **7**, 3734-3739
250	Dimerum acid	*Fasarium dimerum*	Diekmann, H. (1970) *Arch. Mikrobiol.* **73**, 65-76
251	Amycolachrome	*Amycolatopsis orientalis*	Fiedler, H-P, Zähner, H. (2001) *in* Microbial Fundamentals of Biotechnology (V Braun, F Götz Eds) Wiley-VCH PP 16-51

252	Azotochelin (Azotobactin)	*Azotobacter vinelandii*	Corbin, S. L., Bulen, W. A. (1969) *Biochem.* **8**, 757-762
253	Myxochelin	*Angiococcus disciformis*	Kunze, B., Bedorf, N., Kohl, W., Höfle, G., Reichenbach, H. (1989) *J. Antibiot.* **42**, 14-17
254	Amonabactin T789	*Aeromonus hydrophila*	Telford, J. R., Raymond, K. N. (1998) *Inorganic. Chem.* **37**, 4578-4583
255	Amonabactin P750	*Aeromonus hydrophila*	Telford, J. R., Raymond, K. N. (1998) *Inorganic. Chem.* **37**, 4578-4583
256	Amonabactin T732	*Aeromonus hydrophila*	Telford, J. R., Raymond, K. N. (1998) *Inorganic. Chem.* **37**, 4578-4583
257	Amonabactin P693	*Aeromonus hydrophila*	Telford, J. R., Raymond, K. N. (1998) *Inorganic. Chem.* **37**, 4578-4583
258	Salmochelin S1	*Salmonella enterica*	Bister, B., Bischoff, D., Nicholson, G. J., Valdebenito, M., Schneider, K., Winkelmann, G., Hanke, K., Süssmuth, R. D. (2004) *Biometals.* **17**, 471-481
259	Serratiochelin	*Serratia marcescens*	Ehlert, G., Taraz, K., Budzikiewicz, H. (1974) *Z. Naturforsch.* **49c**, 11-17
260	Anachelin 1	*Anabaena cylindrica*	Beiderbeck, H., Taraz, K., Budzikiewicz, H. (2000) *Z. Naturforsch.* **55c**, 681-687
261	Anachelin 2	*Anabaena cylindrica*	Gademann, K., Budzikiewicz, H. (2004) *Chimia.* **58**, 212-214
262	Pistillarin	*Penicillium bilaii*	Capon, R. J., Stewart, M., Ratnayake, R. (2007) *J. Nat. Prod.* **70**, 1746-1752
263	Anguibactin	*Vibrio anguillarium*	Actis, L. A., Fish, W., Crosa, J. H., Kellerman, K., Ellenberger, S. R., Hauser, F. M., SandersLoehr (1986) *J. Bacter.* **167**, 57-65
264	Acinetobactin	*Acinetobacter baumannii*	Yamamoto, S., Okuio, N., Sakakibara, Y. (1994) *Arch. Microbiol.* **162**, 249-254
265	Yersiniabactin	*Yersinia enterocolitica*	Drechsel, H., Stephan, H., Lotz, R., Haag, H., Zähner, H., Hanke, K., Jung, G. (1995) *Liebig. Ann. Chem.* 1725-1733
266	Micacocidin	*Pseudomonas* sp	Kobayashi, S., Nakai, H., Ikenishi, Y., Sun, W-Y., Ozaki, M., Hayase, Y., Takeda, R. (1998) *J. Antibiot.* **51**, 328-332

267	Fusarinine (monomer)	*Laccaria laccata* *L. bicolor*	Haselwandter, K., Häninger, G., Ganzera, M., Haas, H., Nicholson, G., Winkelmann, G. (2013) *Biometals* **26**, 969-979.
268	Deoxyschizokinen	*Bacillus megaterium*	Hu, X., Boyer, G. L. (1995) *Biometals.* **8**, 357-364
269	Heterobactin B	*Rhodococcus erythropolis*	Carrano, C. J., Jordan, M., Drechsel, H., Schmid, D. G., Winkelmann, G. (2001) *Biometals.* **14**, 119-125
270	Fimsbactin A	*Acinetobacter baumannii* *A. baylyl*	Proschak, A., Lubuta, P., Grün, P., Löhr, F., Wilharm, G., De Berardinis, V., Bode, H. B. (2013) *Chem. BioChem.* **14**, 633-638.
271	Fimsbactin B	*Acinetobacter baumannii* *A. baylyl*	Proschak, A., Lubuta, P., Grün, P., Löhr, F., Wilharm, G., De Berardinis, V., Bode, H. B. (2013) *Chem. BioChem.* **14**, 633
272	Fimsbactin C	*Acinetobacter baumannii* *A. baylyl*	Proschak, A., Lubuta, P., Grün, P., Löhr, F., Wilharm, G., De Berardinis, V., Bode, H. B. (2013) *Chem. BioChem.* **14**, 633
273	Fimsbactin D	*Acinetobacter baumannii* *A. baylyl*	Proschak, A., Lubuta, P., Grün, P., Löhr, F., Wilharm, G., De Berardinis, V., Bode, H. B. (2013) *Chem. BioChem.* **14**, 633
274	Fimsbactin E	*Acinetobacter baumannii* *A. baylyl*	Proschak, A., Lubuta, P., Grün, P., Löhr, F., Wilharm, G., De Berardinis, V., Bode, H. B. (2013) *Chem. BioChem.* **14**, 633
275	Fimsbactin F	*Acinetobacter baumannii* *A. baylyl*	Proschak, A., Lubuta, P., Grün, P., Löhr, F., Wilharm, G., De Berardinis, V., Bode, H. B. (2013) *Chem. BioChem.* **14**, 633
276	Desferrithiocin	*Streptomyces antibioticus*	Naegeli, H., Zähner, H. (1980) *Helv. Chim. Acta* **61**, 2088-2095
277	Aeruginic acid	*Pseudomonas aeruginosa*	Yamada, Y., Seki, N., Kitahara, T., Takahasi, M., Matsui, M. (1970) *Agr. Biol. Chem.* **34**, 780-783
278	Pyochelin	*Pseudomonas aeruginosa*	Cox, C. D., Rinehart, K. L., Moore, M. L., Cook, J. C. (1981) *Proc. Natl. Acad. Sci. (USA)* **78**, 4256-4260
279	Thiazostatin	*Streptomyces tolurosus*	Shindo, K., Takenaka, A., Noguchi, T., Hayakawa, Y., Seto, H. (1989) *J. Antibiotic.* **62**, 1526-1528
280	Enantio-Pyochelin	*Pseudomonas fluorescens*	Youard, Z., Reimmann, C. (2008) *Biometals 2008.* (Santiago de Compostela, Spain) Abstract

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281	2,3-Dihydroxybenzoylserine	*Pseudomonas aeroginosa*	Hantke, K. (1990) *FEMS. Microbiol. Letts.* **67**, 5-8
282	Salmochelin SX	*Escherichia coli*, *Salmonella enterica*	Bister, B., Bischoff, D., Nicholson, G. J., Valdebenito, M., Schneider, K., Winkelmann, G., Hanke, K., Sussmuth, R. D. (2004) *Biometals.* **17**, 471-481
283	Citrate	*Escherichia coli*	Braun,. V., Enz, S., (2001) *Microbial Fundamentals of Biotechology*, eds. V. Braun and F. Götz, wiley-VCH, Weinheim, ch. 11, pp 205-211.
284	Chrysobactin	*Erwinia chrysanthemi*	Persmark, M., Expert, D., Neilands, J. B. (1989) *J. Biol. Chem.* **264**, 3187-3193
285	Aminochelin	*Azotobacter vinelandi*	Page, W. J., Tigerström, M. (1988) *J. Gen. Microbiol.* **134**, 453-460
286	Siderochelin A	*Nocardia* sp	Liu, W., Fisher, S., Wells, J. S., Ricca, C. S., Principe, P. A., Trejo, W. H., Bonner, D. P., Gougoutos, J. Z., Poeplitz, B., Sykes, R. B. (1981) *J. Antibiot.* **34**, 791-799
287	Aspergillic acid	*Aspergillus flavus*	Barker, W. R., Callaghan, C., Hill, L., Noble, D., Acred, P., Harper, P. B., Sowa, M. A., Fletton, R. A. (1979) *J. Antibiotic* **32**, 1096-1103
288	Itoic acid	*Bacillus subtilis*	Ito, T., Neilands, J. B. (1958) *J. Amer. Chem. Soc.* **80**, 4645-4647
289	Cepabactin	*Pseudomonas cepacia*	Winkler, S., Ockels, W., Budzikiewicz, H., Korth, K., Pulverer, G. (1986) *Z. Naturforsch.* **41c**, 807-808
290	Pyridoxatin	*Acremonium* sp	Teshima, Y., Shinya, K., Shimazu, A., Furihata, K., Chul, H. S., Hayakawa, Y., Naqai, K. (1991) *J. Antibiot.* **44**, 685-687
291	Quinolobactin	*Pseudomonas fluorescens*	Mossialos, D., Meyer, J-m., Budzikiewicz, H., Wolff, U., Koedam, N., Baysse, C., Anjaiah, V., Cornelis, P. (2000) *Appl. Environ. Microbiol.* **66**, 487-492
292	Ferrimycin A	*Streptomyces griseoflavus*	Bickel, H., Mertens, P., Prelog, V., Seibl, J., Walser, A. (1996) *Tetrahedron*, *Supplement 8*, 171-179. Neilands, J. B., Valenta, J. R. in *Metal Ions in Biological Systems*, ed. H. Sigel and A. Sigel, Dekker, New York, 1985, vol 19, ch. 11, 313-333.

293	Salmycin A	*Streptomyces violaceus* 37290	Vertesy, L., Aretz, W., Fehlhaber, H-W., Kogler, H. (1995) *Helv. Chim. Acta* **78**, 46-60.
294	Albomycin	*Streptomyces* sp WS116	Benz, G., Schroder, T., Kurz, J., Wünsche, C., Karl, W., Steffens, G., Pfitzner, J., Schmidt, D. (1982) *Angew. Chem.* **21**, 527-528.

106	Nocobactin NA	*Nocardia asteroides*	Ratledge, C., Snow, G. A. (1974) *Biochem. J.* **139**, 407-413