

Marine organisms as a prolific source of bioactive depsipeptides

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Contents

Table S1 Detail information for marine cyanobacterium-derived depsipeptides (1-161)	S2
Table S2 Detail information for marine sponge-derived depsipeptides (162-213)	S8
Table S3 Detail information for marine mollusk-derived depsipeptides (214-243)	S10
Table S4 Detail information for marine fungus-derived depsipeptides (244-259)	S11
Table S5 Detail information for marine bacterium-derived depsipeptides (260-282)	S12
Table S6. Detail information for marine algae-derived depsipeptides (283-288).	S13
References	S14

Table S1 Marine cyanobacterium-derived depsipeptides (1-161).

1. Linear lipopeptide

Compound No.	Name	Biological Source/ Strain No.	Country/Region	Bioactivity	Ref.
1	grassystatins D	<i>Symploca</i> VPG 14-61	Cetti Bay, Guam	potential antimetastatic activity against invasive breast cancer	[1]
2	grassystatins E				
3	grassystatins F				
4	hoiamide C	<i>Symploca</i> sp.	Gallows Reef, Papua New Guinea	-	[2]
5	hoiamide D		near Kape Point, Papua New Guinea	inhibitor of p53/MDM2 interaction	[3]
6	malevamides A	<i>Symploca laeteviridis</i>	south shore of Oahu, Hawaii	-	[4]
7	malevamide D	<i>Symploca hydroides</i>		cytotoxic activity	[5]
8	symplostatin 3	<i>Symploca</i> sp. VP452	Kaneohe Bay, Oahu, Hawaii	vitro cytotoxicity activity	[6]
9	symplostatin 4	<i>Symploca</i> sp.	Key Largo (Florida Keys)	antimalarial activity	[7]
10	tasiamide A		Short Drop-off in Palau	cytotoxic activity	[8]
11	tasiamide B				
12	tasiamide C				
13	tasiamide D		Kimbe Bay off the north coast of New Britain, Papua New Guinea	-	[10]
14	tasiamide E			-	
15	tasiamide F	<i>Lyngbya</i> sp. NIH code 399	Cocos Lagoon, Guam	vivo inhibitor of cathepsins D and E	[11]
16	izenamide A	<i>Lyngbya</i> 1605-5	Izena Island, Okinawa Prefecture, Japan	-	[12]
17	izenamide B			-	
18	izenamide C			-	
19	grassystatin A	<i>Lyngbya confervoides</i>	Key Largo of Florida	protease inhibitors activity	[13]
20	grassystatin B				
21	grassystatin C				
22	maedamide	<i>Lyngbya</i> sp.	Okinawa Prefecture	chymotrypsin inhibitor	[14]
23	lyngbyabellin D	<i>Lyngbya</i> sp VP417	Finger's Reef, Apra Harbor, Guam	against the KB cell line.	[15]
24	lyngbyabellin P	<i>Okeania</i> sp.	Red Sea	antifouling activity,	[16]
25	gallinamide A	<i>Schizothrix</i> sp	North coast of Panama	antimalarial and cytotoxic activity	[17]
26	veraguamide K	<i>Oscillatoria margaritifera</i> .	shallow water off Isla Canales	cytotoxic activity	[18]
27	veraguamide L		de Afuera on the Pacific coast of Panama		

2 Cyclodepsipeptides

2.1 Cyclopentadepsipeptides

Compound No.	Name	Biological Source/ Strain No.	Country/Region	Bioactivity	Ref.
28	benderamide A	<i>Lyngbya</i> sp.	shores of St. John's Island, Singapore	-	[19]
29	bouillomide A	<i>Lyngbya bouillonii</i>	Guamanian	inhibition of serine proteases activity	[20]
30	bouillomide B				
31	cocosamide A	<i>Lyngbya majuscula</i>	Cocos Lagoon, Guam	weak cytotoxicity activity	[21]
32	cocosamide B		Papua New Guinea	cytotoxicity activity	[22]
33	guineamide C				
34	kempopeptin A	<i>Lyngbya</i> sp.	Kemp Channel in the Florida Keys	serine Protease Inhibitors activity	[23]
35	kempopeptin B				
36	kempopeptin C				
37	kurahamide	<i>Lyngbya conferWoides</i>	Kuraha, Okinawa Prefecture, Japan	inhibited elastase and chymotrypsin activity	[25]
38	lyngbyastatin 4		Florida Atlantic coast	chymotrypsin inhibitor	[26]
39	lyngbyastatin 5				
40	lyngbyastatin 6	<i>Lyngbya</i> sp.	coast of Fort Lauderdale, Florida	selectively inhibit elastase	[27]
41	lyngbyastatin 7				
42	lyngbyastatin 8				
43	lyngbyastatin 9	<i>Lyngbya semiplena</i>	Tumon Bay, Guam	inhibit porcine pancreatic elastase	[28]
44	lyngbyastatin 10				
45	pompanopeptin A	<i>Lyngbya confervoides</i>	Near Fort Lauderdale, Florida, USA	selectively inhibited trypsin	[29]
46	somamide A	<i>Lyngbya majuscula</i> and <i>Schizothrix</i> sp.	near Somo , Fiji, and Taveuni Island, Fiji	-	[30]
47	somamide B			-	
48	yanucamide A	<i>Lyngbya majuscula</i> and <i>Schizothrix</i> sp.	Yanuca Island, Fiji	Brine shrimp toxicity	[31]
49	yanucamide B				
50	jizanpeptin A	<i>Symploca</i> sp.	Red Sea	protease Inhibitors activity	[32]
51	jizanpeptin B				
52	jizanpeptin C				
53	jizanpeptin D				
54	jizanpeptin E				
55	symplostatin 2	<i>Symploca hydroides</i>	Pago Bay, Guam	-	[33]
56	symplostatin 5	<i>Symploca</i> sp.	Cetti Bay, Guam	elastase inhibitor activity	[34]
57	symplostatin 6			-	
58	symplostatin 7			-	
59	symplostatin 8			-	
60	symplostatin 9			-	
61	symplostatin 10			-	
62	trikoveramide A	<i>Symploca hydroides</i>	Bintan Island, Indonesia	cytotoxic activity	[35]

63	trikoveramide B				
64	trikoveramide C				
65	kyanamide	<i>Caldora penicillata</i>	Kyan, Okinawa Prefecture, Japan	protease inhibitory activity	[36]
66	largamides A			-	
67	largamides B			-	
68	largamides C			-	
69	largamides D	<i>Oscillatoria</i> sp.	Keys off the coast of Key Largo (Florida, USA)	inhibited chymotrypsin activity	[37]
70	largamides E				
71	largamides F				
72	largamides G				
73	loggerpeptin A			-	
74	loggerpeptin B	<i>Leptolyngbya</i> sp.	Loggerhead Key, Florida	-	[38]
75	loggerpeptin C			protease Inhibition activity	
76	molassamide	<i>Dichothrix utahensis</i>	Molasses Reef, Key Largo, Florida, and from Brewer's Bay, St. Thomas, U.S. Virgin Islands	protease-inhibitory activity	[39]
77	odoamide	<i>Okeania</i> sp.	Odo, Okinawa Prefecture, Japan	cytotoxic activity	[40]
78	tutuilaide A	-	American Samoa and Palmyra Atoll	elastase inhibitory activity	[41]
79	tutuilaide B	-		elastase inhibitory activity	[41]
80	tutuilaide C	-			
81	unnarmicin D	<i>Trichodesmium thiebautii</i>	Padre Island, Corpus Christi	-	[42]

2.2 Cycohexadepsipeptides

Compound No.	Name	Biological Source/ Strain No.	Country/Region	Bioactivity	Ref.
82	antanapeptin A			-	
83	antanapeptin B		Antany Mora, Madagascar	-	[43]
84	antanapeptin C			-	
85	antanapeptin D			-	
86	aurilides B			Cancer Cell Toxins	[44]
87	aurilides C				
88	guineamide D	<i>Lyngbya majuscula</i>	Papua New Guinea	-	[22]
89	guineamide F			-	
90	palmyramide A		south of Strawn Island, Palmyra Atoll, USA	cytotoxic activity	[45]
91	trungapeptin A		Thailand	-	[46]
92	trungapeptin B		Trung Province, Thailand	-	[46]
93	trungapeptin C			-	
94	veraguamide A	<i>Symploca cf. hydnoides</i>	Cetti Bay, Guam	cytotoxic activity	[47]

95	veraguamide B				
96	veraguamide C				
97	veraguamide D				
98	veraguamide E				
99	veraguamide F				
100	veraguamide G				
101	veraguamide H			-	
102	veraguamide I	<i>Oscillatoria margaritifera</i>	Coiba National Park, Panama	-	[18]
103	veraguamide J			-	

1.2.3 Cycloheptadepsipeptides

Compound No.	Name	Biological Source/ Strain No.	Country/Region	Bioactivity	Ref.
104	guineamide E	<i>Lyngbya majuscula</i>	Papua New Guinea	-	[22]
105	lagunamide A				[48]
106	lagunamide B	<i>Lyngbya majuscula</i>	Pulau Hantu, Singapore	cytotoxic activity	
107	lagunamide C		Pulau Hantu Besar Singapore		[49]
108	lyngbyastatin 2	<i>Lyngbya majuscula</i>	Finger's Reef, Apra Harbor, Guam	-	[50]
109	norlyngbyastatin 2			-	
110	ulongapeptin	<i>Lyngbya</i> sp	Palauan	cytotoxic activity	[51]
111	coibamide A	<i>Leptolyngbya</i> sp	Coiba National Park, Panama	Antiproliferative activity	[52]
112	kohamamide A			-	[53]
113	kohamamide B	<i>Okeania</i> sp	Kohama Island, Okinawa Prefecture, Japan	cytotoxicity activity	[53]
114	kohamamide C			-	
115	lagunamide D	<i>Dichothrix</i> sp	Loggerhead Key in the Dry Tortugas, Florida	cytotoxic activity	[54]
116	pemukainalide A			-	
117	pemukainalide B	<i>Symploca hydroides</i>	Trikora beach, Bintan Island	cytotoxic activity	[55]
118	viequeamide A			cytotoxic activity	
119	viequeamide B			-	
120	viequeamide C			-	
121	viequeamide D	<i>Rivularia</i> sp	Playa de la Chiva on Vieques Island in the Commonwealth of Puerto Rico, USA	-	[56]
122	viequeamide E			-	
123	viequeamide F			-	

1.2.4 Thiazole-containing Cycodipeptides

Compound No.	Name	Biological Source/ Strain No.	Country/Region	Bioactivity	Ref.
124	grassypeptolide A				
125	grassypeptolide B	<i>Lyngbya confervoides</i> .	Big Pine Shoals, Florida	Cytotoxicity activity	[57]
126	grassypeptolide C				

127	grassyseptolide D	<i>Leptolyngbya</i> sp	Red Sea	-	[58]
128	grassyseptolide E				
129	grassyseptolide F	<i>Lyngbya majuscula</i>	Ngerderrak Reef, Palau	-	[59]
130	grassyseptolide G				
131	guineamide A	<i>Lyngbya majuscula</i>	Papua New Guinea	-	[22]
132	guineamide B			Cytotoxicity activity	
133	hoiamide A	<i>Lyngbya majuscula</i>		Sodium Channel Activator	[60]
134	hoiamide B				
135	lyngbyabellin A	<i>Lyngbya majuscula</i>	Finger's Reef, Apra Harbor, Guam	cytotoxic activity	[61]
136	lyngbyabellin B		Bush Key, Dry Tortugas, FL	Antimicrobial activity	[62]
137	lyngbyabellin E		Alotau Bay, Papua New Guinea	cytotoxic activity	[63]
138	lyngbyabellin H				
139	lyngbyabellin G				
140	27-deoxylyngbyabellin A	<i>Lyngbya bouillonii</i>	Apra Harbor, Guam	-	[64]
141	lyngbyabellin J				
142	obyamide	<i>Lyngbya confervoides</i>	Obyan Bay in Saipan	cytotoxic activity	[65]
1.2.5 Other Cyclodespipeptides					
Compound No.	Name	Biological Source/ Strain No.	Country/Region	Bioactivity	Ref.
143	guineamide G	<i>Lyngbya majuscula</i>	Papua New Guinea	cytotoxicity activity	[66]
144	desmethoxymajusculamide C	<i>Lyngbya majuscula</i>	Yanuca Island, Fiji	cytotoxicity activity	[67]
145	homodolastatin 16		Wasini Island, Kenya	exhibited moderate activity	[68]
146	pitiprolamide	<i>Lyngbya majuscula</i>	Piti Bomb Holes, Guam	cytotoxic activity	[69]
147	lyngbyastatin 1	<i>Lyngbya majuscula/Schizothrix calcicola</i>	Guam Piti Bomb Hole	cytotoxic activity	[70]
148	lyngbyastatin 3	<i>Lyngbya majuscula</i>	Tokai Maru shipwreck in Apra Harbor, Guam	-	[71]
149	wewakamide A	<i>Lyngbya semiplena</i>	Papua New Guinea	brine shrimp toxicity	[66]
150	wewakpeptin A	<i>Lyngbya semiplena</i>	Papua New Guinea	cytotoxic activity	[72]
151	wewakpeptin B			cytotoxic activity	
152	wewakpeptin C			-	
153	wewakpeptin D			-	
154	malevamide B			-	
155	malevamide C	<i>Symploca laete-viridis</i>	south shore of Oahu, Hawaii	-	[4]
156	malevamide E		Oahu near Ala Moana Beach Park	inhibitory effect on Ca ²⁺	
157	triproamide	<i>Symploca hydroides</i>	Trikora beach, Bintan Island	-	[55]
158	companeramide A	<i>Symploca</i>	Coiba Island, Panama	vitro antiplasmodial activity	[74]
159	companeramide B				

160	hapalosin	<i>Hapalosiphon welwitschii</i>	-	multidrug-resistance reversing activity	[75]
161	urumamide	<i>Okeania</i> sp.	Ikei Island, Okinawa	inhibitory activity	[76]

Table S2 Detail information for marine sponge-derived depsipeptides (**162-213**).

Compound No.	Name	Biological Source/ Strain No.	Country/Region	Bioactivity	Ref.
162	callipeltin A	<i>Callipelta</i> sp.	New Caledonian Lithistida	Anti-HIV activity	[77]
163	callipeltin L	<i>Latrunculia</i> sp.	Vanuatu South Pacific	-	[78]
164	callipeltin N	<i>Asteropus</i> sp.	Mary Island, Russell group, Solomon Islands	cytotoxic activity	[79]
165	callipeltin O				
166	cyclolithistide A	<i>Theonella swinhoei</i> .	Jogashima, Sagami Bay, Japan	Antifungal activity	[80]
167	daedophamide	<i>Daedalopelta</i> sp.	Alor Island (Indonesia)	cytotoxic activity	[81]
168	gunungamide A	<i>Discodermia</i> sp.	Palau Gunung, Indonesia	-	[7]
169	homophymine A	<i>Homophymia</i> sp.	east coast of New Caledonia	Anti-HIV activity	[82]
170	homophymine A1	<i>Homophymia</i> sp.	New Caledonia	antiproliferative activity	[83]
171	homophymine B				
172	homophymine B2				
173	homophymine C				
174	homophymine C3				
175	homophymine D				
176	homophymine D4				
177	homophymine E				
178	homophymine E5				
179	microspinosamide	<i>Sidonops microspinosa</i>	near Sulawesi, Indonesia	Inhibited the cytopathic	[84]
180	mirabamide A	<i>Siliquariaspongia mirabilis</i>	Nama Island, southeast of Chuuk Lagoon, in the Federated States of Micronesia	Inhibit HIV-1 Fusion	[85]
181	mirabamide B				
182	mirabamide C				
183	mirabamide D				
184	mirabamide E	<i>Stelletta clavosa</i>	Torres Strait.	Inhibit HIV-1 Fusion	[86]
185	mirabamide F				
186	mirabamide G				
187	mirabamide H				
188	nagahamide A	<i>Theonella swinhoei</i>	southern Japan	Antibacterial activity	[87]
189	papuamide A	<i>Theonella mirabilis</i> and <i>T. swinhoei</i>	near Madang Harbor on the north coast of Papua New Guinea	HIV-Inhibitory and Cytotoxic	[88]
190	papuamide B				
191	papuamide C				
192	papuamide D				
193	papuamide E	<i>Melophlus</i> sp.	Karumolum Russell Island in the Solomon Islands	cytotoxic activity	[89]
194	papuamide F				
195	phoriospongin A	<i>Phoriospongia</i> sp. and <i>Callyspongia bilamellata</i>	Indented Head	Nematocidal activity	[90]

196	phoriospongins B		Reef, Port Phillip Bay, Australia		
197	pipecolidepsin A	<i>Homophymia lamellosa</i>	near Saint Marie Island, Madagascar	cytotoxic activity	[91]
198	pipecolidepsin B				
199	polydiscamide A	<i>Discodermia</i> sp.	St. Lucia, Lesser Antilles	Inhibition of cell proliferation	[92]
200	polydiscamide B	<i>Ircinia</i> sp.	Porpoise Cay, the Great Barrier Reef, Australia	nonendogenous human SNSR agonists	[93]
201	polydiscamide C				
202	polydiscamide D				
203	stellatolide A	<i>Ecionemia acervus</i>		Cytotoxic Activity	[94]
204	stellatolide B			Cytotoxic Activity	
205	stellatolide C				
206	stellatolide D				
207	stellatolide E				
208	stellatolide F				
209	stellatolide G				
210	stellatolide H	<i>Discodermia</i> sp.	East China Sea	cytotoxic activity	[95]
211	stellettapeptins A	<i>Stelletta</i> sp.	northwestern Australia	HIV-inhibitory	[96]
212	stellettapeptins B				
213	theopapuamide	<i>Theonella swinhoei</i>	Papua New Guinea	cytotoxic activity	[97]

Table S3 Detail information for marine mollusk-derived depsipeptides (214-243).

Compound No.	Name	Biological Source/ Strain No.	Country/Region	Bioactivity	Ref.
214	aurilide A	<i>Dolabella auricularia</i>	Shima Peninsula, Mie Prefecture, Japan	cytotoxic activity	[98]
215	dolastatin D				[99]
216	dolastatin H				[100]
217	isodolastatin H			cytotoxic activity	[100]
218	dolastatin G				[101]
219	nordolastatin G				
220	dolastatin 14	<i>Elysia rufescens</i>	Indian Ocean	cytotoxic activity	[102]
221	kahalalide A		Black Point, O'ahu	-	[103]
222	kahalalide B			-	
223	kahalalide C			-	
224	kahalalide D			-	
225	kahalalide E			-	
226	kahalalide F	<i>Elysia ornata</i>		Against AIDS OI Pathogens	[104]
227	kahalalide O			-	[105]
228	kahalalide R	<i>Elysia grandifolia</i>	Malvan in the west coast of India	-	[106]
229	kahalalide S			-	
230	kahalalide Y	<i>Elysia ornata</i>	Kahala Bay near Black Point, Oahu	-	[107]
231	kahalalide Z ₁		coasts of Okha (India)		[108]
232	kahalalide Z ₂			antifungal activity	
233	kulokekahlide-1	<i>Philinopsis speciosa</i>	Shark's Cove, Pupukea, O'ahu	cytotoxic activity	[109]
234	kulokekahlide-2			-	[110]
235	kulolide-1				[111]
236	kulolide-2			-	
237	kulolide-3			-	
238	kulokainallde-1			-	
239	kulomo'opunalide- 1			-	
240	kulomo'opunalide- 2			-	
241	onchidin A	<i>Onchidium</i> sp.	New Caledonia	-	[112]
242	onchidin B			-	[113]
243	pupukeamide	<i>Philinopsis</i> sp.	Shark's Cove, Pupukea, O'ahu	-	[114]

Table S4. Detail information for marine fungus-derived depsipeptides (244-259).

Compound No.	Name	Biological Source/ Strain No.	Country/Region	Bioactivity	Ref.
244	alternaramide	<i>Alternaria</i> sp. SF-5016	Masan Bay area, Korea	antibiotic activity	[115]
245	enniatin G	<i>Halosarpheia</i> sp. 732	South China Sea	inhibitory activity	[116]
246	fusarihixin A	<i>Fusarium</i> sp. R5	Leizhou Peninsula, China	antifungal activity	[117]
247	fusarihixin B				
248	guangomide A	Sponge-derived fungus strain no. 001314c	Guango, Papua New Guinea	cytotoxic activity	[118]
249	guangomide B				
250	HA23	<i>Fusarium</i> sp. (CANU-HA 23)	-	-	[119]
251	JBIR-113	<i>Penicillium</i> sp. fS36	Takarajima Island, Kagoshima Prefecture, Japan	-	[120]
252	JBIR-114			-	
253	JBIR-115			-	
254	sansalvamide	<i>Fusarium</i> sp.	Little San Salvador Island, Bahamas	cytotoxic activity	[121]
255	W493 A	<i>Fusarium</i> sp	Shizuoka city in Jpan	antibacterial activity	[122]
256	W493 B				
257	W493 C		Chinese Mangrove plant <i>Ceriops tagal</i>	-	[123]
258	W493 D			-	
259	zygosporamide	<i>Zygosporium masonii</i>	Maui, Hawaii	cytotoxic activity	[124]

Table S5. Detail information for marine bacterium-derived depsipeptides (260-282).

Compound No.	Name	Biological Source/ Strain No.	Country/Region	Bioactivity	Ref.
260	chromopeptide A	<i>Chromobacterium</i> sp. HS-13-94	East China Sea	cytotoxic activity	[125]
261	rakicidin C	<i>Streptomyces</i> sp (strain GT 61042)	-	-	[126]
262	rakicidin D	<i>Streptomyces</i> sp. MWW064	Samut Sakhon province,Thailand	inhibitor of tumor cell invasion	[127]
263	rakicidin F	<i>Streptomyces</i> sp. GKU 220	Andaman sea, Ranong, Thailand	Antibacterial activity	[128]
264	rakicidin G	<i>Micromonospora chalcea</i> FIM 02-523	-	cytotoxic activity	[129]
265	rakicidin H		-		
266	rakicidin I		-		
267	salinamide A				
268	salinamide B	<i>Streptomyces</i> sp. CNB-091	Florida Keys	antibiotic activity	[130]
269	salinamide F			Antibiotic and inhibitor of bacterial RNA polymerase activity	[131]
270	sameuramide A	<i>Chromobacterum</i> sp. QS3666.	Sameura bay, Miyagi prefecture, Japan	-	[132]
271	streptopeptolin A	<i>Streptomyces olivochromogenes</i> NBRC 3561	Japan	inhibitory activity against chymotrypsin	[133]
272	streptopeptolin B			chymotrypsin inhibitory	[134]
273	streptopeptolin C			-	[134]
274	thiocoraline	<i>Micromonospora</i> sp L-13-ACM2-092	Indian Ocean near the coast of Mozambique.	Antitumor activity	[135]
275	thiochondrilline A	<i>Verrucosispora</i> sp.	Florida Keys	-	[136]
276	thiochondrilline B			-	
277	thiochondrilline C				
278	22'-deoxythiocoraline			cytotoxic activity	
279	12'-sulfoxythiocoraline	<i>Photobacterium</i> sp. MBIC06485	Onna Beach, Okinawa, Japan	Antibacterial activity	[137]
280	unnarmicin A				
281	unnarmicin C				
282	verrucosamide	<i>Verrucosispora</i> sp. CNX-026	Central West Coast of Florida	cytotoxic activity	[138]

Table S6. Detail information for marine algae-derived depsipeptides (**283-288**).

Compound No.	Name	Biological Source/ Strain No.	Country/Region	Bioactivity	Ref.
283	kahalalide K	<i>Bryopsis</i> sp.	Wai'ananae Boat Harbor, Hawaii	-	[139]
284	kahalalide P			-	[140]
285	kahalalide Q			-	
286	mebamamide A	<i>Derbesia marina</i>	Mebama, Mie, Japan	induced the differentiation of HL60 cells into macrophage	[141]
287	mebamamide B				
288	pagoamide A	<i>Derbesia</i> sp.	Fagatele Bay, American Samoa	-	[142]

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