

Supplementary Materials

An exploratory in silico analysis of bacteriocin gene clusters in the urobiome

Jennifer Jones, Craig P. Murphy, Roy D. Sleator, Eamonn P. Culligan

Department of Biological Sciences, Munster Technological University, Bishopstown, Cork T12 P928, Ireland.

Correspondence to: Dr. Eamonn P. Culligan, Department of Biological Sciences, Munster Technological University, Bishopstown, Cork T12 P928, Ireland. E-mail: Eamonn.culligan@mtu.ie

Supplementary Table 1. Preliminary antimicrobial prediction by BAGEL4 and antiSMASH7 for the bacterial isolates from the urobiome

ISOLATE	BAGEL4						ANTISMASH7		
	Antibiotic	Antimicrobial peptide	Other	Antibiotic	Antimicrobial peptide	Other	Antibiotic	Antimicrobial peptide	Other
<i>ACINETOBACTER SEPTICUS</i> STR. UMB1319	-	-	-	-	-	-	-	-	NI- siderophore, Arylpolyene
<i>ACTINOBACULUM SCHAALII</i> STR. UMB0086	-	-	-	-	-	-	-	RiPP-like	Type III polyketide synthase (T3PKS)
<i>ACTINOBACULUM SCHAALII</i> STR. UMB0063	-	-	-	-	-	-	-	-	T3PKS
<i>ACTINOBACULUM URINALE</i> STR. UMB0759	-	-	-	-	-	-	-	-	T3PKS
<i>ACTINOMYCES EUROPAEUS</i> STR. UMB0652	-	-	-	-	-	-	-	-	-
<i>ACTINOMYCES GRAEVENITZII</i> STR. UMB0286	Sactipeptide	-	-	-	-	-	-	-	RRE-element containing cluster
<i>ACTINOMYCES HOMINIS</i> STR. UMB0859	LAPs	-	-	-	-	-	-	LAP, RiPP-like	-
<i>ACTINOMYCES NAESLUNDII</i> STR. UMB0181	Lasso peptide	Linocin M18	Sactipeptide	-	-	-	Thiopeptide	RiPP-like	RRE-element containing cluster

<i>ACTINOMYCES NEUII</i> STR. UMB0402	-	-	-	-	-	-	-	-	-
<i>ACTINOMYCES NEUII</i> STR. UMB0125	-	-	-	-	-	-	-	-	-
<i>ACTINOMYCES NEUII</i> STR. UMB0138	Sactipeptide	Microbisporicin	-	-	-	-	-	Lanthipeptide- class-I	-
<i>ACTINOMYCES NEUII</i> STR. UMB0918	Sactipeptide	-	-	-	-	-	-	-	-
<i>ACTINOMYCES ODONTOLYTICUS</i> STR. UMB0018	-	-	-	-	-	-	-	-	-
<i>ACTINOMYCES SP.</i> STR. UMB0183	Lactococcin	LAPs	Linocin	Sactipeptide	-	-	Thiopeptide	RiPP-like (3), LAP	-
<i>ACTINOMYCES SP.</i> STR. UMB0731	Linocin	Sactipeptide	-	-	-	-	-	RiPP-like, Lanthipeptide- class-III, LAP	-
<i>ACTINOMYCES TURICENSIS</i> STR. UMB0250	Thiopeptide	-	-	-	-	-	Thiopeptide	-	-
<i>ACTINOMYCES UROGENITALIS</i> STR. UMB0319	Sactipeptide	-	-	-	-	-	-	-	-
<i>AEROCOCCUS CHRISTENSENII</i> STR. UMB0844	Sactipeptide	-	-	-	-	-	-	-	-
<i>AEROCOCCUS SANGUINICOLA</i> STR.	Sactipeptide	Lichenicidin VK21A1	-	-	-	-	-	Lanthipeptide- class-II	-

UMB0139									
<i>AEROCOCCUS URINAE</i>	-	-	-	-	-	-	-	-	T3PKS
STR. UMB0088									
<i>AEROCOCCUS URINAE</i>	-	-	-	-	-	-	-	-	T3PKS
STR. UMB0080									
<i>AEROCOCCUS URINAE</i>	-	-	-	-	-	-	-	-	T3PKS
STR. UMB0126									
<i>AEROCOCCUS URINAE</i>	-	-	-	-	-	-	-	-	T3PKS
STR. UMB0232									
<i>AEROCOCCUS URINAE</i>	-	-	-	-	-	-	-	-	T3PKS
STR. UMB0072									
<i>AEROCOCCUS URINAE</i>	-	-	-	-	-	-	-	-	T3PKS
STR. UMB0072									
<i>AEROCOCCUS VIRIDANS</i>	-	-	-	-	-	-	-	-	-
STR. UMB0240									
<i>ALLOSCARDOVIA</i>	-	-	-	-	-	-	-	RiPP-like	T3PKS
<i>OMNICOLENS STR.</i>									
UMB0064									
<i>ALLOSCARDOVIA</i>	-	-	-	-	-	-	-	RiPP-like	T3PKS
<i>OMNICOLENS STR.</i>									
UMB0006									
<i>ANAEROCOCCUS</i>	Sactipeptide	-	-	-	-	-	-	Ranthipeptide	-
<i>HYDROGENALIS STR.</i>									
UMB0204									
<i>ANAEROCOCCUS</i>	Sactipeptide	Propioncin_SM1	-	-	-	-	Equibacti	-	RRE-element
<i>OCTAVIUS STR.</i>									
UMB0119									
	(2)						n		containing cluster

<i>PSEUDOGLUTAMICIBAC TER ALBUS</i> STR. UMB0722	-	-	-	-	-	-	-	-	Beta lactone
<i>ARTHROBACTER CUMMINSII</i> STR. UMB0715	-	-	-	-	-	-	-	-	Beta lactone
<i>BACILLUS ARYABHATAI</i> STR. UMB0500	Sactipeptide	UViB	-	-	-	-	-	-	T3PKS, phoshonate, NI- siderophore, CDPS, Terpene (3)
<i>BACILLUS CIBI</i> STR. UMB0893	Sactipeptide (2)	COMX3	Sonorensin	Lasso - peptide	-	-	-	Lasso - peptide, LAP	Terpene, NI - siderophore, T3PKS
<i>BACILLUS DRENTENSIS</i> STR. UMB0728	-	-	-	-	-	-	-	-	Terpene (4), T3PKS
<i>BACILLUS SP.</i> STR. UMB0899	LAPs	COMX3	Sonorensin	Sactipeptide	-	-	-	LAP (2)	Terpene (2), T3PKS, NI- siderophore
<i>BIFIDOBACTERIUM BREVE</i> STR. UMB0915	-	-	-	-	-	-	-	-	-
<i>BIFIDOBACTERIUM BREVE</i> STR. UMB0089	-	-	-	-	-	-	-	-	-
<i>BIFIDOBACTERIUM LONGUM</i> STR. UMB0788	-	-	-	-	-	-	-	-	-
<i>BRACHYBACTERIUM FAECIUM</i> STR.	Microbispori cin	Sactipeptide	Lanthipeptid e- Class-I	-	-	-	-	Lanthipeptide- Class-I, RiPP-	-

UMB0905								like	
<i>BREVIBACTERIUM LUTEOLUM</i> STR.	Sactipeptide	-	-	-	-	-	-	-	NAPAA, Terpene, NAGGN, Tropodithietic-acid
UMB0680									
<i>BREVIBACTERIUM SP.</i> STR. UMB0680	Sactipeptide	-	-	-	-	-	-	-	NAPAA, Terpene, NAGGN, Tropodithietic-acid
<i>BREVIBACTERIUM RAVENSPURGENSE</i> STR.	-	-	-	-	-	-	-	-	Terpene, Ectoine
UMB0426									
<i>BREVIBACTERIUM PAUCIVORANS</i> STR.	-	-	-	-	-	-	-	NRPS	Terpene, NAPPA
UMB1301									
<i>CAMPYLOBACTER UREOLYTICUS</i> STR.	Sactipeptide	-	-	-	-	-	-	-	Arylpolyene
UMB0112									
<i>CITROBACTER MURLINIAE</i> STR.	Colicin	Colicin-10	Botromycin	-	-	Thiopeptide	NRP-metallophore	-	
UMB1094									
<i>CORYNEBACTERIUM SP.</i> STR. UMB0338	-	-	-	-	-	-	-	NRP-metallophore	Terpene, T3PKS, NAPAA
<i>CORYNEBACTERIUM SP.</i> STR. UMB0042	-	-	-	-	-	-	-	NRP-metallophore	Terpene, T3PKS, NAPAA,

<i>DOLOSICOCCUS PAUCIVORANS</i> STR. UMB0852	-	-	-	-	-	-	-	-	T3PKS
<i>DOLOSICOCCUS PAUCIVORANS</i> STR. UMB0860	-	-	-	-	-	-	-	-	T3PKS
<i>DOLOSICOCCUS PAUCIVORANS</i> STR. UMB0860	-	-	-	-	-	-	-	-	T3PKS
<i>ENTEROBACTER AEROGENES</i> STR. UMB0295	-	-	-	-	-	-	Lankacidin C	RiPP-like, NRPS	Arylpolyene
<i>KLEBSIELLA AEROGENES</i> STR. UMB0295	-	-	-	-	-	-	Lankacidin C	RiPP-like, NRPS	Arylpolyene
<i>ENTEROCOCCUS FAECALIS</i> STR. UMB0891	Cytolysin_Clyls	Enterocin_96	-	-	-	-	-	Cyclic lactone autoinducer, lanthipeptide-Class-II	RRE-element containing cluster
<i>ENTEROCOCCUS FAECALIS</i> STR. UMB0048	Cytolysin_ClyLs, Cytolysin_ClyL1	-	-	-	-	-	-	Lanthipeptide-Class-II	-
<i>ESCHERICHIA COLI</i> STR. UMB0789	Colicin	Microcin	Microcin_M, Colicin E1	Bottromycin	ComX4, Carocin_D	Thiopeptide	-	NRPS (6), NRP-metallophore (2)	Enterobactin, arylpolyene, T1PKS (2)

<i>ESCHERICHIA COLI</i> STR. UMB0900	Colicin_E9	Carocin_D	Bottromycin	-	-	Thiopeptide	NRP-metallophore (2), NRPS (2)	T1PKS, NISiderophore
<i>ESCHERICHIA COLI</i> STR. UMB0901	ComX4	Microcin	Bottromycin	Microcin_M	Colicin	Thiopeptide	NRP-metallophore (2), NRPS (3)	T3PKS
<i>ESCHERICHIA COLI</i> STR. UMB0727	Colicin (2)	Microcin	Bottromycin	Microcin_M	Colicin-10, Colicin E7	Thiopeptide	RiPP-like, NRPS (6), NRP-metallophore (2)	Enterobactin, arylpolyene, T1PKS (2)
<i>FACKLAMIA HOMINIS</i> STR. UMB0111	Lanthipeptide e-Class-IV	-	-	-	-	-	Lasso peptide	T3PKS
<i>FACKLAMIA SP.</i> STR. UMB0898	-	-	-	-	-	-	-	-
<i>FINEGOLDIA MAGNA</i> STR. UMB0115	Putative bacteriocin	Pneumolancidin	-	-	-	-	Ranthipeptide, Lanthipeptide-Class-II, NRPS, RiPP-like	RRE-containing
<i>FUSOBACTERIUM NUCLEATUM</i> STR. UMB0249	Sactipeptide	-	-	-	-	-	NRPS-like	-
<i>GARDNERELLA VAGINALIS</i> STR. UMB0061	Propioncin_SM1	-	-	-	-	-	-	T3PKS
<i>GARDNERELLA</i>	Variacin	-	-	-	-	-	Lanthipeptide-	-

<i>VAGINALIS</i> STR.									
UMB0833									
<i>GARDNERELLA</i>	-	-	-	-	-	-	-	-	T3PKS
<i>VAGINALIS</i> STR.									
UMB1428									
<i>GEMELLA</i>	-	-	-	-	-	-	-	-	T3PKS
<i>HAEMOLYSANS</i> STR.									
UMB1385									
<i>GEMELLA SANGUINIS</i> STR. UMB0186	Cytolysin_Cl yL1	-	-	-	-	-	-	Lanthipeptide- Class-II, RiPP- like	-
<i>GLOBICATELLA</i> <i>SANGUINIS</i> STR.	-	-	-	-	-	-	-	-	Betalactone
UMB0514									
<i>GORDONIA TERRAE</i> STR. UMB0777	PoyA	Putative bacteriocin family protein	Sactipeptide	-	-	-	-	NRPS (7), Betalactone (2), RiPP-like	Terpene, NAPAA, NI- siderophore, Ectoine T1PKS, arylpolyene, redox- cofactor
<i>HAEMOPHILUS</i> <i>PARAINFLUENZAE</i> STR.	-	-	-	-	-	-	-	RiPP-like	-
UMB0748									
<i>KLEBSIELLA</i> <i>PNEUMONIAE</i> STR.	-	-	-	-	-	-	-	-	-
UMB0411									

<i>KLEBSIELLA PNEUMONIAE</i> STR. UMB0140	Bottromycin	-	-	-	-	-	Thiopeptide	NRP-metallophore, NRPS, RiPP-like	Redox-cofactor
<i>KOCURIA RHIZOPHILA</i> STR. UMB0131	-	-	-	-	-	-	-	-	Terpene, T3PKS, NI-siderophore, NAPAA, Betalactone
<i>KYTOCOCCUS SCHROETERI</i> STR. UMB1298	Propioncin_T1 (2)	-	-	-	-	-	-	RiPP-like	NAPAA, Terpene, NI-siderophore, Ectoine
<i>LACTOBACILLUS CRISPATUS</i> STR. UMB0803	Enterolysin_A	Bacteriocin_LS2chaina, ggmotif: ComC; bacteriocin_IIC	Bacteriocin_helveti J	Helevticin_J	Penocin_A (2)	-	-	RiPP-like (4)	-
<i>LACTOBACILLUS CRISPATUS</i> STR. UMB0044	Enterolysin_A	Bacteriocin_LS2chaina, ggmotif: ComC; bacteriocin_IIC	Bacteriocin_helveti J	Helevticin_J	Penocin_A (2)	-	-	RiPP-like (4)	-
<i>LACTOBACILLUS CRISPATUS</i> STR. UMB0085	ComC; L_biotic_typeA_bacteriocin in IIC, ggmotif: ComC; bacteriocin	Bacteriocin_LS2chaina	Bovicin_225_peptide	Enterolysin_A	Bacteriocin_helveti J	-	-	RiPP-like (3)	-
<i>LACTOBACILLUS CRISPATUS</i> STR.	Bacteriocin_helveti J	Helevticin_J	Helevticin_J	Bovicin_225_peptide	Enterolysin_A	-	-	LAP, RiPP-like	Furan

UMB0824 <i>LACTOBACILLUS</i> <i>CRISPATUS</i> STR. UMB0040	Bacteriocin helveticin_J	Helevticin_J	Bovicin_225 _peptide	ComC; L_biotic_ty peA_bacteri ocin IIc, ggmotif: ComC; bacteriocin_ IIc	Bacterioci n_LS2_ch aina	-	RiPP-like (2)	-
<i>LACTOBACILLUS</i> <i>CRISPATUS</i> STR. UMB0040	Bacteriocin helveticin_J	Helevticin_J	Bovicin_225 _peptide	ComC; L_biotic_ty peA_bacteri ocin IIc, ggmotif: ComC; bacteriocin_ IIc	Bacterioci n_LS2_ch aina	-	RiPP-like (2)	-
<i>LACTOBACILLUS</i> <i>CRISPATUS</i> STR. UMB1398	Bacteriocin helveticin_J	Helevticin_J	ComC; L_biotic_typ eA_bacterio cin IIc, ggmotif: ComC; bacteriocin_ IIc	Bacteriocin_ LS2_chain a	Enterolysi n_A	-	RiPP-like (2)	-
<i>LACTOBACILLUS</i> <i>CRISPATUS</i> STR.	Bacteriocin_ LS2_chain a	Enterolysin_A	Enterolysin_ A	Helevticin_ J	-	-	RiPP-like (3)	-

UMB0054								
<i>LACTOBACILLUS DELBRUECKII</i> STR.	Helevticin_J	Helevticin_J	Enterolysin_A	-	-	-	-	-
UMB0003								
<i>LACTOBACILLUS FERMENTUM</i> STR.	Enterolysin_A	-	-	-	-	-	-	Terpene
UMB0187								
<i>LACTOBACILLUS GASSERI</i> STR. UMB0099	Acidiocin_L F221B (GassericinK 7B), Gassericin_T	Bacteriocin_LS2chainb, Unidentified Bacteriocin	L_biotic_typeA: bacteriocin_IIC, ggmotif; Bacteriocin_IIC	Bacteriocin_helveticn_J	Microcin_M	-	Gassericin_T, Gassericin-S	-
<i>LACTOBACILLUS GASSERI</i> STR. UMB0045	AcdB_acidocin_B	Bacteriocin_helveticn_J	-	-	-	-	-	-
<i>LACTOBACILLUS GASSERI</i> STR. UMB0670	AcdB_acidocin_B	L_biotic_typeA; bacteriocin_IIC	Pedicion	Bacteriocin_helveticn_J	-	-	-	-
<i>LACTOBACILLUS GASSERI</i> STR. UMB0045	AcdB_acidocin_B	Bacteriocin_helveticn_J	-	-	-	-	-	-
<i>LACTOBACILLUS GASSERI</i> STR. UMB0056	Bacteriocin_LS2_chainb, Bacteriocin	Bacteriocin_helveticn_J	-	-	-	-	Gassericin T, Gassericin-S	-
<i>LACTOBACILLUS INERS</i> STR. UMB0030	Mutacin_11 (MutacinH-29B)	Lanthipeptide-Class-II	-	-	-	-	RiPP-like, Lanthipeptide_Class-II	-
<i>LACTOBACILLUS INERS</i>	Mutacin_11	Lanthipeptide- Class-II	-	-	-	-	Lanthipeptide	-

STR. UMB0033	(MutacinH-29B)							- Class-II	
<i>LACTOBACILLUS INERS</i> STR. UMB1051	Mutacin_11 (MutacinH-29B)	Lanthipeptide-Class-IV	-	-	-	-		Mutacin II, Lanthipeptide- Class_V, Lanthipeptide_ Class_III	-
<i>LACTOBACILLUS JENSENII</i> STR. UMB0007	-	-	-	-	-	-		NRPS	-
<i>LACTOBACILLUS JENSENII</i> STR. UMB0077	Enterolysin_A	-	-	-	-	-		NRPS	-
<i>LACTOBACILLUS PONTIS</i> STR. UMB0683	-	-	-	-	-	-		-	T3PKS, Furan
<i>LACTOBACILLUS RHAMNOSUS</i> STR. UMB0004	Carnocin_C P52	Enterocin_X_chain_beta	ggmotif; Bacteriocin_Ilc	-	-	-		RiPP-like	T3PKS
<i>LACTOBACILLUS VAGINALIS</i> STR. UMB0388	Enterolysin_A	-	-	-	-	-		-	T3PKS
<i>LECLERCIA ADECARBOXYLATA</i> STR. UMB0660	Bottromycin	-	-	-	-	-	Thiopeptide	NRP- metallophore, NRPS	NI- siderophore, Butyrolactone, arylpolyene
<i>MICROBACTERIUM SP.</i> STR. UMB0228	-	-	-	-	-	-		LAP	Terpene, Betalactone, TPKS
<i>MICROCOCCLUS LUTEUS</i> STR. UMB0189	-	-	-	-	-	-		-	NI-siderophore, NAPAA,

<i>MICROCOCCUS SP. STR.</i> UMB0867	-	-	-	-	-	-	-	-	Betalactone, Terpene, Ectoine, RRE-containing NI- siderophore, NAPAA, Betalactone, Terpene, Ectoine, RRE- containing
<i>MICROCOCCUS SP. STR.</i> UMB0031	-	-	-	-	-	-	-	-	NI-siderophore, NAPAA, Betalactone, Terpene, Ectoine, RRE- containing
<i>MICROCOCCUS LUTEUS</i> STR. UMB0189	-	-	-	-	-	-	-	-	NI-siderophore, NAPAA, Betalactone, Terpene, Ectoine, RRE- containing
<i>MICROCOCCUS SP. STR.</i> UMB0038	-	-	-	-	-	-	-	-	NI- siderophore, NAPAA, Betalactone, Terpene, Ectoine, RRE-

								containing
<i>MICROCOCCUS LYLAE</i> STR. UMB0955	Lanthipeptid e-Class-IV	-	-	-	-	-	Lanthipeptide- Class-III	Ectoine, Betalactone, NAPAA
MORAXELLA OSLOENSIS STR. UMB0416	-	-	-	-	-	-	-	Betalactone, NI- siderophore
<i>MORGANELLA</i> <i>MORGANII</i> STR. UMB1297	Bottromycin	Colicin_E6	Microcin	-	-	Thiopepti de	RiPP-like, NRPS	Betalactone, T1PKS
<i>NEISSERIA PERFLAVA</i> STR. UMB0023	-	-	-	-	-	-	-	Terpene, Arylpolyene (2), hserlactone, Resorcinol
<i>NEISSERIA PERFLAVA</i> STR. UMB0210	-	-	-	-	-	-	-	Terpene, Arylpolyene (2), hserlactone, Resorcinol
<i>NEISSERIA SICCA</i> STR. UMB0321	-	-	-	-	-	-	-	Terpene, hserlactone
<i>NOSOCOMIICOCCUS</i> <i>MASSILIENSIS</i> STR. UMB0959	Lanthipeptid e-Class-I	-	-	-	-	-	Lanthipeptide- Class-I	-
<i>NOSOCOMIICOCCUS</i> <i>MASSILIENSIS</i> STR. UMB0959	Lanthipeptid e-Class-I	-	-	-	-	-	Lanthipeptide- Class-I	-

<i>OLIGELLA URETHRALIS</i> STR. UMB0345	-	-	-	-	-	-	-	-	Betalactone, Terpene, NI_siderophore RRE-containing
<i>PREVOTELLA BUCCALIS</i> STR. UMB0536	-	-	-	-	-	-	-	-	RRE-containing
<i>PREVOTELLA</i> <i>TIMONENSIS</i> STR. UMB0818	LAPs	Sactipeptide	-	-	-	-	-	LAP	RRE-containing
<i>PROPIONIBACTERIUM</i> <i>ACNES</i> STR. UMB0211	TP-1161	TP-1161	-	-	-	Thiopeptide, Cutimycin	RiPP-like, NRPS (2)	-	-
<i>PROTEUS MIRABILIS</i> STR. UMB0315	Bottromycin	Colicin	-	-	-	Thiopeptide	RiPP-like, NRPS	Betalactone, NI- siderophore, T1PKS, Ladderane	
<i>PSEUDOMONAS</i> <i>AERUGINOSA</i> STR. UMB0740	Bottromycin	Colicin-10	Pyocin_AP4 1_subunit	Pyocin_S1	-	Thiopeptide	Pyocyanine (2), NRPS-like (2), NRPS (7)	Redox-cofactor, hserlactone, Betalactone, NAGGN, opine- like- metallophore, pyochelin	
<i>ROTHIA DENTOCARIOSA</i> STR. UMB0083	LAPs	Lichenicidin VK21A1	ggmotif; LE-DUF; LE- LAC481;	MA-2PEPA	L_biotic_t ypeA	-	LAP, Lanthipeptide- Class_II	Enterobactin, RRE-containing, Butyrolactone	

			LE- MER+2PEP ; L_biotic_typeA;						
<i>ROTHIA MUCILAGINOSA</i> STR. UMB0024	Geobacillin	Sactipeptide	-	-	-	-	-	-	Enterobactin
<i>STAPHYLOCOCCUS AUREUS</i> STR. UMB0910	Putative bacteriocin	Sactipeptide	Auto-inducing-peptide- III	Delta-lysin	-	-	RiPP-like, NRPS	Staphyloferrin A, Staphyloferrin B, Staphylopine cyclic-lactone-autoinducer, Terpene, T3PKS	
<i>STAPHYLOCOCCUS HOMINIS</i> STR. UMB0272	Auto_inducing_peptide_I	Sactipeptide	Amylocyclin	-	-	-	RiPP-like (2)	Cyclic-lactone-autoinducer, NI-siderophore, T3PKS	
<i>STAPHYLOCOCCUS SP.</i> STR. UMB0328	Auto_inducing_peptide_I	Delta-lysinI (2)	Lanthipeptide- Class-II	Sactipeptide	Warnericin	-	Lanthipeptide-Class-II	Staphylopine, Staphyloferrin A, T3PKs, Terpene, cyclic lactone autoinducer	
<i>STAPHYLOCOCCUS PETTENKOFERI</i> STR. UMB0834	Auto_inducing_peptide_I	Sactipeptide	Zoocin_A	-	-	-	Eipeptide	Terpene, NI_siderophore (2), T3PKS,	

<i>STREPTOCOCCUS SP.</i> STR. UMB0039	-	-	-	-	-	-	-	-	cyclic-lactone- autoinducer RRE-containing
<i>STREPTOCOCCUS SP.</i> STR. UMB0767	Zoocin_A	-	-	-	-	-	-	-	Arylpolyene, T3PKS
<i>STREPTOCOCCUS AGALACTIAE</i> STR. UMB0776	Zoocin_A	-	-	-	-	-	-	-	Arylpolyene, T3PKS
<i>STREPTOCOCCUS AGALACTIAE</i> STR. UMB0049	Zoocin_A	-	-	-	-	-	-	-	Arylpolyene, T3PKS
<i>STREPTOCOCCUS ANGINOSUS</i> STR. UMB0252	-	-	-	-	-	-	-	-	-
<i>STREPTOCOCCUS ANGINOSUS</i> STR. UMB0839	Zoocin_A	-	-	-	-	-	-	RiPP-like	T3PKS
<i>STREPTOCOCCUS ANGINOSUS</i> STR. UMB0820	-	-	-	-	-	-	-	-	T3PKS
<i>STREPTOCOCCUS ANGINOSUS</i> STR. UMB0329	-	-	-	-	-	-	-	RiPP-like	T3PKS
<i>STREPTOCOCCUS ANGINOSUS</i> STR. UMB0220	-	-	-	-	-	-	-	RiPP-like	T3PKS

<i>STREPTOCOCCUS ANGINOSUS</i> STR. UMB0434	-	-	-	-	-	-	-	RiPP-like	T3PKS
<i>STREPTOCOCCUS ANGINOSUS</i> STR. UMB0050	-	-	-	-	-	-	-	RiPP-like	T3PKS
<i>STREPTOCOCCUS ANGINOSUS</i> STR. UMB0142	-	-	-	-	-	-	-	RiPP-like	T3PKS
<i>STREPTOCOCCUS DENTISANI</i> STR. UMB0832	Sactipeptide	-	-	-	-	-	-	RiPP-like, NRPS	T3PKS
<i>STREPTOCOCCUS DENTISANI</i> STR. UMB0008	Acidiocin_L F221B (GassericinK 7B), Gassericin_T	-	-	-	-	-	-	RiPP-like (2)	T3PKS
<i>STREPTOCOCCUS DENTISANI</i> STR. UMB0029	LAPs	Lichenicidin VK21A2_ (Lichenicidin_A2)	Pneumolancin (2)	Sactipeptide (2)	Thusin_alpha	Thiopeptide	Lanthipeptide-Class-II, RiPP-like (2), RaS-RiPP	Furan	
<i>STREPTOCOCCUS DENTISANI</i> STR. UMB0079	Pneumolancin (3)	-	-	-	-	-	RiPP-like (2)	T3PKS	
<i>STREPTOCOCCUS MITIS</i> STR. UMB1341	-	-	-	-	-	-	RiPP-like	T3PKS	
<i>STREPTOCOCCUS</i>	Pneumolancin	-	-	-	-	-	RiPP-like (2)	T3PKS	

<i>DENTISANI</i> STR. UMB0079	din (3)								
<i>STREPTOCOCCUS</i> <i>PARASANGUINI</i> STR. UMB0216	Sactipeptide	-	-	-	-	-	-	-	-
<i>STREPTOCOCCUS</i> <i>MACEDONICUS</i> STR. UMB0733	Ubericin_A	Bovicin_225_peptide (4)	Nisin_U	-	-	-	Lanthipeptide- Class-I, RiPP- like	T3PKS	
<i>STREPTOCOCCUS</i> <i>SALIVARIUS</i> STR. UMB0051	Salvaricin_A 5	Thermophilin_A	Bacteriocin_ J46 (2), McdA1	BIpI	-	-	Salvaricin A, Suicin 65, RiPP-like (2)	T3PKS	
<i>STREPTOCOCCUS</i> <i>SALIVARIUS</i> STR. UMB0028	Streptin	-	-	-	-	-	Streptin	T3Pks	
<i>TRUEPERELLA</i> <i>BERNARDIAE</i> STR. UMB0116	Sactipeptide	-	-	-	-	-	-	-	
<i>VARIBACULUM</i> <i>CAMBRIENSE</i> STR. UMB0744	Sactipeptide	-	-	-	-	-	RiPP-like	-	
<i>VARIBACULUM</i> <i>CAMBRIENSE</i> STR. UMB0796	Sactipeptide	-	-	-	-	-	RiPP-like	-	
<i>VEILLONELLA PARVULA</i> STR. UMB0371	-	-	-	-	-	-	Ranthipeptide	-	
<i>YOKENELLA</i> <i>REGENSBURGEI</i> STR.	Bottromycin	-	-	-	-	Thiopepti de	Enterobactin, NRP-	Butyrolactone, Arylpolyene, NI-	

UMB0819

metallophore siderophore

Supplementary Table 2. Urobiome strains which encode putative bacteriocin gene cluster(s) with surrounding accessory genes present

BAGEL4 AOIs	Genome name	BLASTP result	Query cover	% ident ity	Alignment EMBOSS	Accessio n number
ACIDIOCIN_LF221B(GASSERICINK7B)	<i>Streptococcus dentisani</i> str. UMB0008	Blp family class II bacteriocin [<i>Streptococcus oralis</i>]	100%	100%	100%	WP_049537864.1
ACIDOCIN_LF221B(GASSERICINK7B)	<i>Lactobacillus gasseri</i> str. UMB0099	Blp family class II bacteriocin [<i>Lactobacillus</i>]	100%	100%	100%	WP_003649213.1
AMYLOCYCLIN*	<i>Staphylococcus hominis</i> str. UMB0272	Uberolysin/carnocyclin family circular bacteriocin [<i>Staphylococcus hominis</i>]	100%	100%	89%	WP_101804450.1
BACTERIOCIN*	<i>Lactobacillus gasseri</i> str. UMB0056	Bacteriocin [<i>Lactobacillus</i>]	100%	100%	100%	WP_049160225.1
BACTERIOCIN_LS2CHANA*	<i>Lactobacillus crispatus</i> str. UMB0040	Blp family class II bacteriocin [<i>Lactobacillus amylovorus</i>]	100%	99%	99%	WP_013642488.1
BACTERIOCIN_LS2CHANA*	<i>Lactobacillus crispatus</i> str. UMB0803	Blp family class II bacteriocin [<i>Lactobacillus amylovorus</i>]	100%	99%	99%	WP_013642488.1
BACTERIOCIN_LS2CHANA*	<i>Lactobacillus crispatus</i> str. UMB0085	Blp family class II bacteriocin [<i>Lactobacillus crispatus</i>]	100%	99%	99%	WP_013642488.1
BACTERIOCIN_LS2CHANA*	<i>Lactobacillus crispatus</i> str.	Blp family class II bacteriocin [<i>Lactobacillus crispatus</i>]	100%	99%	99%	WP_013642488.1

	UMB0044					
BACTERIOCIN_LS2CHA INA*	<i>Lactobacillus crispatus</i> str.	Blp family class II bacteriocin [<i>Lactobacillus crispatus</i>]	100%	99%	99%	WP_0136 42488.1
	UMB1398					
BACTERIOCIN_LS2CHA INA	<i>Lactobacillus crispatus</i> str.	Blp family class II bacteriocin [<i>Lactobacillus crispatus</i>]	100%	100%	100%	WP_0057 26423.1
	UMB0054					
BACTERIOCIN_LS2CHA INB*	<i>Lactobacillus gasseri</i> str. UMB0056	Blp family class II bacteriocin [<i>Ligilactobacillus salivarius</i>]	97%	47.76 %	43.8%	WP_0324 95430.1
BACTERIOCIN_LS2CHA INB*	<i>Lactobacillus gasseri</i> str. UMB0099	Blp family class II bacteriocin [<i>Ligilactobacillus salivarius</i>]	97%	47.76 %	43.8%	WP_0324 95430.1
BIPI*	<i>Streptococcus salivarius</i> str.	Class IIb bacteriocin, lactobin A/cerein 7B family [<i>Streptococcus</i>]	87%	100%	87.1%	WP_2257 91565.1
	UMB0051					
BIPM	<i>Streptococcus dentisani</i> str.	Two-peptide bacteriocin subunit BlpM [<i>Streptococcus</i>]	100%	100%	100%	WP_0003 79951.1
	UMB0008					
BIPM	<i>Streptococcus dentisani</i> str.	Blp family class II bacteriocin [<i>Streptococcus oralis</i>]	100%	100%	100%	WP_1018 00376.1
	UMB0008					
BIPN	<i>Streptococcus dentisani</i> str.	Blp family class II bacteriocin [Bacteria]	100%	100%	100%	WP_0010 99737.1
	UMB0008					
BIPU*	<i>Streptococcus dentisani</i> str.	MULTISPECIES: bacteriocin class II family protein [Bacteria]	100%	100%	100%	WP_0708 00393.1

BLPC*	UMB0008 <i>Streptococcus dentisani</i> str.	Quorum-sensing system pheromone BlpC [<i>Streptococcus oralis</i>]	100%	100%	100%	WP_1018 00373.1
BOVICIN_225_PEPTIDE*	UMB0008 <i>Streptococcus macedonicus</i> str.	Bacteriocin [<i>Streptococcus</i>]	74%	66.27%	49.1%	WP_0396 94458.1
BOVICIN_225_PEPTIDE*	UMB0733 <i>Streptococcus macedonicus</i> str.	Garvicin Q family class II bacteriocin [<i>Streptococcus gallolyticus</i>]	100%	80%	43.9%	WP_0396 94458.1
BOVICIN_225_PEPTIDE*	UMB0733 <i>Streptococcus macedonicus</i> str.	Garvicin Q family class II bacteriocin [<i>Streptococcus gallolyticus</i>]	60%	80%	32.4%	WP_0396 94458.1
BOVICIN_225_PEPTIDE*	UMB0733 <i>Streptococcus macedonicus</i> str.	Bacteriocin class II with double glycine leader peptide [<i>Streptococcus infantarius</i> subsp. <i>Infantarius</i>]	100%	95.9%	95.9%	MCO462 0482.1
CARNOCIN_CP52*	UMB0733 <i>Lactobacillus rhamnosus</i> str.	Bacteriocin immunity protein [<i>Lacticaseibacillus rhamnosus</i>]	100%	100%	100%	WP_0476 78371.1
COLICIN	UMB0004 <i>Citrobacter murlinae</i> str. UMB1094	Type VI secretion system tube protein TssD [<i>Citrobacter freundii</i>]	100%	100%	100%	WP_1021 90731.1
COLICIN*	UMB0901 <i>Escherichia coli</i> str.	Pyocin-S2 [<i>Escherichia coli</i>]	100%	100%	100%	CAF4718 426.1
COLICIN*	UMB0727 <i>Escherichia coli</i> str.	Pyocin-S2 [<i>Escherichia coli</i>]	100%	100%	100%	CAF4718 426.1

COLICIN*	<i>Proteus mirabilis</i> str. UMB0315	Colicin-E2 [<i>Proteus mirabilis</i>]	99%	99%	99.1%	AWF410 01.1
COLICIN-10	<i>Escherichia coli</i> str. UMB0727	Colicin-like pore-forming protein [<i>Escherichia coli</i>]	100%	100%	100%	WP_0162 32721.1
COLICIN_E7	<i>Escherichia coli</i> str. UMB0727	Colicin-like bacteriocin tRNase domain-containing protein [<i>Escherichia coli</i>]	100%	100%	100%	WP_0420 21075.1
COLICIN_E9*	<i>Escherichia coli</i> str. UMB0789	Type VI secretion system tube protein TssD [<i>Escherichia coli</i>]	100%	100%	99.8%	WP_0005 02506.1
COLICIN_E9*	<i>Escherichia coli</i> str. UMB0900	Colicin [<i>Escherichia coli</i>]	100%	100%	99.7%	STP2208 2.1
COLICIN_E6	<i>Morganella morganii</i> str. UMB1297	Colicin E3/pyocin S6 family cytotoxin [<i>Morganella morganii</i>]	100%	100%	100%	WP_1808 01870.1
COMC; L_BIOTIC_TYPEA; BACTERIOCIN_IIC*	<i>Lactobacillus crispatus</i> str. UMB0040	Hypothetical protein [<i>Lactobacillus</i>]	100%	100%	100%	WP_0057 20990.1
COMC; L_BIOTIC_TYPEA; BACTERIOCIN_IIC*	<i>Lactobacillus crispatus</i> str. UMB0085	Bacteriocin [<i>Lactobacillus crispatus</i>]	100%	100%	100%	WP_0057 20990.1
COMC; L_BIOTIC_TYPEA; BACTERIOCIN_IIC*	<i>Lactobacillus crispatus</i> str. UMB1398	Hypothetical protein [<i>Lactobacillus</i>]	100%	100%	100%	WP_0057 20990.1
COMC; L_BIOTIC_TYPEA; BACTERIOCIN_IIC*	<i>Streptococcus macedonicus</i> str. UMB0733	Bacteriocin [<i>Streptococcus gallolyticus</i>]	100%	78%	78%	WP_1143 17773.1
ENTEROCIN_X_CHAIN_	<i>Lactobacillus</i>	Class IIb bacteriocin, lactobin A/cerein 7B family	100%	100%	100%	WP_0476

BETA*	<i>rhamnosus</i> str. UMB0004	[<i>Lacticaseibacillus rhamnosus</i>]				78355.1
GASSERICIN_T	<i>Lactobacillus gasseri</i> str. UMB0099	Blp family class II bacteriocin [<i>Lactobacillus paragasseri</i>]	100%	100%	100%	WP_0491 59833.1
GGMOTIF; BACTERIOCIN_IIC; GGMOTIF;	<i>Lactobacillus gasseri</i> str. UMB0099	Blp family class II bacteriocin [<i>Lactobacillus</i>]	100%	100%	100%	WP_1018 90487.1
BACTERIOCIN_IIC*	<i>Lactobacillus rhamnosus</i> str. UMB0004	Bacteriocin [<i>Lacticaseibacillus rhamnosus</i>]	100%	100%	100%	WP_0491 71132.1
GGMOTIF; COMC; BACTERIOCIN_IIC*	<i>Lactobacillus crispatus</i> str. UMB0803	Bacteriocin [<i>Lactobacillus crispatus</i>]	100%	98%	98%	MCT788 7040.1
GGMOTIF; COMC; BACTERIOCIN_IIC*	<i>Lactobacillus crispatus</i> str. UMB0040	Bacteriocin [<i>Lactobacillus crispatus</i>]	100%	98%	98%	MCT788 7040.1
GGMOTIF; COMC; BACTERIOCIN_IIC*	<i>Lactobacillus crispatus</i> str. UMB0085	Bacteriocin [<i>Lactobacillus crispatus</i>]	100%	98%	98%	MCT788 7040.1
GGMOTIF; COMC; BACTERIOCIN_IIC*	<i>Lactobacillus crispatus</i> str. UMB0044	Bacteriocin [<i>Lactobacillus crispatus</i>]	100%	98%	98%	MCT788 7040.1
GGMOTIF; COMC; BACTERIOCIN_IIC*	<i>Lactobacillus crispatus</i> str. UMB1398	Bacteriocin [<i>Lactobacillus crispatus</i>]	100%	98%	98%	MCT788 7040.1
L_BIOTIC_TYPEA:	<i>Lactobacillus gasseri</i>	Lactacin F inducer peptide precursor [<i>Lactobacillus</i>]	100%	84%	92%	WP_2603

BACTERIOCIN_IIC*	str. UMB0099	<i>johnsonii</i>]				07981.1
L_BIOTIC_TYPEA; BACTERIOCIN_IIC*	<i>Lactobacillus gasseri</i> str. UMB0670	Lactacin F inducer peptide precursor [<i>Lactobacillus gasseri</i>]	98%	100%	98%	WP_2257 92992.1
LAPS (SONORENSIN)*	<i>Bacillus cibi</i> str. UMB0893	Heterocycloanthracin/sonorensin family bacteriocin [<i>Bacillus sp.</i> UMB0893]	73%	100%	73.3%	PLR6611 9.1
LICHENICIDINVK21A1*	<i>Aerococcus sanguinicola</i> str. UMB0139	Plantaricin C family lantibiotic [<i>Aerococcus sanguinicola</i>]	100%	100%	100%	WP_1016 03837.1
LICHENICIDINVK21A2_ (LICHENICIDIN_A2)*	<i>Streptococcus dentisani</i> str. UMB0029	Class II lanthipeptide, LchA2/BrTA2 family [<i>Streptococcus sp.</i> UMB0029]	100%	100%	87.5%	WP_1022 10124.1
MCDA1	<i>Streptococcus salivarius</i> str. UMB0051	Lactacin 481 family lantibiotic [<i>Streptococcus</i>]	100%	100%	100%	WP_0807 02563.1
MICROCIN_H47_(MCCH 47)	<i>Escherichia coli</i> str. UMB0789	MchB protein [<i>Escherichia coli</i> CFT073]	100%	100%	100%	WP_0807 02563.1
MICROCIN_M	<i>Escherichia coli</i> str. UMB0789	Microcin McmA [<i>Escherichia</i>]	100%	100%	100%	WP_0013 18125.1
MICROCIN_M*	<i>Lactobacillus gasseri</i> str. UMB0099	Bacteriocin [<i>Lactobacillus</i>]	100%	100%	100%	WP_1018 90486.1
MUTACIN_11(MUTACI NH-29B)	<i>Lactobacillus gasseri</i> str. UMB1051	Lactacin 481 family lantibiotic [<i>Lactobacillus iners</i>]	100%	100%	100%	WP_2765 08305.1
MUTACIN_11(MUTACI NH-29B)	<i>Gardnerella vaginalis</i> str. UMB0033	Type A2 lanthipeptide [<i>Lactobacillus iners</i>]	100%	100%	100%	WP_2403 98376.1
MUTACIN_11(MUTACI	<i>Lactobacillus iners</i>	Type A2 lanthipeptide [<i>Lactobacillus iners</i>]	100%	100%	63.1%	WP_2403

NH-29B)*	str. UMB0030					98376.1
NISIN_U*	<i>Streptococcus macedonicus</i> str. UMB0733	Gallidermin/nisin family lantibiotic [<i>Streptococcus suis</i>]	100%	100%	75%	WP_2284 78826.1
PEDIOGIN*	<i>Lactobacillus gasseri</i> str. UMB0099	Bacteriocin immunity protein [<i>Lactobacillus</i>]	100%	100%	100%	WP_1018 90489.1
PEDIOGIN*	<i>Lactobacillus gasseri</i> str. UMB0670	Pediocin immunity protein PedB [<i>Lactobacillus gasseri</i> ATCC 33323 = JCM 1131]	100%	100%	89%	ABJ5993 8.1
PENOCIN_A*	<i>Lactobacillus crispatus</i> str. UMB0044	TIGR04139 family peptide modification target [<i>Lactobacillus crispatus</i>]	100%	100%	96%	AZR1641 6.1
PENOCIN_A*	<i>Lactobacillus crispatus</i> str. UMB0803	Hypothetical protein [<i>Lactobacillus crispatus</i>]	98%	40.62%	34.7%	WP_1546 26382.1
PLANTARICIN C FAMILY LANTIBIOTIC*	<i>Staphylococcus sp.</i> str. UMB0328	Plantaricin C family lantibiotic [<i>Staphylococcus</i>]	100%	100%	100%	WP_1046 81709.1
PNEUMOLANCIDIN	<i>Finegoldia magna</i> str. UMB0115	Salivaricin M family lantibiotic [<i>Finegoldia magna</i>]	100%	100%	100%	WP_0942 06507.1
PUTATIVE BACTERIOGIN*	<i>Streptococcus dentisani</i> str. UMB0008	ComC/BlpC family leader-containing pheromone/bacteriocin [<i>Streptococcus</i>]	100%	100%	100%	WP_0708 00397.1
PUTATIVE BACTERIOGIN*	<i>Lactobacillus crispatus</i> str. UMB0085	Lactococcin 972 family bacteriocin [<i>Lactobacillus</i>]	100%	100%	100%	WP_0612 05069.1
PUTATIVE	<i>Finegoldia magna</i> str.	Lactococcin 972 family bacteriocin [<i>Finegoldia</i>]	100%	100%	95.5%	WP_0028

BACTERIOCIN*	UMB0115					40185.1
PYOCIN_AP41_SUBUNIT	<i>Pseudomonas aeruginosa</i> str. UMB0740	Pyocin_S1 [<i>Pseudomonas</i>]	100%	100%	100%	WP_0031 45451.1
PYOCIN_S1	<i>Pseudomonas aeruginosa</i> str. UMB0740	S-type pyocin domain-containing protein [<i>Pseudomonas aeruginosa</i>]	100%	100%	100%	WP_0230 88120.1
SALVARICIN_A5	<i>Streptococcus salivarius</i> str. UMB0051	Type A2 lanthipeptide [<i>Streptococcus salivarius</i>]	100%	100%	100%	WP_1017 99750.1
STREPTIN	<i>Streptococcus salivarius</i> str. UMB0028	Lantibiotic streptin [<i>Streptococcus sanguinis</i>]	100%	100%	100%	WP_0029 17611.1
SUBTILIN*	<i>Rothia mucilaginosa</i> str. UMB0024	Gallidermin/nisin family lantibiotic [<i>Actinomyces sp.</i> ICM58]	100%	83.54%	83.5%	WP_0814 95980.1
THERMOPHILLIN_A	<i>Streptococcus salivarius</i> str. UMB0051	Blp family class II bacteriocin [<i>Streptococcus</i>]	100%	100%	100%	WP_0486 74859.1
THUSIN_ALPHA	<i>Streptococcus dentisani</i> str. UMB0029	Lichenicidin alpha family lanthipeptide [<i>Streptococcus sp.</i> UMB0029]	100%	100%	100%	WP_1022 10125.1
UBERICIN_A*	<i>Streptococcus macedonicus</i> str. UMB0733	Blp family class II bacteriocin [<i>Streptococcus</i>]	93%	100%	93.5%	WP_0030 66580.1
UNIDENTIFIED	<i>Lactobacillus gasseri</i>	Bacteriocin [<i>Lactobacillus</i>]	100%	100%	100%	WP_0491

BACTERIOCIN*	str. UMB0099					60225.1
VARIACIN (17.2 BACTERIOCIN_J46)	<i>Gardnerella vaginalis</i> str. UMB1642	Lacticin 481 family lantibiotic [<i>Gardnerella</i>]	100%	100%	100%	WP_0041 11352.1
VARIACIN (17.2 BACTERIOCIN_J46)	<i>Gardnerella vaginalis</i> str. UMB0170	Lacticin 481 family lantibiotic [<i>Gardnerella</i>]	100%	100%	100%	WP_0041 11352.2
VARIACIN (17.2 BACTERIOCIN_J46)	<i>Streptococcus</i> <i>salivarius</i> str. UMB0051	Lacticin 481 family lantibiotic [<i>Streptococcus</i>]	100%	100%	100%	WP_0376 01371.1
VARIACIN (17.2 BACTERIOCIN_J46)*	<i>Streptococcus</i> <i>salivarius</i> str. UMB0051	Lacticin 481 family lantibiotic [<i>Streptococcus</i> <i>salivarius</i>]	100%	100%	98%	WP_0376 01366.1

Putative bacteriocin hits are presented with their closest homologues as identified through BLASTP analysis and alignment using EBI EMBOSS needle, with an * representing the bacteriocins that are potentially novel by either differing by two or more amino acids or matching to a reported but previously uncharacterised bacteriocin.