Electronic Supplementary Material (ESI) for Natural Product Reports.

From Dolastatin 13 to Cyanopeptolins, Micropeptins and Lyngbyastatins: The chemical biology of Ahp-Cyclodepsipeptides.

Steffen Köcher,[1] Sarah Resch,[1] Till Kessenbrock,[1] Lukas Schrapp,[1]
Michael Ehrmann,[2] and Markus Kaiser[1]*

1 Chemical Biology, Zentrum für Medizinische Biotechnologie (ZMB), Faculty of Biology, Universität Duisburg-Essen, Universitätsstr. 2, 45117 Essen (Germany)
Email: markus.kaiser@uni-due.de

2 Microbiology, Zentrum für Medizinische Biotechnologie (ZMB), Faculty of Biology, Universität Duisburg-Essen, Universitätsstr. 2, 45117 Essen (Germany)

Supplementary Tab.1. Isolated natural Ahp-Cyclodepsipeptides with their corresponding AA-Sequence, inhibitory effect and source.

Name	Source	Available Inhibition Data	AA-Sequence[f]									Ref.
			AA_1	AA_2	AA_3	Thr/Hmp (O)	AA_5	Ahp/Amp	AA_7	AA_8	AA_9	
A90720A	*Microchaete lotakensis*	Thrombin: IC_{50} = 270 ng/mL; Trypsin: IC_{50} = 10 ng/mL; Plasmin: IC_{50} = 30 ng/mL		Hsg	D-Leu	Thr	Arg	Ahp	Leu	MeTyr	Val	[1, 2]
Anabaenopeptilide 90-A	*Anabaena sp.* 90			Fa	Gln	Thr	Hty	Ahp	Thr	Dmy	Ile	[3]
Anabaenopeptilide 90-B	*Anabaena sp.* 90			Fa	Gln	Thr	Hty	Ahp	Thr	Dmy(3-Cl)	Ile	[3]
Anabaenopeptilide 202-A	*Anabaena sp* 202A2			Fa	Gln	Thr	Hty	Ahp	Thr	MeTyr	Ile	[3]
Anabaenopeptilide 202-B	*Anabaena sp* 202A2			Fa	Gln	Thr	Hty	Ahp	Thr	MeTyr(3-Cl)	Ile	[3]
Actinosynneptide A	*Actinosynnema pretiosum* HGF052:asm18	HeLa: IC_{50} = 34.4 µM; PC3: IC_{50} = 31 µM				Thr[a]	Dhb	Ahp	Phe	MeTyr	Ala	[4]
Aeruginopeptin 228-A	*Microcystis aeruginosa* M228			Hpla	Gln	Thr	Tyr	Ahp	Thr	MePhe	Ile	[5]
Aeruginopeptin 228-B	*Microcystis aeruginosa* M228	active vs. Factor VIIa		Hpla	Gln	Thr	ThTyr	Ahp	Thr	MePhe	Ile	[5, 6]
Aeruginopeptin 95-A	*Microcystis aeruginosa* TAC 95		Hpla	Thr	Gln	Thr	Tyr	Ahp	Thr	MePhe	Ile	[5]
Aeruginopeptin 95-B	*Microcystis aeruginosa* TAC 95		Hpla	Thr	Gln	Thr	ThTyr	Ahp	Thr	MePhe	Ile	[5]
Aeruginopeptin 917S-A	*Microcystis aeruginosa* M228			Hpla	Gln	Thr	Tyr	Ahp	Leu	MeTyr	Ile	[7]
Aeruginopeptin 917S-B	*Microcystis aeruginosa* M228			Hpla	Gln	Thr	ThTyr	Ahp	Leu	MeTyr	Ile	[7]
Aeruginopeptin 917S-C	*Microcystis aeruginosa* M228			Hpla	Gln	Thr	Leu	Ahp	Leu	MeTyr	Ile	[7]
Bouillomide A	*Lyngbya bouillonii*	Chymotrypsin: IC_{50} = 0.17 µM; Elastase: IC_{50} = 1.9 µM	Ba	Ala	Val	Thr	Dhb	Ahp	Phe	MeTyr	Val	[8]
Bouillomide B	*Lyngbya bouillonii*	Chymotrypsin: IC_{50} = 9.3 µM; Elastase: IC_{50} = 1.9 µM	Ba	Ala	Val	Thr	Dhb	Ahp	Phe	MeTyr(3-Br)	Val	[8]
Crocapeptin A1	*Chondromyces crocatus* Cm c5	Chymotrypsin: IC_{50} = 0.1 µM		Pa	Gln	Thr	Leu	Ahp	Phe	MeTyr	Val	[9]
Crocapeptin A2	*Chondromyces crocatus* Cm c5	Chymotrypsin: IC_{50} = 0.1 µM		iBa	Gln	Thr	Leu	Ahp	Phe	MeTyr	Val	[9]

Name	Source	Inhibition	AA-Sequence[f]								Ref.
			AA_1 — AA_2 — AA_3 — Thr/Hmp (O) — AA_5 — Ahp/Amp — AA_7 — AA_8 — AA_9								
Crocapeptin A3	*Chondromyces crocatus* Cm c5	Chymotrypsin: IC_{50} = 0.1 µM	Pea	Gln	Thr	Leu	Ahp	Phe	MeTyr	Val	[9]
Crocapeptin B	*Chondromyces crocatus* Cm c2	Chymotrypsin: IC_{50} = 0.2 µM	iBa	Gln	Thr	Leu	Ahp	Phe	MeTyr	Ile	[9]
Cyanopeptolin A	*Microcystis* PCC 7806		Ha	Asp	Thr	Arg	Ahp	Leu	MePhe	Val	[10]
Cyanopeptolin B	*Microcystis* PCC 7806	Trypsin: IC_{50} < 0.2 µg/mL	Ha	Asp	Thr	Lys	Ahp	Leu	MePhe	Val	[10-12]
Cyanopeptolin C	*Microcystis* PCC 7806		Ha	Asp	Thr	Lys (Me)	Ahp	Leu	MePhe	Val	[10, 12]
Cyanopeptolin D	*Microcystis* PCC 7806		Ha	Asp	Thr	Lys (Me_2)	Ahp	Leu	MePhe	Val	[10]
Cyanopeptolin S	*Microcystis* sp.	Trypsin: IC_{50} < 0.2 µg/mL; Plasmin: IC_{50} < 5 µg/mL; *Daphnia magna*: toxic to 60% (<11.5 µg/mL)		Hsg	Thr	Arg	Ahp	Ile	MePhe	Ile	[11, 13]
Cyanopeptolin S‘[c]	*Microcystis sp.*			Gla	Thr	Arg	Ahp	Ile	MePhe	Ile	[14]
Cyanopeptolin SS	*Microcystis aeruginosa* PCC 7806	Trypsin: IC_{50} < 0.2 µg/mL; Plasmin: IC_{50} < 5 µg/mL; *Daphnia magna*: toxic to 60% (7.5 µg/mL); Thrombin: IC_{50} = 45.2 µM		Ssg	Thr	Arg	Ahp	Ile	MePhe	Ile	[13, 15]
Cyanopeptolin CB071	*Aphanocapsa* sp.	Trypsin: IC_{50} = 2.5 µM	Ha	Glu	Thr	Arg	Ahp	Ile	Dmy(3-Cl)	Val	[16]
Cyanopeptolin 880	*Planktothrix agardhi* CYA 126/*8*			Msg	Thr	Hty	Ahp	Ile	MePhe	Ile	[12, 17]
Cyanopeptolin 911[c]	*Microcystis sp.*			Ssg	Thr	Arg	Ahp	Leu	MePhe	Val	[14]
Cyanopeptolin 920[c]	*Microcystis sp.*		Ac	Lys	Thr	Lys	Ahp	Phe	MeTyr	Val	[18]
Cyanopeptolin 930[c]	*Microcystis sp.*		Ba	Glu	Thr	Arg	Ahp	Leu	MeTyr	Val	[14]
Cyanopeptolin 958[c]	*Microcystis sp.*		Ba	Glu	Thr	Arg	Ahp	Leu	MeTyr	Val	[14]
Cyanopeptolin 959[c]	*Microcystissp. Chroococcales*			Hsg	Thr	Arg	Ahp	Phe	MePhe	Ile	[18]
Cyanopeptolin 972[c]	*Microcystis sp.*		Ha	Asp	Thr	Arg	Ahp	Leu	MeTyr	Val	[14]
Cyanopeptolin 972C[c]	*Microcystissp. Chroococcales*		Ha	Glu	Thr	Lys	Ahp	Leu	MeTyr	Ile	[18]

Name	Source	Inhibition	AA-Sequence[f]									Ref.
			AA_1	AA_2	AA_3	Thr/Hmp (O)	AA_5	Ahp/Amp	AA_7	AA_8	AA_9	
Cyanopeptolin 991[c]	*Microcystis sp.*				Hsg	Thr	Arg	Ahp	Leu	MePhe	Ile	[14]
Cyanopeptolin 991[c]	*Microcystissp. Chroococcales*				Hsg	Thr	Arg	Ahp	Leu	MePhe	Ile	[18]
Cyanopeptolin 992[c]	*Microcystis sp.*			Ha	Glu	Thr	Lys	Ahp	Phe	MeTyr	Val	[14]
Cyanopeptolin 993[c]	*Microcystis sp*			Ha	Glu	Thr	Tyr	Ahp	Leu	MeTyr	Val	[14]
Cyanopeptolin 1000[c]	*Microcystissp. Chroococcales*			Ha	Glu	Thr	Lys	Ahp	Leu	MeTyr	Ile	[18]
Cyanopeptolin 1006[c]	*Microcystis sp*			Ha	Asp	Thr	Arg	Ahp	Phe	MeTyr	Val	[14]
Cyanopeptolin 1006D[c]	*Microcystissp. Chroococcales*			Ha	Glu	Thr	Lys	Ahp	Phe	MeTyr	Ile	[18]
Cyanopeptolin 1014[c]	*Microcystis sp*			Oa	Glu	Thr	Arg	Ahp	Leu	MeTyr	Val	[14]
Cyanopeptolin 1020A[c]	*Microcystis sp*			Ha	Glu	Thr	Arg	Ahp	Phe	MeTyr	Val	[14]
Cyanopeptolin 1020B[c]	*Microcystis sp*			Oa	Glu	Thr	Lys	Ahp	Phe	MeTyr	Val	[14]
Cyanopeptolin 1021[c]	*Microcystis sp*			Oa	Glu	Thr	Tyr	Ahp	Leu	MeTyr	Val	[14]
Cyanopeptolin 1034A[c]	*Microcystissp. Chroococcales*			Oa	Glu	Thr	Lys	Ahp	Phe	MeTyr	Ile	[18]
Cyanopeptolin 1048[c]	*Microcystis sp*			Oa	Glu	Thr	Arg	Ahp	Phe	MeTyr	Val	[14]
Cyanopeptolin 1063[c]	*Microcystissp. Chroococcales*		Ac	Leu	Gln	Thr	Tyr	Ahp	Leu	MeTyr	Ile	[18]
Cyanopeptolin 960	*Planktothrix agardhii* CYA 126/8				Mhg	Thr	Hty	Ahp	Ile	MePhe	Ile	[17]
Cyanopeptolin 963A	*Microcystis* PCC 7806	Chymotrypsin: IC_{50} = 0.9 µM		Ha	Asp	Thr	Tyr	Ahp	Leu	MePhe	Val	[19]
Cyanopeptolin 1020	*Microcystis aeruginosa* UV-006	Trypsin: IC_{50} = 0.67 nM; Chymotrypsin: IC_{50} = 1.8 µM; Plasmin: IC_{50}= 0.49 µM; Factor XIa: IC_{50} = 3.9 nM; Kallikrein: IC_{50} = 4.5 nM; *T. platyurus*: LC_{50} = 8.8 µM		Ha	Glu	Thr	Arg	Ahp	Phe	MeTyr	Val	[20]

Name	Source	Inhibition	AA-Sequence[f]								Ref.
			AA_1 — AA_2 — AA_3 — Thr/Hmp (O) — AA_5 — Ahp/Amp — AA_7 — AA_8 — AA_9								
Cyanopeptolin CP1006[c]	*Nostoc edaphicum* CCNP 1411		Ha	Asp	Thr	Arg	Ahp	Phe	MeTyr	Val	[21]
Cyanopeptolin CP1013[c]	*Nostoc edaphicum* CCNP 1411		Ha	Asp	Thr	Tyr	Ahp	Phe	MeTyr	Val	[21]
Cyanopeptolin CP1018[c]	*Nostoc edaphicum* CCNP 1411	Chymotrypsin: IC_{50} = 0.24 µM	Oa	Asp	Thr	Arg	Ahp	Phe	MePhe	Val	[21]
Cyanopeptolin CP1020[c]	*Nostoc edaphicum* CCNP 1411	Trypsin: IC_{50} = 0..25 µM; Chymotrypsin: IC_{50} = 3.1 µM	Ha	Asp	Thr	Arg	Ahp	Phe	MeHty	Val	[21]
Cyanopeptolin CP1027[c]	*Nostoc edaphicum* CCNP 1411	Chymotrypsin: IC_{50} = 0.26 µM	Ha	Asp	Thr	Tyr	Ahp	Phe	MeHty	Val	[21]
Cyanopeptolin CP1048[c]	*Nostoc edaphicum* CCNP 1411		Oa	Asp	Thr	Arg	Ahp	Phe	MeHty	Val	[21]
Cyanopeptolin CP969[c]	*Nostoc edaphicum* CCNP 1411		Ba	Asp	Thr	Tyr	Ahp	Phe	MePhe	Val	[21]
Cyanopeptolin CP978[c]	*Nostoc edaphicum* CCNP 1411	Trypsin: IC_{50} = 3.8 µM; Chymotrypsin: IC_{50} = 0.26 µM	Ba	Asp	Thr	Arg	Ahp	Phe	MeTyr	Val	[21]
Cyanopeptolin CP985[c]	*Nostoc edaphicum* CCNP 1411	Trypsin: IC_{50} = 0.26 µM	Ba	Asp	Thr	Tyr	Ahp	Phe	MeTyr	Val	[21]
Cyanopeptolin CP990[c]	*Nostoc edaphicum* CCNP 1411		Ha	Asp	Thr	Arg	Ahp	Phe	MePhe	Val	[21]
Cyanopeptolin CP992[c]	*Nostoc edaphicum* CCNP 1411	Trypsin: IC_{50} = 3.5 µM; Chymotrypsin: IC_{50} = 0.24 µM	Ba	Asp	Thr	Arg	Ahp	Phe	MeHty	Val	[21]
Cyanopeptolin CP999[c]	*Nostoc edaphicum* CCNP 1411		Ba	Asp	Thr	Tyr	Ahp	Phe	MeHty	Val	[21]
Cyanopeptolin VW-1[c]	*Microcystis* sp.			Hty	Thr	Lys	Ahp	Phe	MeTyr	Met	[22]
Dinghupeptin A	*Streptomyces* sp. SC0581	Chymotrypsin: IC_{50} = 2.1 µM	Mba	Gln	Thr	NHeGln	Ahp	Phe	MeTyr	Ala	[23]
Dinghupeptin B	*Streptomyces* sp. SC0581	Chymotrypsin: IC_{50} = 1.1 µM	Mba	Gln	Thr	NHeGln	Amp	Phe	MeTyr	Ala	[23]
Dolastatin 13[c]	*Dolabella auricularia*	OVCAR-3: GI_{50} = 2.5 µg/mL; SF-295: GI_{50} = 3.9 µg/mL; A498: GI_{50} = 4.5 µg/mL; NCI-H460: GI_{50} = 3.5 µg/mL; KM20L2: GI_{50} = 2.4 µg/mL; SK-MEL-5: GI_{50} = 2.7 µg/mL	Mhg	Val	Thr	Dhb	Ahp	Phe	MePhe	Val	[24, 25]
FR134043	*Streptomyces resistomicificus*	Elastase: IC_{50} = 35 nM	iBa	Cit[d]	Thr	Dhb	Ahp	Phe	MePhe(3',4'-SO_4Na)	Val	[26]

Name	Source	Inhibition	AA-Sequence[f]									Ref.
			AA_1	AA_2	AA_3	Thr/Hmp (O)	AA_5	Ahp/Amp	AA_7	AA_8	AA_9	
FR901277	*Streptomyces resistomicificus*	Elastase: IC_{50} = 18 nM		iBa	Cit[d]	Thr	Dhb	Ahp	Phe	MePhe(3',4'-OH)	Val	[26]
Ichthyopeptin A	*Microcystis ichthyoblabe*	Influenza A: IC_{50} = 12.5 µg/mL		Hpla[c]	Gln	Thr	Tyr	Ahp	Val	MePhe[c]	Ile	[27]
Ichthyopeptin B	*Microcystis ichthyoblabe*	Influenza A: IC_{50} = 12.5 µg/mL		Hpla[c]	Asn	Thr	Leu	Ahp	Ile	MePhe[c]	Val	[27]
Insulapeptolide A	*Nostoc insulare*	Elastase: IC_{50} = 0.14 ± 0.01 µM; Cathepsin G: IC_{50} = 69 µM		Ac	Cit	2*S*,3*R*,4*R*-Hmp	Leu	Ahp	Ile	MeTyr	Val	[28]
Insulapeptolide B	*Nostoc insulare*	Elastase: IC_{50} = 0.10 ± 0.01 µM; Cathepsin G: IC_{50} = 35 µM		Ac	Cit	2*S*,3*R*,4*R*-Hmp	Leu	Ahp	Ile	MeTyr	*allo*-Ile	[28]
Insulapeptolide C	*Nostoc insulare*	Elastase: IC_{50} = 0.090 ± 0.001 µM; Proteinase 3: IC_{50} = 16 µM; Cathepsin G: IC_{50} = 46 µM		Ac	Cit	2*S*,3*R*,4*R*-Hmp	Leu	Ahp	Ile	Dmy	Val	[28]
Insulapeptolide D	*Nostoc insulare*	Elastase: IC_{50} = 0.085± 0.001 µM; Proteinase 3: IC_{50} = 18 µM; Cathepsin G: IC_{50} = 17± 4 µM		Ac	Cit	2*S*,3*R*,4*R*-Hmp	Leu	Ahp	Ile	Dmy	*allo*-Ile	[28]
Insulapeptolide E	*Nostoc insulare*	Elastase: IC_{50} = 3.2± 0.2 µM;	Ba	Pro	Ser	Thr	Hph	Ahp	Thr	MeTyr	*allo*-Ile	[28]
Insulapeptolide F	*Nostoc insulare*	Elastase: IC_{50} = 1.6± 0.1 µM; Proteinase 3: IC_{50} = 46 µM; Cathepsin G: IC_{50} = 64 µM	Ba	Pro	Ser	Thr	Hph	Ahp	Thr	MeTyr	Val	[28]
Insulapeptolide G	*Nostoc insulare*	Elastase: IC_{50} = 3.5± 0.1 µM; Proteinase 3: IC_{50} = 82 µM; Cathepsin G: IC_{50} = 46 µM	Ba	Pro	Ser	Thr	Hph	Ahp	Thr	MePhe	Val	[28]
Insulapeptolide H	*Nostoc insulare*	Elastase: IC_{50} = 2.7± 0.1 µM; Proteinase 3: IC_{50} = 98 µM; Cathepsin G: IC_{50} = 55 µM	Ba	Pro	Ser	Thr	Hph	Ahp	Thr	MePhe	*allo*-Ile	[28]
Jizanpeptin A	*Symploca* sp.	Trypsin: IC_{50} = 160 ±30 nM		Hsg	D-Val	Thr	Lys	Ahp	*allo*-Ile	Dmy(3-Br)	Ile	[29]
Jizanpeptin B	*Symploca* sp.	Trypsin: IC_{50} = 190 ±20 nM		Msg	D-Val	Thr	Lys	Ahp	*allo*-Ile	Dmy(3-Br)	Ile	[29]
Jizanpeptin C	*Symploca* sp.	Trypsin: IC_{50} = 72 ±17 nM; Chymotrypsin: IC_{50} =1.4 ± 0.7 µM		Msg	Val	Thr	Lys	Ahp	*allo*-Ile	Dmy(3-Br)	Ile	[29]
Jizanpeptin D	*Symploca* sp.	Trypsin: IC_{50} = 1000 ± 250 nM		Msg	Ile	Thr	Lys	Ahp	*allo*-Ile	Dmy(3-Br)	Ile	[29]
Jizanpeptin E	*Symploca* sp.	Trypsin: IC_{50} = 150 ± 20 nM		Msg	D-Val	Thr	Arg	Ahp	*allo*-Ile	Dmy(3-Br)	Ile	[29]
Kempopeptin A	*Lyngbya* sp.	Elastase: IC_{50} = 0.32 µM; Chymotrypsin: IC_{50} = 2.6 µM	Ac	Pro	Thr	Thr	Leu	Ahp	Phe	MeTyr	Val	[30]
Kempopeptin B	*Lyngbya* sp.	Trypsin: IC_{50} = 8.4 µM		Ba	Val	Thr	Lys	Ahp	Ile	Dmy(3-Br)	Val	[30]

Name	Source	Inhibition	AA-Sequence[f]									Ref.
			AA_1	AA_2	AA_3	Thr/Hmp (O)	AA_5	Ahp/Amp	AA_7	AA_8	AA_9	
Kempopeptin C		Trypsin: IC_{50} = 0.19 μM; Plasmin: IC_{50} = 0.36 μM; Matriptase: IC_{50} = 0.28 μM; migration MDA-MB-231 cells: by 37 and 60% at 10 and 20 μM		Ba	Val	Thr	Lys	Ahp	Ile	Dmy(3-Cl)	Val	31
Kurahamide	*Lyngbya* sp.	HeLa: IC_{50} = 16 μM; HL60: IC_{50} = 2.5 μM; Chymotrypsin: IC_{50} = 9.0 μM; Elastase: IC_{50} = 0.10 μM	Ba	Ala	Thr(O-R)	Thr	Dhb	Ahp	Phe	MeTyr	Val	32
Largamide D	*Lyngbya* cf. *Confervoides* or *Oscillatoria* sp	Chymotrypsin: IC_{50} = 0.083 ± 0.008 μM or 10 μM; Elastase: IC_{50} = 0.045 ± 0.003 μM	Gla-Ahppa	Ala	Val	Thr	Leu	Ahp	Thr	MeTyr(3-Br)	Val	33, 34
Largamide D oxazolidine	*Lyngbya* cf. *Confervoides*	Chymotrypsin: IC_{50} = 0.928 ± 0.093 μM; Elastase: IC_{50} = 1.52 ± 0.08 μM	Gla-Ahppa	Ala	Val	Thr	Leu	Ahp[b]	*allo*-Thr	MeTyr(3-Br)	Val	33
Largamide E	*Oscillatoria* sp	Chymotrypsin: IC_{50} = 10 μM	Gla-Ahppa	Ala	Val	Thr	Leu	Ahp	Thr	MeTyr(3-Cl)	Val	34
Largamide F	*Oscillatoria* sp	Chymotrypsin: IC_{50} = 4.0 μM	Gla-Ahppa	Ala	Val	Thr	Tyr	Ahp	Thr	MeTyr(3-Br)	Val	34
Largamide G	*Oscillatoria* sp	Chymotrypsin: IC_{50} = 25.0 μM	Gla-Ahppa	Ala	Val	Thr	Hty	Ahp	Thr	MeTyr(3-Br)	Val	34
Loggerpeptin A	DRTO-73	Elastase: IC_{50} = 0.29 ± 0.04 μM; Chymotrypsin: IC_{50} = 0.24 ± 0.01 μM	Ba	Ala	Thr	Thr	Leu	Ahp	Phe	Dmy	Val	35
Loggerpeptin B	DRTO-73	Elastase: IC_{50} = 0.89 ± 0.09 μM; Chymotrypsin: IC_{50} = 0.22 ± 0.02 μM	Ba	Ala	Thr(O-R)	Thr	Leu	Ahp	Phe	Dmy	Val	35
Loggerpeptin C	DRTO-73	Elastase: IC_{50} = 0.62 ± 0.38 μM; Chymotrypsin: IC_{50} = 0.35 ± 0.02 μM	Ba	Ala	Dhb	Thr	Leu	Ahp	Phe	Dmy	Val	35
Lyngbyastatin 4	*Lyngbya confervoides*	Elastase: IC_{50} = 0.03 μM; Chymotrypsin: IC_{50} = 0.30 μM	Hsg	Ala	Hty	Thr	Dhb	Ahp	Phe	MeTyr	Val	36
Lyngbyastatin 5	*Lyngbya confervoides*	Elastase: IC_{50} = 3.2 ± 2.0 nM; Chymotrypsin: IC_{50} = 2.8 ± 0.3 μM	Gla	Ala	Hty	Thr	Dhb	Ahp	Phe	MeTyr	Val	37
Lyngbyastatin 6	*Lyngbya confervoides*	Elastase: IC_{50} = 3.3 ± 0.8 nM; Chymotrypsin: IC_{50} = 2.5 ± 0.8 μM	Hsg	Ala	Hty	Thr	Dhb	Amp	Phe	MeTyr	Val	37
Lyngbyastatin 7	*Lyngbya confervoides*	Elastase: IC_{50} = 8.3 ± 5.4 nM; Chymotrypsin: IC_{50} = 2.5 ± 0.2 μM		Ha	Gln	Thr	Dhb	Ahp	Phe	MeTyr	Val	37

Name	Source	Inhibition	AA-Sequence[f]									Ref.
			AA_1	AA_2	AA_3	Thr/Hmp (O)	AA_5	Ahp/Amp	AA_7	AA_8	AA_9	
Lyngbyastatin 8	*Lyngbya semiplena*	Elastase: IC_{50} = 123 nM;	Ac	Ala	Val	Thr	Dhb	Ahp	Phe	MeTyr	Val	[38]
Lyngbyastatin 9	*Lyngbya semiplena*	Elastase: IC_{50} = 210 nM;	Ba	Ala	Val	Thr	Dhb	Ahp	Phe	MeTyr	Val	[38]
Lyngbyastatin 10	*Lyngbya semiplena*	Elastase: IC_{50} = 120 nM;	Ba	Ala	Val	Thr	Dhb	Ahp	Phe	MeTyr(3-Br)	Val	[38]
Microcystilide A	*Microcystis aeruginosa* NO-15-1840	HCT116: IC_{50} = 0.5 mg/mL; HCTVP35: IC_{50} = 0.5 mg/mL; HL-60: IC_{50} = 0.5 mg/mL		D-Hpla	Gln	Thr	Tyr	Ahp	Leu	MeTyr	Ile	[39]
Micropeptin 90	*Microcystis aeruginosa* NIES-90	Plasmin: IC_{50} = 0.1µg/mL; Trypsin: IC_{50} = 2.0 µg/mL			Hsg	Thr	Arg	Ahp	Phe	MeTyr	Val	[40, 41]
Micropeptin 103	*Microcystis viridis* (NIES-103)	Chymotrypsin: IC_{50} = 1 µg/mL	Ha	Gly	Thr	Thr	Gln	Ahp	Phe	MeTrp	Val	[42]
Micropeptin 996	*Microcystis aeruginosa* UTEX LB2386	Chymotrypsin: IC_{50} = 0.64 µM		Ba	Gln	Thr	Hty	Ahp	Phe	MePhe	Val	[43]
Micropeptin 1106	*Microcystis aeruginosa*		Ba	Tyr	Glu[e]	Thr	Arg	Ahp	Val	MePhe	Ile	[44]
Micropeptin 1120	*Microcystis aeruginosa*		Ba	Tyr	Glu-OMe[e]	Thr	Arg	Ahp	Val	MePhe	Ile	[44]
Micropeptin 88-A	*Microcystis aeruginosa* NIES-88	Chymotrypsin: IC_{50} = 0.4 µg/mL; Elastase: IC_{50} = 3.5 µg/mL			Glu[e]	Thr	ThTyr	Ahp	Val	MePhe	Ile	[45]
Micropeptin 88-B	*Microcystis aeruginosa* NIES-88		Ba	Tyr	Glu[e]	Thr	Glu	Ahp	Val	MePhe	Ile	[45]
Micropeptin 88-C	*Microcystis aeruginosa* NIES-88	Chymotrypsin: IC_{50} = 5.0 µg/mL	Ba	Tyr	Glu[e]	Thr	Tyr	Ahp	Val	MePhe	Ile	[45]
Micropeptin 88-D	*Microcystis aeruginosa* NIES-88	Chymotrypsin: IC_{50} = 10.0 µg/mL	Ba	Tyr	Glu[e]	Thr	ThTyr	Ahp	Val	MePhe	Ile	[45]
Micropeptin 88-E	*Microcystis aeruginosa* NIES-88	Chymotrypsin: IC_{50} = 5.2 µg/mL	Ba	Tyr	Glu[e]	Thr	Leu	Ahp	Val	MePhe	Ile	[45]
Micropeptin 88-F	*Microcystis aeruginosa* NIES-88	Chymotrypsin: IC_{50} = 3.4 µg/mL	Ba	Tyr	Glu-OMe[e]	Thr	Tyr	Ahp	Val	MePhe	Ile	[45]
Micropeptin 88-N	*Microcystis aeruginosa* NIES-88	Chymotrypsin: IC_{50} = 15 µM	Ba	Leu	Glu[e]	Thr	Tyr	Ahp	Val	MePhe	Ile	[46]
Micropeptin 88-Y	*Microcystis aeruginosa* NIES-88	Chymotrypsin: IC_{50} = 1.3 µM	Ac	Tyr	Glu[e]	Thr	Tyr	Ahp	Val	MePhe	Ile	[46]
Micropeptin 478-A	*Microcystis aeruginosa*	Plasmin: IC_{50} = 0.1 µg/mL; Trypsin: IC_{50} = 0.7 µM; Chymotrypsin: IC_{50} = 5.2 µM			Hsg	Thr	Arg	Ahp	Ile	MeTyr(3-Cl)	Ile	[47, 48]

Name	Source	Inhibition	AA-Sequence[f]									Ref.
			AA_1 — AA_2 —	AA_3 —	Thr/Hmp (O) —	AA_5 —	Ahp/Amp —	AA_7 —	AA_8 —	AA_9		
Micropeptin 478-B	*Microcystis aeruginosa*	Plasmin: IC_{50} = 0.4 µg/mL; Trypsin: IC_{50} = 2.4 µM; Chymotrypsin: IC_{50} = 72.0 µM		Ssg	Thr	Arg	Ahp	Ile	MeTyr (3-Cl)	Ile	[47, 48]
Micropeptin A	*Microcystis aeruginosa* NIES-100	Plasmin: IC_{50} = 0.026µg/mL; Trypsin: IC_{50} = 0.071 µg/mL	Ha	Glu	Thr	Lys	Ahp	Leu	MeTyr[c]	Val	[49]
Micropeptin B	*Microcystis aeruginosa* NIES-100	Plasmin: IC_{50} = 0.035 µg/mL; Trypsin: IC_{50} = 0.25µg/mL	Oa	Glu	Thr	Lys	Ahp	Leu	MeTyr[c]	Val	[49]
Micropeptin C	*Microcystis aeruginosa* NIES-100	Chymotrypsin: IC_{50} = 1.1 µg/mL	Ha	Glu	Thr	Tyr	Ahp	Phe	MeTyr	Val	[50]
Micropeptin D	*Microcystis aeruginosa* NIES-100	Chymotrypsin: IC_{50} = 1.2 µg/mL	Oa	Glu	Thr	Tyr	Ahp	Phe	MeTyr	Val	[50]
Micropeptin E	*Microcystis aeruginosa* NIES-100	Chymotrypsin: IC_{50} = 1.0 µg/mL	Ha	Glu	Thr	Tyr	Ahp	Leu	MeTyr	Val	[50]
Micropeptin F	*Microcystis aeruginosa* NIES-100	Chymotrypsin: IC_{50} = 1.5 µg/mL	Oa	Glu	Thr	Tyr	Ahp	Leu	MeTyr	Val	[50]
Micropeptin EI964	*Microcystis aeruginosa*	Trypsin: IC_{50} = 4.2 µg/mL	Ac	Asp	Thr	Arg	Ahp	Phe	MeTyr	Ile	[51]
Micropeptin EI992	*Microcystis aeruginosa*	Trypsin: IC_{50} = 3.8 µg/mL	Ba	Asp	Thr	Arg	Ahp	Phe	MeTyr	Ile	[51]
Micropeptin DR1006	*Microcystis aeruginosa*	Chymotrypsin: IC_{50} = 2.7 µM; Elastase: IC_{50} = 13.0 µM	Hpla	Gln	Thr	Leu	Ahp	Leu	MePhe	Ile	[52]
Micropeptin DR1056	*Microcystis aeruginosa*	Chymotrypsin: IC_{50} = 1.6 µM;	Hpla	Gln	Thr	Tyr	Ahp	Leu	MePhe	Ile	[52]
Micropeptin DR1060	*Microcystis aeruginosa*	Chymotrypsin: IC_{50} = 5.3 µM; Elastase: IC_{50} = 50 µM	Hpla	Gln	Thr	ThTyr[c]	Ahp	Leu	MePhe	Ile	[52]
Micropeptin HH978	*Microcystis aeruginosa* IL-399	Chymotrypsin: IC_{50} = 4.3 µM; Elastase: IC_{50} = 17.6 µM	Hpla	Asn	Thr	Leu	Ahp	Leu	MePhe	Val	[53]
Micropeptin HM978	*Microcystis* spp	Chymotrypsin: IC_{50} = 3.6 µM; Elastase: IC_{50} = 45.2 µM	Hpla	Asn	Thr	Leu	Ahp	Ile	MePhe	Val	[54]
Micropeptin GH979	*Microcystis* spp	Chymotrypsin: IC_{50} = 15.2 µM; Elastase: IC_{50} = 45.5 µM	Hpla	Asp	Thr	Leu	Ahp	Ile	MePhe	Val	[54]
Micropeptin HA983	*Microcystis* spp	Chymotrypsin: IC_{50} = 9.4 µM	Ac	Gln	Thr	Gln	Ahp	Phe	MeTyr(3-Cl)	Ile	[54]
Micropeptin HU895A	*Microcystis aeruginosa*	Trypsin: IC_{50} = 3.5 µM; Chymotrypsin: IC_{50} = 19.6 µM		Gla	Thr	Arg	Ahp	Ile	Dmy(3-Cl)	Val	[48]
Micropeptin HU895B	*Microcystis aeruginosa*	Trypsin: IC_{50} = 0.9 µM; Chymotrypsin: IC_{50} = 5.4 µM		Gla	Thr	Arg	Ahp	Ile	MeTyr(3-Cl)	Ile	[48]
Micropeptin HU909	*Microcystis aeruginosa*	Trypsin: IC_{50} = 1.1 µM; Chymotrypsin: IC_{50} = 2.8 µM		Gla	Thr	Arg	Amp	Ile	Dmy(3-Cl)	Val	[48]

Name	Source	Inhibition	AA-Sequence[f]									Ref.
			AA_1 — AA_2 —	AA_3 —	Thr/Hmp (O) —	AA_5 —	Ahp/Amp —	AA_7 —	AA_8 —	AA_9		
Micropeptin HU975	*Microcystis aeruginosa*	Trypsin: IC_{50} = 5.2 µM; Chymotrypsin: IC_{50} = 24.0 µM		Hsg	Thr	Arg	Ahp	Ile	Dmy(3-Cl)	Val	[48]
Micropeptin HU989	*Microcystis aeruginosa*	Trypsin: IC_{50} = 0.7 µM; Chymotrypsin: IC_{50} = 18.2 µM		Hsg	Thr	Arg	Ahp	Ile	Dmy(3-Cl)	Ile	[48]
Micropeptin HU1021	*Microcystis aeruginosa*	Trypsin: IC_{50} = 2.2 µM		Ssg	Thr	Arg	Ahp	Ile	MeTyr	Ile	[48]
Micropeptin HU1041	*Microcystis aeruginosa*	Trypsin: IC_{50} = 1.2 µM		Ssg	Thr	Arg	Ahp	Ile	MeTyr(3-Cl)	Val	[48]
Micropeptin HU1069	*Microcystis aeruginosa*	Trypsin: IC_{50} = 1.7 µM		Ssg	Thr	Arg	Ahp	Ile	Dmy(3-Cl)	Ile	[48]
Micropeptin KB928	*Microcystis* spp.	Trypsin: IC_{50} = 0.09 µM	Ba	Asp	Thr	Arg	Ahp	Val	MePhe	Ile	[55]
Micropeptin KB956	*Microcystis* spp.	Trypsin: IC_{50} = 0.62 µM	Ba	Asp(Me)	Thr	Arg	Amp	Val	MePhe	Ile	[55]
Micropeptin KB970A	*Microcystis* spp.	Trypsin: IC_{50} = 0.09 µM	Ha	Asp(Me)	Thr	Arg	Ahp	Val	MePhe	Ile	[55]
Micropeptin KB970B	*Microcystis* spp.	Trypsin: IC_{50} = 0.65 µM	Ha	Asp	Thr	Arg	Amp	Val	MePhe	Ile	[55]
Micropeptin KB970C	*Microcystis* spp.	Trypsin: IC_{50} = 4.27 µM	Ha	Asp(Me)	Thr	Arg	Amp	Val	MePhe	Val	[55]
Micropeptin KB984	*Microcystis* spp.	Trypsin: IC_{50} = 1.12 µM	Ha	Asp(Me)	Thr	Arg	Amp	Val	MePhe	Ile	[55]
Micropeptin KB992	*Microcystis* spp.	Chymotrypsin: IC_{50} = 0.87 µM	Hpla	Gln	Thr	Leu	Amp	Ile	MeTyr(3-Cl)	Val	[55]
Micropeptin KB1046	*Microcystis* spp.	Chymotrypsin: IC_{50} = 0.22 µM	Hpla	Gln	Thr	ThTyr	Ahp	Val	MePhe	Ile	[55]
Micropeptin KB1048	*Microcystis* spp.	Trypsin: IC_{50} = 2.01 µM; Chymotrypsin: IC_{50} = 0.63 µM	Ha	Asp(Me)	Thr	Arg	Amp	Ile	MeTyr(3-Cl)	Ile	[55]
Micropeptin KT1042	*Microcystis* sp.	Trypsin: IC_{50} = 21.5 µg/mL		L-Hsg	Thr	Hty	Ahp	Ile	MePhe	Ile	[56]
Micropeptin KT1042	*Microcystis* spp.	Chymotrypsin: IC_{50} = 0.26 µM	Hpla	Gln	Thr	Tyr	Ahp	Ile	MePhe	Val	[57]
Micropeptin KR1002	*Microcystis* sp.	Chymotrypsin: IC_{50} = 18.8 µM; Elastase: IC_{50} = 28.0 µM	Ba	Gln	Thr	ThTyr	Ahp	Phe	MeTyr	Val	[58]
Micropeptin KR1030	*Microcystis* sp.	Chymotrypsin: IC_{50} = 13.9 µM; Elastase: IC_{50} = 28.0 µM	Ha	Gln	Thr	ThTyr	Ahp	Phe	MeTyr	Val	[58]
Micropeptin KR998	*Microcystis* sp.	Chymotrypsin: IC_{50} = 5.9 µM	Ha	Gln	Thr	Tyr	Ahp	Phe	MeTyr	Val	[58]

Name	Source	Inhibition	AA-Sequence[f]									Ref.
			AA_1	AA_2	AA_3	Thr/Hmp (O)	AA_5	Ahp/Amp	AA_7	AA_8	AA_9	
Micropeptin LH911A	*Microcystis* spp	Trypsin: IC_{50} = 1.9 µM			Hsg	Thr	Arg	Ahp	Ile	MePhe	Val	[59]
Micropeptin LH911B	*Microcystis* spp	Trypsin: IC_{50} = 3.1 µM			Hsg	Thr	Arg	Ahp	Val	MePhe	Ile	[59]
Micropeptin LH911C	*Microcystis* spp	Trypsin: IC_{50} = 11.7 µM			Hsg	Thr	Lys(Me)	Ahp	Ile	MePhe	Ile	[59]
Micropeptin LH920	*Microcystis* spp	Chymotrypsin: IC_{50} = 4.7 µM		Ha	Gly	Thr	Gln	Ahp	Phe	MeTyr	Val	[59]
Micropeptin LH925	*Microcystis* spp				Hsg	Thr	Lys(Me_2)	Ahp	Ile	MePhe	Ile	[59]
Micropeptin LH1021	*Microcystis* spp	Chymotrypsin: IC_{50} = 1.1 µM		Ha	Thr	Thr	Gln	Ahp	Phe	MeTyr	Val	[59]
Micropeptin LH 1048	*Microcystis* spp	Trypsin: IC_{50} = 2.0 µM; Chymotrypsin: IC_{50} = 5.3 µM		Oa	Glu	Thr	Arg	Ahp	Phe	MeTyr	Val	[59]
Micropeptin LH1062	*Microcystis* spp	Trypsin: IC_{50} = 3.0 µM; Chymotrypsin: IC_{50} = 3.0 µM		Oa	Glu(Me)	Thr	Arg	Ahp	Phe	MeTyr	Val	[59]
micropeptin MM836	*Microcystis* spp.	Chymotrypsin: IC_{50} = 1.4 µM; Elastase: IC_{50} = 45.5 µM			Gla	Thr	Leu	Ahp	Phe	MePhe	Ile	[60]
micropeptin MM850	*Microcystis* spp.	Chymotrypsin: IC_{50} = 1.7 µM			Gla	Thr	Leu	Amp	Phe	MePhe	Ile	[60]
Micropeptin MM916	*Microcystis* spp.	Chymotrypsin: IC_{50} = 3.0 µM			Msg	Thr	Leu	Ahp	Phe	MePhe	Ile	[60]
Micropeptin MM932	*Microcystis* spp.	Chymotrypsin: IC_{50} = 5.4 µM; Elastase: IC_{50} = 4.4 µM			Msg	Thr	Leu	Ahp	Phe	MeTyr	Ile	[60]
Micropeptin MM978	*Microcystis* spp.	Chymotrypsin: IC_{50} = 4.6 µM; Elastase: IC_{50} = 19.1 µM			Ha	Thr	Gln	Ahp	Phe	MeTyr	Ile	[60]
Micropeptin MZ771	*Microcystis* sp.					Thr	Arg	Amp	Ile	MePhe	Ile	[15]
Micropeptin MZ845	*Microcystis* sp.	Trypsin: IC_{50} = 2.6 µM			Gla	Thr	Arg	Ahp	Ile	MePhe	Ile	[15]
Micropeptin MZ859	*Microcystis* sp.	Trypsin: IC_{50} = 0.6 µM; Thrombin: IC_{50} = 52.9 µM			Gla	Thr	Arg	Amp	Ile	MePhe	Ile	[15]
Micropeptin MZ925	*Microcystis* sp.	Trypsin: IC_{50} = 24.2 µM			Shg	Thr	Arg	Ahp	Ile	MePhe	Ile	[15]
Micropeptin MZ939A	*Microcystis* sp.	Trypsin: IC_{50} = 1.5 µM			Hsg	Thr	Arg	Amp	Ile	MePhe	Ile	[15]
Micropeptin MZ939B	*Microcystis* sp.	Trypsin: IC_{50} = 7.4 µM			Shg	Thr	Arg	Amp	Ile	MePhe	Ile	[15]

Name	Source	Inhibition	AA-Sequence[f]									Ref.
			AA_1 —	AA_2 —	AA_3 —	O Thr/Hmp —	AA_5 —	Ahp/Amp —	AA_7 —	AA_8 —	AA_9	
Micropeptin MZ1019	*Microcystis* sp.	Trypsin: IC_{50} = 1.6 µM			Ssg	Thr	Arg	Amp	Ile	MePhe	Ile	[15]
Micropeptin SD944	*Microcystis aeruginosa* IL-215	Trypsin: IC_{50} = 8.0 µg/mL		Ha	Asp	Thr	Lys	Ahp	Leu	MeTyr	Val	[61]
Micropeptin SD979	*Microcystis aeruginosa* IL-215	Chymotrypsin: IC_{50} = 2.4 µg/mL		Ha	Asp	Thr	Tyr	Ahp	Leu	MeTyr	Val	[61]
Micropeptin SD999	*Microcystis aeruginosa* IL-215	Trypsin: IC_{50} = 4.0 µg/mL		Ha	Asp	Thr	Arg	Ahp	Leu	MeKyn	Val	[61]
micropeptins SD1002	*Microcystis aeruginosa* IL-215	Chymotrypsin: IC_{50} = 3.2 µg/mL		Ha	Asp	Thr	Tyr	Ahp	Leu	MeTrp	Val	[61]
Micropeptin SF995	*Microcystis* sp.	Trypsin: IC_{50} = 0.2 µg/ml		Ha	Asp	Thr	Arg	Ahp	Ile	MeTrp	Val	[62]
Micropeptin T1		Chymotrypsin: IC_{50} = 3.0 µg/mL		Ha	Glu	Thr	Tyr	Ahp	Phe	MeTrp	Val	[63]
Micropeptin T2		Trypsin: IC_{50} = 0.1 µg/mL; Plasmin: IC_{50} = 0.1 µg/mL		Ha	Glu	Thr	Lys	Ahp	Phe	MeTrp	Val	[63]
Micropeptin T-20	*Microcystis aeruginosa*	Chymotrypsin: IC_{50} = 2.5 nM; Tyrosinase: IC_{50} = 5.0 mM			Hpg	Thr	Phe	Ahp	Phe	MeTyr	Ile	[64]
Micropeptin TR1058	*Microcystis* sp. IL-428	Chymotrypsin: IC_{50} = 6.78 µM		Hpla	Tyr	Thr	Gln	Ahp	Leu	MeTyr	Val	[65]
Molassamide	*Dichothrix utahensis*	Chymotrypsin: IC_{50} = 0.234 µM; Elastase: IC_{50} = 0.032 µM	Ba	Ala	Thr	Thr	Dhb	Ahp	Phe	MeTyr	Val	[66]
Nostocyclin	*Nostoc* sp.	Proteinphosphatase 1: IC_{50} = 64 µM	D-Hpla	Ile	Hse	Thr	Hse	Ahp	Phe	MeTyr	Val	[67]
Nostopeptin BN920	*Nostoc* sp. IL-235	Chymotrypsin: IC_{50} = 0.11 µM or 31.2 nM; Trypsin: IC_{50} = 11.4 µM		Ac	Gln	Thr	Leu	Ahp	Phe	MeTyr	Val	[68, 69]
Nostopeptin A	*Nostoc minutum*	Elastase: IC_{50} = 1.3 µg/mL; Chymotrypsin: IC_{50} = 1.4 µg/mL		Ba	Gln	2*S*,3*R*,4*R*-Hmp	Leu	Ahp	Ile	MeTyr	Ile	[70, 71]
Nostopeptin B	*Nostoc minutum*	Elastase: IC_{50} = 11 µg/mL; Chymotrypsin: IC_{50} = 1.6 µg/mL		Ac	Gln	2*S*,3*R*,4*R*-Hmp	Leu	Ahp	Ile	MeTyr	Ile	[70, 71]
Nostopeptin C	*Nostoc minutum* NIES 26	Elastase: IC_{50} = 50 µg/mL; Chymotrypsin: IC_{50} = 90 µg/mL		Ac	Gln	2*S*,3*R*,4*R*-Hmp	Leu	Ahp	Ile	MeTyr	Ile	[71]
Nostopeptin D	*Nostoc minutum* NIES 26	Elastase: IC_{50} = 60 µg/mL; Chymotrypsin: IC_{50} = 90 µg/mL		Ba	Gln	2*S*,3*R*,4*R*-Hmp	Leu	Ahp	Ile	MeTyr	Ile	[71]
Nostopeptin E	*Nostoc linckia* NIES 25	Elastase: IC_{50} = 9.8 µg/mL; Chymotrypsin: IC_{50} = 3.6 µg/mL		Ac	Cit	2*S*,3*R*,4*R*-Hmp	Leu	Ahp	Ile	MeTyr	Ile	[71]
Nostopeptin F	*Nostoc linckia* NIES 25	Elastase: IC_{50} = 3.6 µg/mL; Chymotrypsin: IC_{50} = 3.8 µg/mL		Ac	Cit	2*S*,3*R*,4*R*-Hmp	Leu	Amp	Ile	MeTyr	Ile	[71]

Name	Source	Inhibition	AA-Sequence[f]									Ref.
			AA$_1$	AA$_2$	AA$_3$	O Thr/Hmp	AA$_5$	Ahp/Amp	AA$_7$	AA$_8$	AA$_9$	
Nostopeptin I	*Nostoc linckia* NIES 25	Elastase: IC_{50} = 3.1 µg/mL; Chymotrypsin: IC_{50} = 3.5 µg/mL		Ac	Cit	2*S*,3*R*,4*R*-Hmp	Leu	Ahp	Ile	Dmy	Ile	[71]
Nostopeptin J	*Nostoc linckia* (NIES 25)	Elastase: IC_{50} = 3.6 µg/mL; Chymotrypsin: IC_{50} = 3.2 µg/mL		Ac	Cit	2*S*,3*R*,4*R*-Hmp	Leu	Amp	Ile	Dmy	Ile	[71]
Oscillapeptilide 97-A	*Oscillatoria agardhii* strain 97	Chymotrypsin: IC_{50} = 12.9 µg/mL; Elastase: IC_{50} = 0.73 µg/mL	Ac	Pro	Gln	Thr	Leu	Ahp	Phe	Dmy	Ile	[72]
Oscillapeptilide 97-B	*Oscillatoria agardhii* strain 97	Chymotrypsin: IC_{50} = 10.7 µg/mL; Elastase: IC_{50} = 0.41 µg/mL	Ac	Pro	Gln	Thr	Leu	Ahp	Phe	MeTyr	Ile	[72]
Oscillapeptin (A)	*Oscillatoria agardhii* NIES-204	Elastase: IC_{50} = 0.3 µg/mL; Chymotrypsin: IC_{50} = 2.2 µg/mL		Msg[c]	Hty	Thr	Hty	Ahp	Ile	Dmy[c]	Ile	[73, 74]
Oscillapeptin B	*Oscillatoria agardhii* NIES-204	Chymotrypsin: IC_{50} = 2.1 µg/mL; Elastase: IC_{50} = 0.05 µg/mL		Msg	Hty	Thr	Hty (3‘-Me)	Ahp	Ile	MePhe	Ile	[74]
Oscillapeptin C	*Oscillatoria agardhii* NIES-205	Chymotrypsin: IC_{50} = 3.0 µg/mL		Mhg	D-Hty	Thr	ThTyr	Amp	Ile	MePhe	Ile	[74]
Oscillapeptin D	*Oscillatoria agardhii*	Trypsin: IC_{50} = 13 nM		Msg	Hty	Thr	Lys	Ahp	Ile	MePhe	Ile	[75]
Oscillapeptin D	*Oscillatoria agardhii* (NIES-205)	Chymotrypsin: IC_{50} = 2.2 µg/mL; Elastase: IC_{50} = 30.0 µg/mL		Msg	D-Hty	Thr	ThTyr	Ahp	Ile	MePhe	Ile	[74]
Oscillapeptin E	*Oscillatoria agardhii* (NIES-205)	Chymotrypsin: IC_{50} = 3.0 µg/mL; Elastase: IC_{50} = 3.0 µg/mL		Msg	D/L-Hty	Thr	Hty	Ahp	Ile	MePhe	Ile	[74]
Oscillapeptin F	*Oscillatoria agardhii* (NIES-596)	Trypsin: IC_{50} = 0.2 µg/mL; Plasmin: IC_{50} = 0.03 µg/mL		Msg	D-Hty	Thr	Lys	Ahp	Ile	MePhe	Ile	[74]
Oscillapeptin G	*Oscillatoria agardhii*	Chymotrypsin: IC_{50} = 11.4 µg/mL; Elastase: IC_{50} = 1.12 µg/mL	Gla	Hty	Gln	Thr	Leu	Ahp	Thr	MeTyr	*allo*-Ile	[72, 76]
Oscillapeptin J	*Planktothrix rubescens*	*Thamnocephalus platyurus*: LC_{50}= 15.6 µM		Hsg	Tyr	Thr	Arg	Ahp	Thr	MeTyr	*allo*-Ile	[77]
Pompanopeptin A	*Lyngbya confervoides*	Trypsin: IC_{50} = 2.4 ± 0.4 µg/mL		Ba	Met(5-O)	Thr	Arg	Ahp	Ile	Dmy(3-Br)	Val	[78]
Planktopeptin BL1061	*Planktothrix rubescens*	Chymotrypsin: IC_{50} = 2.1 µM; Elastase: IC_{50} = 40 nM	Gla	Leu	Gln	Thr	Leu	Ahp	Thr	Dmy	Ile	[79]
Planktopeptin BL1125	*Planktothrix rubescens*	Chymotrypsin: IC_{50} = 0.8 µM; Elastase: IC_{50} = 96 nM	Gla	Hty	Gln	Thr	Leu	Ahp	Thr	Dmy	Ile	[79, 80]
Planktopeptin BL843	*Planktothrix rubescens*	Chymotrypsin: IC_{50} = 14.0 µM; Elastase: IC_{50} = 1.7 µM			cGlu	Thr	Leu	Ahp	Thr	Dmy	Ile	[79]
Scyptolin A	*Scytonema hofmanni* PCC 7110	Elastase: IC_{50} = 3.1 µg/mL	Ba	Ala	Thr	Thr	Leu	Ahp	Thr	MeTyr(3-Cl)	Val	[81]
Scyptolin B	*Scytonema hofmanni* PCC 7110	Elastase: IC_{50} = 3.1 µg/mL	Ba	Ala	Thr(O-R)	Thr	Leu	Ahp	Thr	MeTyr(3-Cl)	Val	[81]
Somamide A	*Lyngbya majuscula*			Ha	Met(5-O)	Thr	Dhb	Ahp	Phe	MeTyr	Val	[82]

Name	Source	Inhibition	AA-Sequence[f]									Ref.
			AA_1	AA_2	AA_3	Thr/Hmp (O)	AA_5	Ahp/Amp	AA_7	AA_8	AA_9	
Somamide B[c]	*Schizothrix*			Ha	Gln	Thr	Dhb	Ahp	Phe	MeTyr	Val	[82]
Stigonemapeptin	*Stigonema* sp.	Chymotrypsin: IC_{50} = 2.93 µM; Elastase: IC_{50} = 0.26 µM	Fa	Pro	Gln	Thr	Dhb	Ahp	Phe	MeTyr	Val	[83]
Streptopeptolin	*Streptomyces olivochromogenes* NBRC 3561	Chymotrypsin: IC_{50} = 5.0 µg/mL		Mba	Gln	Thr	Gln	Ahp	Phe	MeTyr	Ala	[84]
Symplocamide A	*Symploca* sp.	H-460: IC_{50} = 40 nM; Neuro-2a: IC_{50} = 29 nM; W2 *Plasmodium falciparum*: IC_{50} = 0.95 µM; Trypsin: IC_{50} = 80.2 µM; Chymotrypsin: IC_{50} = 0.38 µM		Ba	Gln	Thr	Cit	Ahp	Ile	Dmy(3-Br)	Val	[85]
Symplostatin 2	*Symploca hydnoides*		Ba	Ile	Met(5-O)	Thr	Dhb	Ahp	Phe	MeTyr	Val	[86]
Symplostatin 5		Elastase: IC_{50} = 144 ± 2.9 nM; Chymotrypsin IC_{50} = 322 ± 3.2 nM		Msg	Val	Thr	Dhb	Ahp	Phe	MePhe	Ile	[87]
Symplostatin 6		Elastase: IC_{50} = 121 ± 12 nM; Chymotrypsin IC_{50} = 503 ± 65 nM		Msg	Val	Thr	Dhb	Ahp	Phe	MePhe	Val	[87]
Symplostatin 7		Elastase: IC_{50} = 195 ± 28 nM; Chymotrypsin IC_{50} = 515 ± 43 nM		Msg	Ile	Thr	Dhb	Ahp	Phe	MePhe	Ile	[87]
Symplostatin 8		Elastase: IC_{50} = 41 ± 9.0 nM; Chymotrypsin IC_{50} = 268 ± 11 nM		Msg	Val	Thr	Dhb	Ahp	Phe	MeTyr	Ile	[87]
Symplostatin 9		Elastase: IC_{50} = 28 ± 5.8 nM; Chymotrypsin IC_{50} = 324 ± 27 nM		Msg	Val	Thr	Dhb	Ahp	Phe	MeTyr	Val	[87]
Symplostatin 10		Elastase: IC_{50} = 21 ± 2.9 nM; Chymotrypsin: IC_{50} = 222 ± 5.1 nM		Msg	Ile	Thr	Dhb	Ahp	Phe	MeTyr	Ile	[87]
Tasipeptin A	*Symploca* sp.	KB: IC_{50} = 0.93 µM		Ba	Val	Thr	Leu	Ahp	Leu	MePhe	Val	[88]
Tasipeptin B	*Symploca* sp.	KB: IC_{50} = 0.82 µM			Ba	Thr	Leu	Ahp	Leu	MePhe	Val	[88]
#28[c]	*Desmonostoc* sp			Mdhp	Gln	Thr	Leu	Ahp	Leu	MeTyr(Cl)	Leu	[89]
#29[c]	*Desmonostoc* sp		Ac	Pro	Gln	Thr	Leu	Ahp	Val	Dmy	Val	[89]
#30[c]	*Desmonostoc* sp		Ac	Pro	Gln	Thr	Leu	Ahp	Val	MeTyr(Cl)	Val	[89]
#31[c]	*Desmonostoc* sp		Ac	Pro	Gln	Thr	Leu	Ahp	Leu	MeTyr	Leu	[89]
#32[c]	*Desmonostoc* sp		Ac	Pro	Gln	Thr	Leu	Ahp	Val	MeTyr(Cl)	Leu	[89]
#33[c]	*Desmonostoc* sp		Ac	Pro	Gln	Thr	Leu	Ahp	Val	Dmy	Val	[89]
#34[c]	*Desmonostoc* sp		Ac	Pro	Gln	Thr	Leu	Ahp	Leu	MeTyr(Cl)	Leu	[89]

Name	Source	Inhibition	AA-Sequence[f]									Ref.
			AA_1	AA_2	AA_3	Thr/Hmp (O)	AA_5	Ahp/Amp	AA_7	AA_8	AA_9	
#35[c]	*Desmonostoc* sp		Ac	Pro	Gln	Thr	Leu	Ahp	Val	Dmy	Leu	[89]
#36[c]	*Desmonostoc* sp		Ac	Pro	Gln	Thr	Leu	Ahp	Leu	Dmy	Val	[89]
#37[c]	*Desmonostoc* sp		Ac	Pro	Gln	Thr	Leu	Ahp	Leu	Dmy	Leu	[89]
#38[c]	*Desmonostoc* sp		Pa	Pro	Gln	Thr	Leu	Ahp	Leu	Dmy	Leu	[89]

[a] no esterbond; [b] OH-Group is linked to the Thr-subsite (AA_7) and forms an oxazolidine; [c] without stereo informations; [d] Cit-subsite is linked to MePhe-derivative (position 2'); [e] linked via side-chain; [f] abbreviations for amino acids/residues found in Ahp-cyclodepsipetides: Ac: acetic acid; Ahppa: 2-amino-5-(4'-methoxyphenyl)pentanoic acid; Ba: butyric acid; cGlu: Glu-γ-lactam; Dmy: *N*,*O*-dimethyltyrosine; Fa: Formic acid; Gla: Glyceric acid; Ha: hexanoic acid; Hpla: 2-Hydroxy-3-(4-hydroxyphenyl)propanoic acid; Hmv: 2-hydroxy-3-methylvaleric acid; Hpg: 3'-O-phosphate (*R*)-glyceric acid; Hsg: 3-O-sulfated (*R*)-glyceric acid; Hty: Homotyrosine; iBa: *iso*-Butyric acid; Mba: methyl-2-butenoic acid; Mdhp: methyl-dehydroproline; MePhe(3',4'-SO_4): 3',4'-Disulfate-*N*-methylphenylalanine; MePhe:(3',4'-OH): 3',4'-Hydroxy-N-methylphenylalanine; Mhg: 2-Methoxy-(*R*)-glycyric acid; Msg: 2-O-methyl-3-O-sulfate-(*R*)-glyceric acid; Oa: Octanoic acid; Pa: Propionic acid; Pea:2-pentanic acid; R: Ba-Ala-; Shg: 2-O-sulfated-(*R*)-glyceric acid; Ssg: 2,3-O-disulfated-(*R*)-glyceric acid; ThTyr: Tetrahydrotyrosine

References

1. A. Y. Lee, T. A. Smitka, R. Bonjouklian and J. Clardy, *Chem. Biol.*, 1994, **1**, 113-117.
2. R. Bonjouklian, T. A. Smitka, A. H. Hunt, J. L. Occolowitz, T. J. Perun, L. Doolin, S. Stevenson, L. Knauss, R. Wijayaratne, S. Szewczyk and G. M. L. Patterson, *Tetrahedron*, 1996, **52**, 395-404.
3. K. Fujii, K. Sivonen, T. Nakano and K.-I. Harada, *Tetrahedron*, 2002, **58**, 6863-6871.
4. C. Lu, F. Xie, C. Shan and Y. Shen, *Appl. Microbiol. Biotechnol.*, 2017, **101**, 2273-2279.
5. K.-i. Harada, T. Mayumi, T. Shimada, M. Suzuki, F. Kondo and M. F. Watanabe, *Tetrahedron Lett.*, 1993, **34**, 6091-6094.
6. A. R. Anas, A. Nakajima, C. Naruse, M. Tone, H. Asukabe and K. Harada, *Mar. Drugs*, 2016, **14**, 7.
7. K. Harada, T. Mayumi, T. Shimada, K. Fujii, F. Kondo, H. D. Park and M. F. Watanabe, *Environ. Toxicol.*, 2001, **16**, 298-305.
8. B. K. Rubio, S. M. Parrish, W. Yoshida, P. J. Schupp, T. Schils and P. G. Williams, *Tetrahedron Lett.*, 2010, **51**, 6718-6721.
9. K. Viehrig, F. Surup, K. Harmrolfs, R. Jansen, B. Kunze and R. Muller, *J. Am. Chem. Soc.*, 2013, **135**, 16885-16894.
10. C. Martin, L. Oberer, T. Ino, W. A. KÖNig, M. Busch and J. Weckesser, *J. Antibiot.*, 1993, **46**, 1550-1556.
11. C. Jakobi, L. Oberer, C. Quiquerez, W. A. Konig and J. Weckesser, *FEMS Microbiol. Lett.*, 1995, **129**, 129-133.
12. B. Bober, Z. Lechowski and J. Bialczyk, *Phycol. Res.*, 2011, **59**, 286-294.
13. C. Jakobi, K. L. Rinehart, R. Neuber, K. Mez and J. Weckesser, *Phycologia*, 1996, **35**, 111-116.
14. O. Czarnecki, M. Henning, I. Lippert and M. Welker, *Environ. Microbiol.*, 2006, **8**, 77-87.
15. E. Zafrir and S. Carmeli, *J. Nat. Prod.*, 2010, **73**, 352-358.
16. H. Choi, S. K. Oh, W. Yih, J. Chin, H. Kang and J.-R. Rho, *Chem. Pharm. Bull.*, 2008, **56**, 1191-1193.
17. H. S. Okumura, B. Philmus, C. Portmann and T. K. Hemscheidt, *J. Nat. Prod.*, 2009, **72**, 172-176.

18. M. Welker, B. Marsalek, L. Sejnohova and H. von Dohren, *Peptides*, 2006, **27**, 2090-2103.
19. B. Bister, S. Keller, H. I. Baumann, G. Nicholson, S. Weist, G. Jung, R. D. Sussmuth and F. Juttner, *J. Nat. Prod.*, 2004, **67**, 1755-1757.
20. K. Gademann, C. Portmann, J. F. Blom, M. Zeder and F. Juttner, *J. Nat. Prod.*, 2010, **73**, 980-984.
21. H. Mazur-Marzec, A. Fidor, M. Ceglowska, E. Wieczerzak, M. Kropidlowska, M. Goua, J. Macaskill and C. Edwards, *Mar. Drugs*, 2018, **16**, 220.
22. U. Neumann, V. Campos, S. Cantarero, H. Urrutia, R. Heinze, J. Weckesser and M. Erhard, *Syst. Appl. Microbiol.*, 2000, **23**, 191-197.
23. L. Yang, H. Li, P. Wu, A. Mahal, J. Xue, L. Xu and X. Wei, *J. Nat. Prod.*, 2018, **81**, 1928-1936.
24. G. R. Pettit, Y. Kamano, C. L. Herald, C. Dufresne, R. L. Cerny, D. L. Herald, J. M. Schmidt and H. Kizu, *J. Am. Chem. Soc.*, 1989, **111**, 5015-5017.
25. G. R. Pettit, Y. Kamano, C. L. Herald, Y. Fujii, H. Kizu, M. R. Boyd, F. E. Boettner, D. L. Doubek, J. M. Schmidt, J.-C. Chapuis and C. Michel, *Tetrahedron*, 1993, **49**, 9151-9170.
26. I. Nakanishi, A. Fujikawa, K. Imai and A. Sato, *J. Pept. Res.*, 2000, **55**, 120-128.
27. E. N. Zainuddin, R. Mentel, V. Wray, R. Jansen, M. Nimtz, M. Lalk and S. Mundt, *J. Nat. Prod.*, 2007, **70**, 1084-1088.
28. C. Mehner, D. Muller, S. Kehraus, S. Hautmann, M. Gutschow and G. M. Konig, *Chembiochem*, 2008, **9**, 2692-2703.
29. D. A. Gallegos, J. Saurí, R. D. Cohen, X. Wan, P. Videau, A. O. Vallota-Eastman, L. A. Shaala, D. T. A. Youssef, R. T. Williamson, G. E. Martin, B. Philmus, A. E. Sikora, J. E. Ishmael and K. L. McPhail, *J. Nat. Prod.*, 2018, **81**, 1417-1425.
30. K. Taori, V. J. Paul and H. Luesch, *J. Nat. Prod.*, 2008, **71**, 1625-1629.
31. F. H. Al-Awadhi, L. A. Salvador, B. K. Law, V. J. Paul and H. Luesch, *Mar. Drugs*, 2017, **15**, 290.
32. A. Iwasaki, S. Sumimoto, O. Ohno, S. Suda and K. Suenaga, *Bul. Chem. Soc. Jpn.*, 2014, **87**, 609-613.
33. S. Matthew, R. Ratnayake, M. A. Becerro, R. Ritson-Williams, V. J. Paul and H. Luesch, *Mar. Drugs*, 2010, **8**, 1803-1816.
34. A. Plaza and C. A. Bewley, *J. Org. Chem.*, 2006, **71**, 6898-6907.
35. F. H. Al-Awadhi, V. J. Paul and H. Luesch, *Chembiochem*, 2018, **19**, 815-825.

36. S. Matthew, C. Ross, J. R. Rocca, V. J. Paul and H. Luesch, *J. Nat. Prod.*, 2007, **70**, 124-127.
37. K. Taori, S. Matthew, J. R. Rocca, V. J. Paul and H. Luesch, *J. Nat. Prod.*, 2007, **70**, 1593-1600.
38. J. C. Kwan, K. Taori, V. J. Paul and H. Luesch, *Mar. Drugs*, 2009, **7**, 528-538.
39. S. Tsukamoto, P. Painuly, K. A. Young, X. Yang, Y. Shimizu and L. Cornell, *J. Am. Chem. Soc.*, 1993, **115**, 11046-11047.
40. K. Ishida, M. Murakami, H. Matsuda and K. Yamaguchi, *Tetrahedron Lett.*, 1995, **36**, 3535-3538.
41. K. Ishida, H. Matsuda, M. Murakami and K. Yamaguchi, *Tetrahedron Lett.*, 1996, **37**, 9225-9226.
42. M. Murakami, S. Kodani, K. Ishida, H. Matsuda and K. Yamaguchi, *Tetrahedron Lett.*, 1997, **38**, 3035-3038.
43. W. K. Strangman, A. K. Stewart, M. C. Herring and J. L. C. Wright, *Tetrahedron Lett.*, 2018, **59**, 934-937.
44. J. D. Isaacs, W. K. Strangman, A. E. Barbera, M. A. Mallin, M. R. McIver and J. L. Wright, *Harmful Algae*, 2014, **31**, 82-86.
45. K. Ishida, H. Matsuda and M. Murakami, *Tetrahedron*, 1998, **54**, 5545-5556.
46. H. Yamaki, N. Sitachitta, T. Sano and K. Kaya, *J. Nat. Prod.*, 2005, **68**, 14-18.
47. K. Ishida, H. Matsuda, M. Murakami and K. Yamaguchi, *J. Nat. Prod.*, 1997, **60**, 184-187.
48. S. Gesner-Apter and S. Carmeli, *J. Nat. Prod.*, 2009, **72**, 1429-1436.
49. T. Okino, M. Murakami, R. Haraguchi, H. Munekata, H. Matsuda and K. Yamaguchi, *Tetrahedron Lett.*, 1993, **34**, 8131-8134.
50. T. Kisugi and T. Okino, *J. Nat. Prod.*, 2009, **72**, 777-781.
51. A. Ploutno, M. Shoshan and S. Carmeli, *J. Nat. Prod.*, 2002, **65**, 973-978.
52. S. Adiv, R. Aharonv-Nadborny and S. Carmeli, *Tetrahedron*, 2010, **66**, 7429-7436.
53. A. Lodin-Friedman and S. Carmeli, *J. Nat. Prod.*, 2013, **76**, 1196-1200.
54. M. Lifshits, E. Zafrir-Ilan, A. Raveh and S. Carmeli, *Tetrahedron*, 2011, **67**, 4017-4024.
55. S. Elkobi-Peer and S. Carmeli, *Mar. Drugs*, 2015, **13**, 2347-2375.
56. D. Beresovsky, O. Hadas, A. Livne, A. Sukenik, A. Kaplan and S. Carmeli, *Isr. J. Chem.*, 2006, **46**, 79-87.
57. M. Lifshits and S. Carmeli, *J. Nat. Prod.*, 2012, **75**, 209-219.

58. T. Thorskov Bladt, S. Kalifa-Aviv, T. Ostenfeld Larsen and S. Carmeli, *Tetrahedron*, 2014, **70**, 936-943.
59. M. Vegman and S. Carmeli, *Tetrahedron*, 2013, **69**, 10108-10115.
60. E. Zafrir-Ilan and S. Carmeli, *Tetrahedron*, 2010, **66**, 9194-9202.
61. V. Reshef and S. Carmeli, *Tetrahedron*, 2001, **57**, 2885-2894.
62. R. Banker and S. Carmeli, *Tetrahedron*, 1999, **55**, 10835-10844.
63. S. Kodani, S. Suzuki, K. Ishida and M. Murakami, *FEMS Microbiol. Lett.*, 1999, **178**, 343-348.
64. T. Okano, T. Sano and K. Kaya, *Tetrahedron Lett.*, 1999, **40**, 2379-2382.
65. R. Hasan-Amer and S. Carmeli, *Mar. Drugs*, 2017, **15**, 371.
66. S. P. Gunasekera, M. W. Miller, J. C. Kwan, H. Luesch and V. J. Paul, *J. Nat. Prod.*, 2010, **73**, 459-462.
67. K. Kaya, T. Sano, K. A. Beattie and G. A. Codd, *Tetrahedron Lett.*, 1996, **37**, 6725-6728.
68. A. Ploutno and S. Carmeli, *Tetrahedron*, 2002, **58**, 9949-9957.
69. E. von Elert, L. Oberer, P. Merkel, T. Huhn and J. F. Blom, *J. Nat. Prod.*, 2005, **68**, 1324-1327.
70. T. Okino, S. Qi, H. Matsuda, M. Murakami and K. Yamaguchi, *J. Nat. Prod.*, 1997, **60**, 158-161.
71. S. Qi, I. Keishi, M. Hisashi and M. Masahiro, *Symp. Chem. Nat. Prod., Symp. Pap.*, 1998, **40**, 499-504.
72. K. Fujii, K. Sivonen, E. Naganawa and K.-I. Harada, *Tetrahedron*, 2000, **56**, 725-733.
73. H. J. Shin, M. Murakami, H. Matsuda, K. Ishida and K. Yamaguchi, *Tetrahedron Lett.*, 1995, **36**, 5235-5238.
74. Y. Itou, K. Ishida, H. J. Shin and M. Murakami, *Tetrahedron*, 1999, **55**, 6871-6882.
75. T. Sano, J. He, Y. Liu and K. Kaya, *Phycol. Res.*, 1998, **42**, 13-17.
76. T. Sano and K. Kaya, *J. Nat. Prod.*, 1996, **59**, 90-92.
77. J. F. Blom, B. Bister, D. Bischoff, G. Nicholson, G. Jung, R. D. Sussmuth and F. Juttner, *J. Nat. Prod.*, 2003, **66**, 431-434.
78. S. Matthew, C. Ross, V. J. Paul and H. Luesch, *Tetrahedron*, 2008, **64**, 4081-4089.
79. O. Grach-Pogrebinsky, B. Sedmak and S. Carmeli, *Tetrahedron*, 2003, **59**, 8329-8336.
80. P. Ferranti, A. Nasi, M. Bruno, A. Basile, L. Serpe and P. Gallo, *Rapid Commun. Mass Spectrom.*, 2011, **25**, 1173-1183.

81. U. Matern, L. Oberer, R. A. Falchetto, M. Erhard, W. A. König, M. Herdman and J. Weckesser, *Phytochem.*, 2001, **58**, 1087-1095.
82. L. M. Nogle, R. T. Williamson and W. H. Gerwick, *J. Nat. Prod.*, 2001, **64**, 716-719.
83. H. S. Kang, A. Krunic and J. Orjala, *J. Nat. Prod.*, 2012, **75**, 807-811.
84. S. Kodani, H. Komaki, H. Hemmi, Y. Miyake, I. Kaweewan and H. Dohra, *ACS Omega*, 2018, **3**, 8104-8110.
85. R. G. Linington, D. J. Edwards, C. F. Shuman, K. L. McPhail, T. Matainaho and W. H. Gerwick, *J. Nat. Prod.*, 2008, **71**, 22-27.
86. G. G. Harrigan, H. Luesch, W. Y. Yoshida, R. E. Moore, D. G. Nagle and V. J. Paul, *J. Nat. Prod.*, 1999, **62**, 655-658.
87. L. A. Salvador, K. Taori, J. S. Biggs, J. Jakoncic, D. A. Ostrov, V. J. Paul and H. Luesch, *J. Med. Chem.*, 2013, **56**, 1276-1290.
88. P. G. Williams, W. Y. Yoshida, R. E. Moore and V. J. Paul, *J. Nat. Prod.*, 2003, **66**, 620-624.
89. M. Sanz, A. P. D. Andreote, M. F. Fiore, F. A. Dörr and E. Pinto, *Mar. Drugs*, 2015, **13**, 3892-3919.