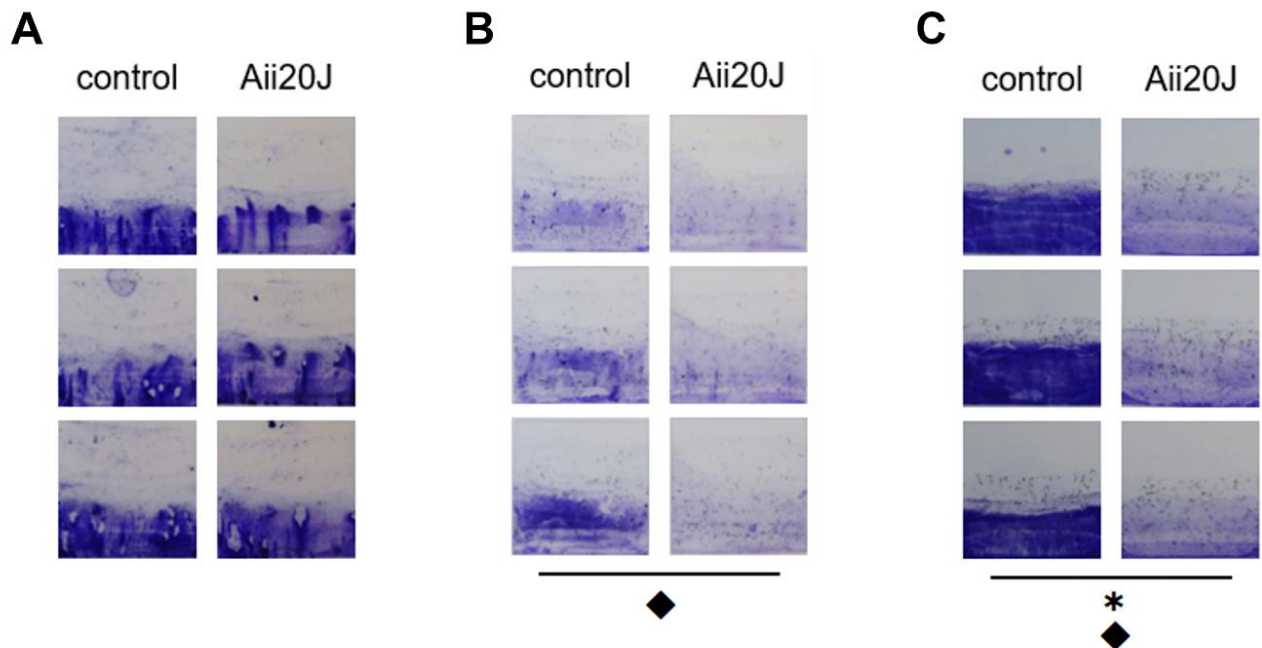


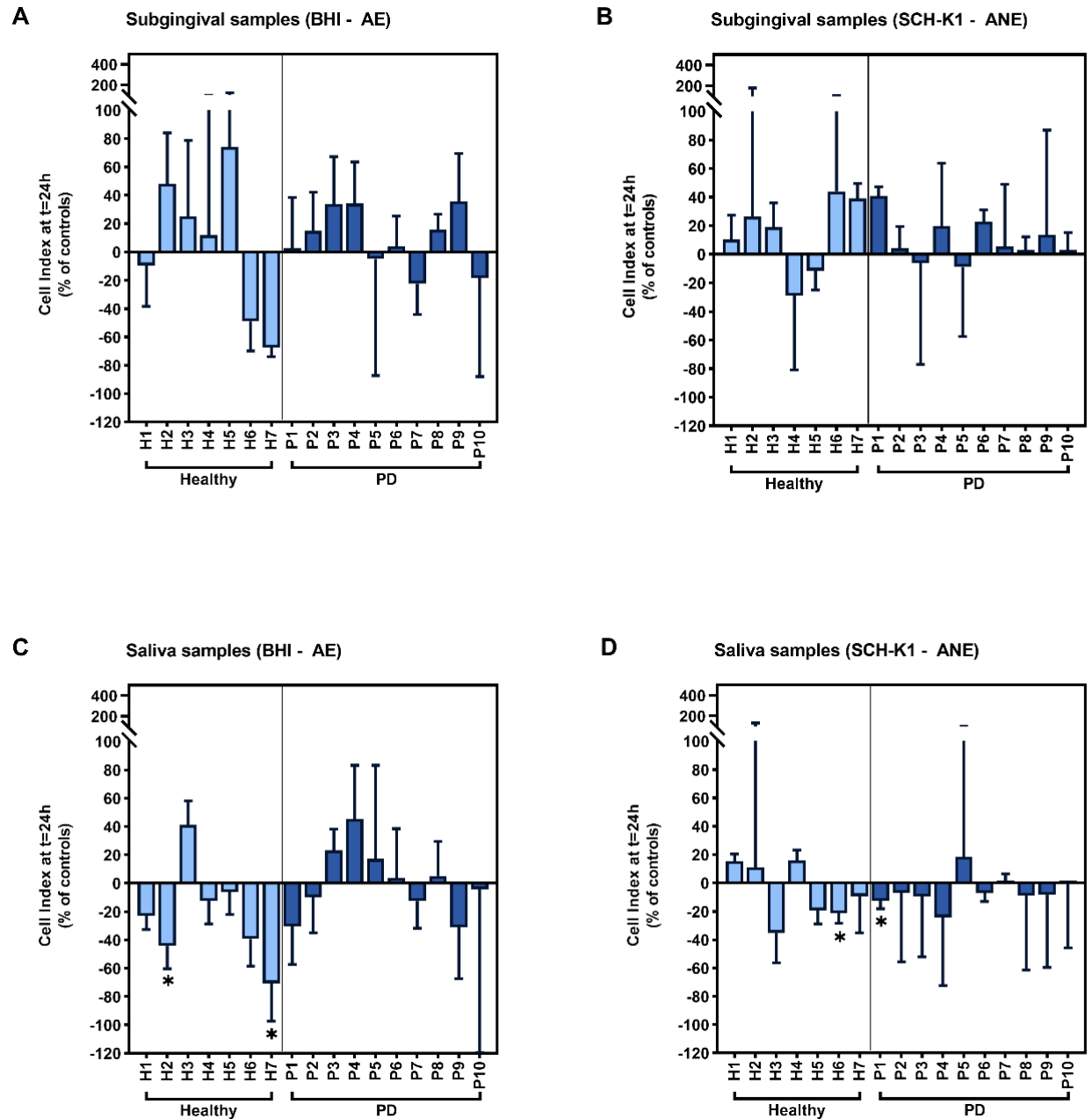
1 Supplementary Material ¹

1.1 Supplementary Figures

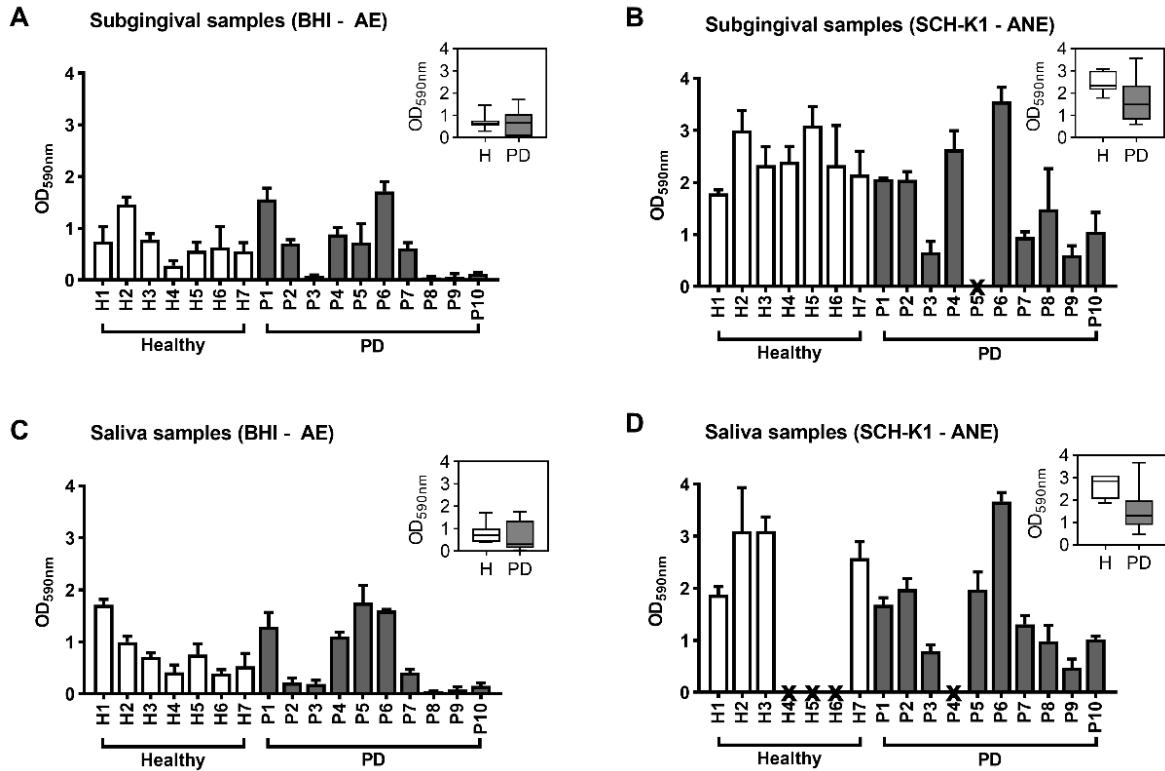


Supplementary Figure S1. Visual examination of biofilms grown in the AAA model and stained with CV. A. Control and Aii20J-treated biofilms that do not differ statistically nor visually. **B.** Control biofilms that are not significantly different in absorbance (OD_{590nm}) but differ visually (marked with a diamond; ♦) from Aii20J-treated biofilms. **C.** Control biofilms that differ statistically (*) and visually (♦) from Aii20J-treated biofilms.

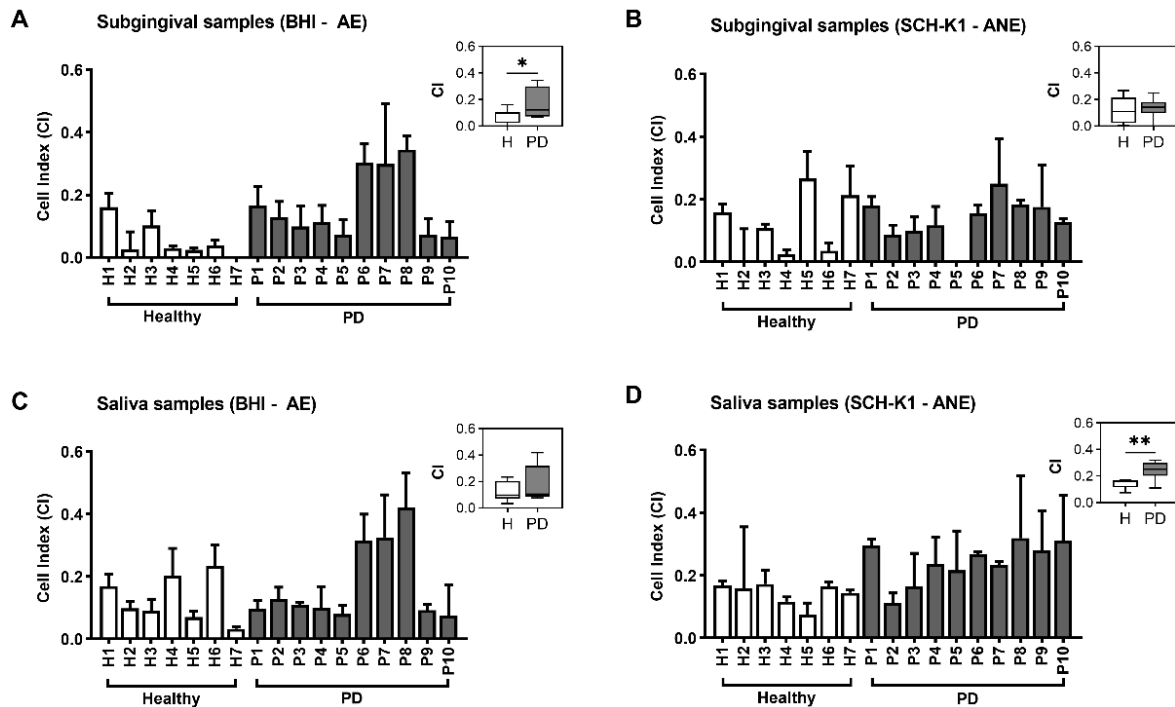
¹ References for the Supplementary Material can be found at the end of this document.



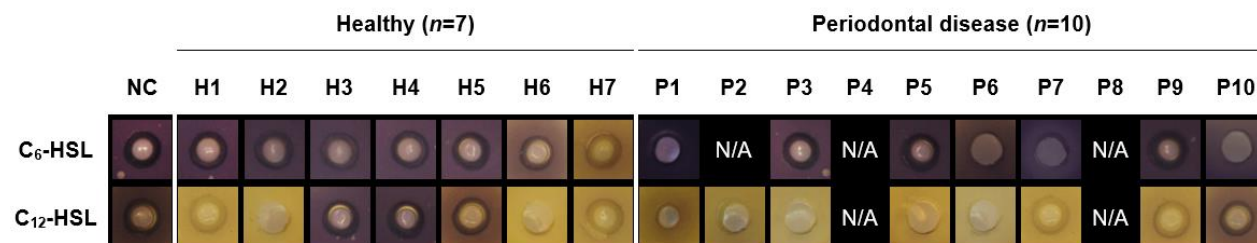
Supplementary Figure S2. Inhibition of biofilm formation in the xCELLigence system in the presence of Aii20J. Results are represented as mean $\pm$ SD ($n = 3$) of the percentage of cell index values of Aii20J-treated biofilms compared to their control, at $t = 24$ h. Samples used to inoculate the biofilms were obtained from healthy donors (light blue bars) and patients with periodontal disease (PD, dark blue bars). Subgingival samples were grown in BHI and aerobiosis (A) and SCH-K1 and anaerobiosis (B). Saliva samples were grown in BHI and aerobiosis (C) and SCH-K1 and anaerobiosis (D). Asterisks (*) indicate statistical significance (t -tests, $*\alpha = 0.05$). AE: aerobiosis. ANE: anaerobiosis.



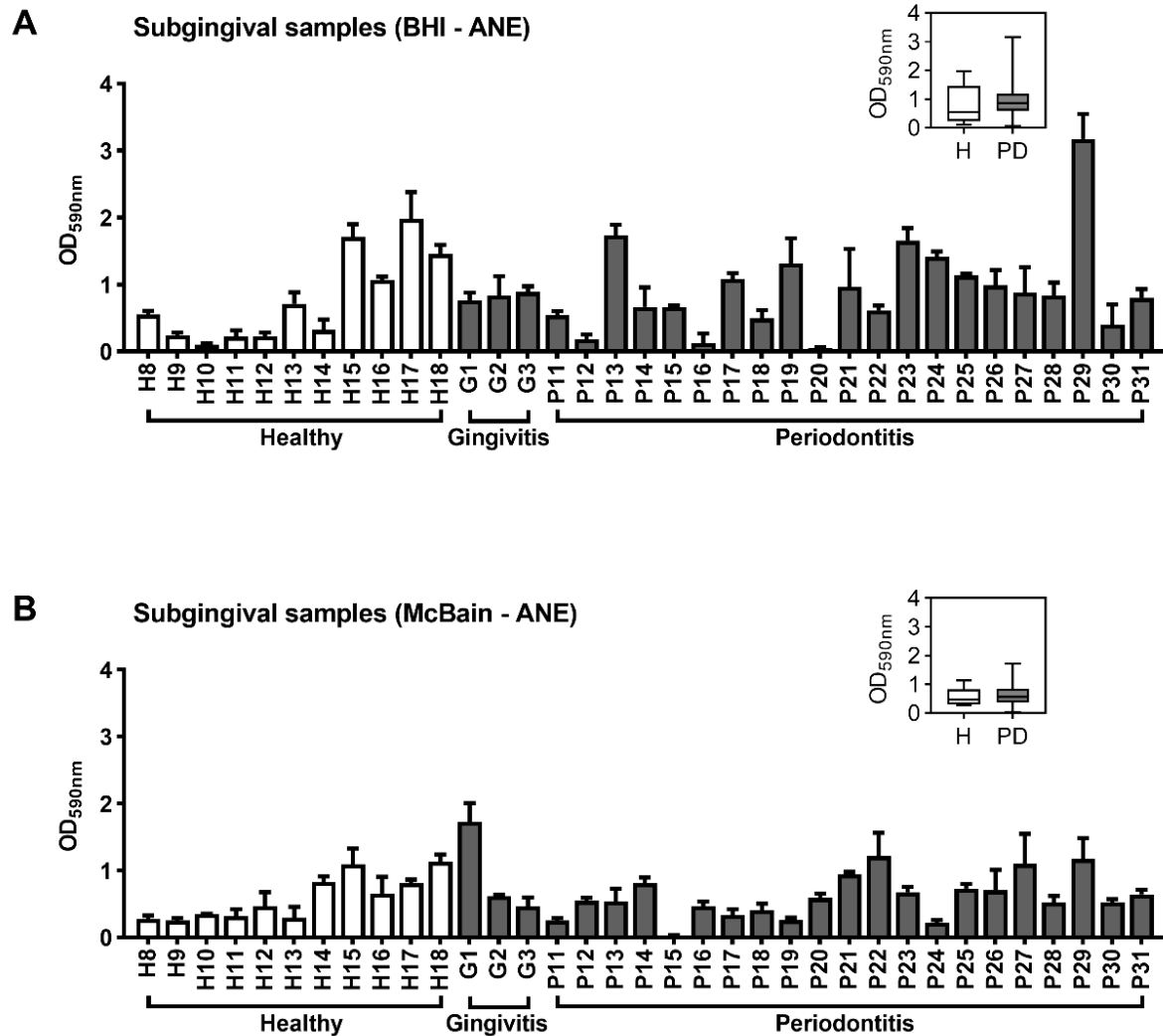
Supplementary Figure S3. Biofilm formation in the AAA model, represented as mean $\pm$ SD ($n = 3$) of control biofilms (OD_{590nm}). Samples used to inoculate the biofilms were obtained from healthy donors (white bars) and patients with periodontal disease (PD, grey bars). All biofilms were grown for 24h. Subgingival samples were grown in BHI and aerobiosis (A) and SCH-K1 and anaerobiosis (B). Saliva samples were grown in BHI and aerobiosis (C) and SCH-K1 and anaerobiosis (D). In samples P5 (B) and H4, H5, H6 and P4 (D), marked with an “X” on the x-axis, biofilm could not be quantified. Inserted in each graph is a boxplot (median and interquartile range -IQR-, whiskers range from minimum to maximum) comparing absolute values of control biofilms (OD_{590nm}) from healthy donors ($n = 7$) and patients with PD ($n = 10$). Asterisks (*) indicate statistical significance (t -tests; $*\alpha = 0.05$). AE: aerobiosis. ANE: anaerobiosis.



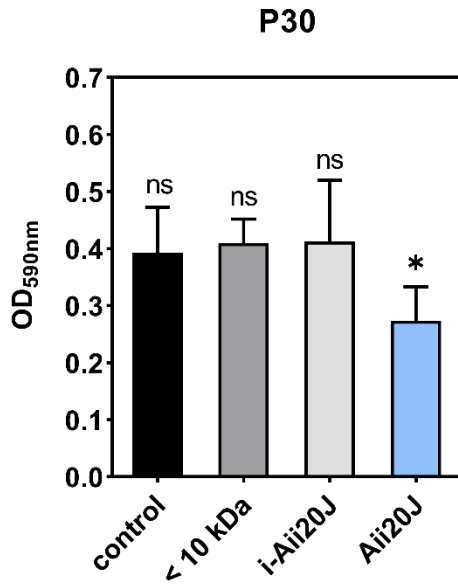
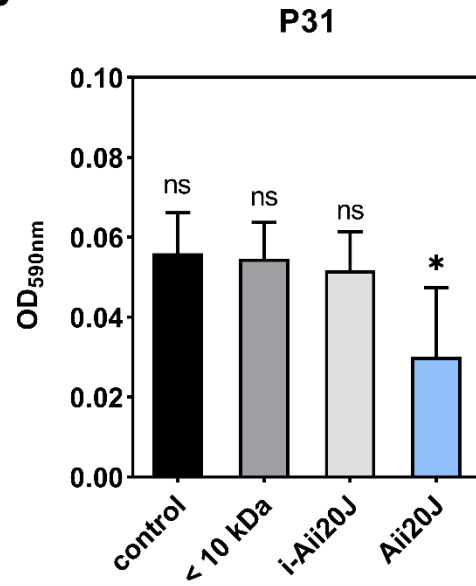
Supplementary Figure S4. Biofilm formation in the xCELLigence system at t = 24h. Results are represented as mean $\pm$ SD ($n = 3$) cell index (CI) values of control biofilms. Samples used to inoculate the biofilms were obtained from healthy donors (white bars) and patients with periodontal disease (PD, grey bars). Subgingival samples were grown in BHI and aerobiosis (**A**) and SCH-K1 and anaerobiosis (**B**). Saliva samples were grown in BHI and aerobiosis (**C**) and SCH-K1 and anaerobiosis (**D**). Inserted in each graph is a boxplot (median and interquartile range -IQR-, whiskers range from minimum to maximum) comparing absolute values of control biofilms (CI) from healthy donors ($n = 7$) and patients with PD ($n = 10$). Asterisks (*) indicate statistical significance (t -tests; $*\alpha = 0.05$, $**\alpha = 0.01$). AE: aerobiosis. ANE: anaerobiosis.



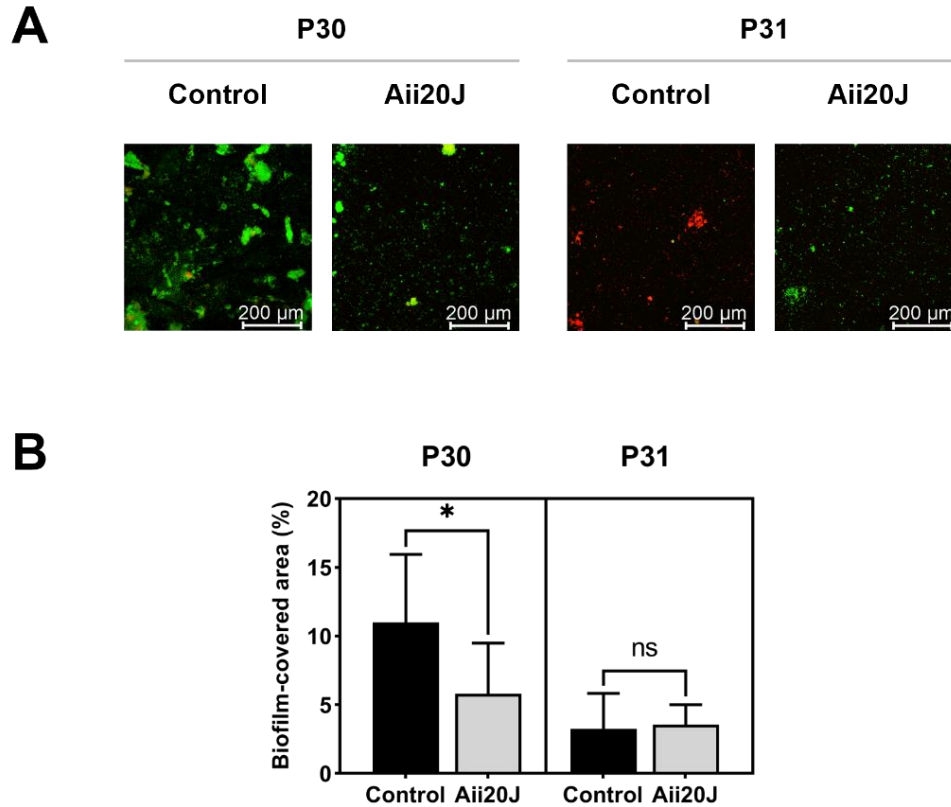
Supplementary Figure S5. QQ activity in saliva samples. A violacein halo around the wells after 24h of incubation with C₆-HSL or C₁₂-HSL indicates that the AHL preserves its original structure. Reduced or inexistent halos show partial and total degradation of the AHL, respectively. NC: negative control. N/A: not available.



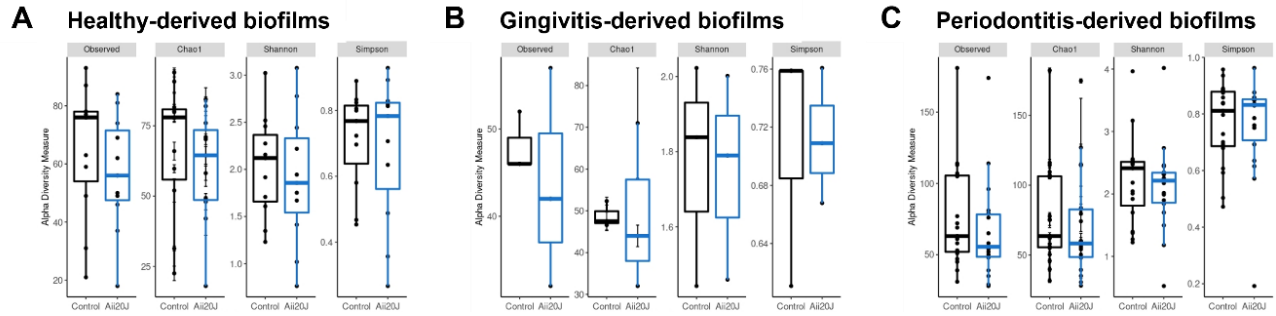
Supplementary Figure S6. Biofilm formation of subgingival samples in the AAA model, represented as mean $\pm$ SD ($n = 3$) of control biofilms (OD_{590nm}). Samples used to inoculate the biofilms were obtained from healthy donors (white bars) and patients with gingivitis and periodontitis (grey bars). All biofilms were grown for 24h. Biofilms were cultured in anaerobic conditions in BHI (**A**) and McBain medium (**B**). Inserted in each graph is a boxplot (median and interquartile range -IQR-, whiskers range from minimum to maximum) comparing absolute values of control biofilms (OD_{590nm}) from healthy donors ($n = 11$) and patients with gingivitis and periodontitis ($n = 24$). Asterisks (*) indicate statistical significance (t -tests; $*\alpha = 0.05$). ANE: anaerobiosis.

A**B**

Supplementary Figure S7. Effect of the QQ enzyme (“Aii20J”), the soluble fraction of the purification product comprising all compounds under 10 kDa (“< 10 kDa”), and the heat-inactivated QQ enzyme (“i-Aii20J”) on *in vitro* subgingival biofilm formation in comparison with the untreated biofilms (“control”). Biofilm mass was measured with CV staining (OD_{590nm}). Subgingival samples were grown in McBain and anaerobiosis in the AAA model for 24h. Samples used to inoculate the biofilms were obtained from two patients with periodontal disease: P30 (**A**), and P31 (**B**), from previous experiments. Results displayed in this figure were generated from independent experiments than the ones included in Figure 3. Results are represented as mean $\pm$ SD ($n = 3$) of biofilms. Asterisks (*) indicate statistical significance (ANOVA, $\alpha = 0.05$).



Supplementary Figure S8. Confocal-laser scanning microscopy visualization of subgingival biofilms grown in the AAA model in McBain and anaerobiosis, in control and Aii20J-treated conditions. Samples were taken from two patients with periodontitis (P30 and P31). **A.** Representative confocal photomicrographs of the areas with highest biofilm coverage, for each patient and condition, among eight randomly analyzed fields. The photomicrographs display FoV observed at 20x magnification. Scale bars represent 200 μm . Viable cells are stained with SYTO 9 and appear green, and membrane-damaged cells are stained with PI and appear red. **B.** Area covered by the biofilms, expressed as the percentage of biofilm-covered area relative to the total FoV ($n = 8$ fields at 20x). Asterisks (*) indicate statistical significance of the differences between Aii20J-treated biofilms (grey bars) and control biofilms (black bars) (t -tests, $^*\alpha = 0.05$).



Supplementary Figure S9. Alpha diversity indexes of subgingival biofilms grown in the AAA model. Boxplots represent the median and interquartile range (IQR), and whiskers range from $Q1 - 1.5 \text{ IQR}$ to $Q3 + 1.5 \text{ IQR}$. Biofilms were grown for 24h in McBain and anaerobic conditions. Samples used to inoculate the biofilms were obtained from healthy donors (**A**, $n = 11$), patients with gingivitis (**B**, $n = 3$), and patients with periodontitis (**C**, $n = 19$).

1.2 Supplementary Tables

Supplementary Table S1. Classification of the oral health status of the first group of patients recruited in this study ($n = 17$). Oral health status was assessed according to the proceedings from the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions (Papapanou et al., 2018; Tonetti et al., 2018). F: female. M: male. RP: reduced periodontium.

	Code	Age	Sex	Classification
Healthy ($n = 7$)	H1	30	F	Healthy
	H2	57	M	Healthy, RP
	H3	46	F	Healthy
	H4	22	F	Healthy
	H5	39	F	Healthy
	H6	49	F	Healthy, RP
	H7	45	F	Healthy, RP
Periodontal disease ($n = 10$)	P1	48	F	Periodontitis (Stage II)
	P2	49	M	Periodontitis (Stage II)
	P3	47	F	Gingivitis
	P4	43	F	Gingivitis
	P5	44	F	Gingivitis
	P6	70	M	Periodontitis (Stage IV)
	P7	75	M	Periodontitis (Stage IV)
	P8	55	F	Periodontitis (Stage II)
	P9	65	M	Periodontitis (Stage III)
	P10	39	M	Periodontitis (Stage III)

Supplementary Table S2. Classification of the oral health status of the second group of patients recruited in this study ($n = 35$). Oral health status was assessed according to the proceedings from the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions (Papapanou et al., 2018; Tonetti et al., 2018). F: female. M: male. RP: reduced periodontium.

	Code	Age	Sex	Classification
Healthy ($n = 11$)	H8	24	F	Healthy
	H9	49	M	Healthy, RP
	H10	50	F	Healthy
	H11	42	F	Healthy, RP
	H12	54	M	Healthy, RP
	H13	69	F	Healthy, RP
	H14	54	M	Healthy, RP
	H15	74	F	Healthy, RP
	H16	48	F	Healthy, RP
	H17	39	F	Healthy
	H18	63	F	Healthy, RP
Periodontal disease ($n = 24$)	G1	31	F	Gingivitis
	G2	77	F	Gingivitis
	G3	72	M	Gingivitis
	P11	64	F	Periodontitis (Stage III)
	P12	78	F	Periodontitis (Stage II)
	P13	62	M	Periodontitis (Stage III)
	P14	73	M	Periodontitis (Stage II)
	P15	38	F	Periodontitis (Stage I)
	P16	64	M	Periodontitis (Stage II)
	P17	57	F	Periodontitis (Stage IV)
	P18	54	M	Periodontitis (Stage III)
	P19	70	M	Periodontitis (Stage II)
	P20	74	M	Periodontitis (Stage II)
	P21	64	F	Periodontitis (Stage II)
	P22	55	F	Periodontitis (Stage I)
	P23	65	F	Periodontitis (Stage III)
	P24	64	M	Periodontitis (Stage III)
	P25	51	F	Periodontitis (Stage III)
	P26	85	M	Periodontitis (Stage III)
	P27	70	M	Periodontitis (Stage III)
	P28	71	M	Periodontitis (Stage II)
	P29	86	M	Periodontitis (Stage III)
	P30	51	F	Periodontitis (Stage II)
	P31	59	M	Periodontitis (Stage II)

Supplementary Table S3. Sequences of the sets of primers (F: forward; R: reverse) and probes (P) used for the quantification of each bacterial species. The last columns indicate the normalized concentrations and the amplicon size.

Species	Target gene	Sequence	Concn (μM)	Length (bp)
<i>P. endodontalis</i>	<i>rpoB</i>	F: TGTTAAGGATGGGAAAGTCGAT	0.8	147
		R: GCGTAGCGTGACTTTACTTTGTC	0.8	
		P: #6 ^a	0.2	
<i>P. gingivalis</i> ^b	<i>rgpB</i>	F: GCCTTACCGTCTTTCACGAT	0.5	206
		R: AAGATGCTCGACACATGGAC	0.5	
		P: CCATCGTCAGAGAGCGTAGC ^c	0.2	
Eubacteria ^d	16S rRNA	F: TCCTACGGGAGGCAGCAGT	0.6	462
		R: GGACTACCAGGGTATCTAATCCTGTT	0.7	
		P: CGTATTACCGCGGCTGCTGGCAC	0.2	

^a Universal ProbeLibrary probe (Roche).

^b Described at Vilarrasa et al. (Vilarrasa et al., 2018).

^c TAMRA TaqMan probe (Life Technologies) labeled with 6FAM.

^d Described at Nadkarni et al. (Nadkarni et al., 2002). All other primers and probes were self-designed.

Supplementary Table S4. Annotation of the sequences queried against the metagenomes. The first column ("Annotation") contains the name of each protein family, as displayed in Figure 6. The second column ("L1") contains the main group to which each protein family belongs. Columns "L2" and "L3" contain the annotated name and accession number, respectively, of the representative sequence of each protein family. Last, column "L4" contains the accession numbers of all sequences belonging to each protein family.

New_annotation	L1	L2	L3	L4
AHL-Synthases-1-HdtS	AHL-Synthases	putative acylhomoserine lactone synthase HdtS [Pseudomonas protegens CHA0]	gi 500239661 gb AGL81819.1	AEV60042.1 gi.500239661.gb.AGL AAG30826.1
AHL-Synthases-2-LuxM	AHL-Synthases	RecName: Full=Acyl-homoserine-lactone synthase; AltName: Full=Autoinducer synthesis protein LuxI	WP-048661067.1	WP-012600240.1 WP-050712378.1 WP-048614683.1 WP-048610660.1 WP-048609758.1 AAC36807.1 CDT89922.1 WP-048661067.1 WP-065779339.1 WP-025501628.1 WP-021823173.1 WP-005494702.1 WP-029857810.1 WP-020838754.1 WP-029798823.1
AHL-Synthases-3-LasI-like	AHL-Synthases	MULTISPECIES: N-3-oxohexanoyl-L-homoserine lactone synthase AinS [Aliivibrio]	WP-003534106.1	WP-003534106.1
AHL-Synthases-4-LasI	AHL-Synthases	acyl-homoserine-lactone synthase [Vibrio crassostreae]	WP-003083017.1	WP-003083017.1
AHL-Synthases-5-RhlI	AHL-Synthases	MULTISPECIES: acyl-homoserine-lactone synthase [Sinorhizobium]	sp P54291.2 RHLI-PSEAE	sp.P54291.2.RHLI-PS
AHL-Synthases-6-GinI	AHL-Synthases	MULTISPECIES: acyl-homoserine-lactone synthase LasI [Pseudomonas]	BAG07415.1	BAG07415.1
AHL-Synthases-7-CepI	AHL-Synthases	RecName: Full=Acyl-homoserine-lactone synthase; AltName: Full=Autoinducer synthesis protein RhlI	AAG61123.1	WP-002000467.1 WP-002023245.1 WP-000387874.1 WP-106479630.1 AAG61123.1
AHL-Synthases-8-AurI	AHL-Synthases	AHL synthase [Komagataeibacter intermedius]	BAM94429.1	BAM94429.1
AHL-Synthases-9-EdwI	AHL-Synthases	AHL synthase [Burkholderia cepacia ATCC 25416]	AYI57645.1	sp.P52988.1.YENI-YE AAA82096.1 BAF31199.1 AKC96425.1 AYI57645.1
AHL-Synthases-10-LuxI	AHL-Synthases	AHL synthase [Pseudomonas chlororaphis subsp. aurantiaca]	sp P35328.1 LUXJ-ALIF1	sp.P35328.1.LUXJ-AL AAA27552.1
AHL-Synthases-11-AinS	AHL-Synthases	AHL synthase [Edwardsiella ictaluri]	WP-038155219.1	WP-038155219.1
AHL-Receptors-1-LuxR	AHL-Receptor	LuxR, partial [Aliivibrio fischeri]	AAQ90229.1	AAQ90229.1
AHL-Receptors-2-LuxR	AHL-Receptor	LuxR, partial [Vibrio harveyi]	AAN86705.2	AAN86705.2
AHL-Receptors-3-LuxR	AHL-Receptor	MULTISPECIES: LuxR family transcriptional regulator [Enterobacteriaceae]	WP-001560555.1	WP-001560555.1
AHL-Receptors-4-SdiA	AHL-Receptor	MULTISPECIES: autoinducer binding domain-containing protein [Burkholderia]	WP-006766136.1	WP-006766136.1 WP-027789395.1 AIE47888.1 AIE47886.1 AIE47884.1 AAG61131.1 AAG61132.1 AAG61130.1 AAG61133.1
AHL-Receptors-5-LasR	AHL-Receptor	TPA: transcriptional regulator LasR [Pseudomonas aeruginosa]	HCH0449634.1	BAA06489.1 HCH0449634.1 WP-134292997.1
AHL-Receptors-6-RhlR	AHL-Receptor	MULTISPECIES: transcriptional regulator RhlR [Pseudomonas]	WP-003119559.1	BAA15736.1 ATI05176.1 NP-416426.1 WP-032641394.1 WP-001154267.1 WP-024155212.1 WP-001154265.1 WP-003119559.1 ACI42868.1
AHL-Receptors-7-AbaR	AHL-Receptor	MULTISPECIES: LuxR family transcriptional regulator AbaR [Acinetobacter]	WP-000446790.1	WP-000446790.1
AHL-Receptors-8-TraR	AHL-Receptor	RecName: Full=Transcriptional activator protein TraR	sp P54294.1 TRAR-AGRFC	sp.P54294.1.TRAR-AG
AHL-Receptors-9-PluR	AHL-Receptor	orphan LuxR-type receptor PluR [Photorhabdus laumondii subsp. laumondii]	AGO97061.1	AGO97061.1
AHL-Receptors-10-LuxN	AHL-Receptor	HAI-1 autoinducer 1 hybrid sensor histidine kinase/phosphatase LuxN	SQA39244.1	SQA39244.1
Non-AHL-Synthases-1-DarABC	Non-AHL-Synthases	Photorhabdus asymbiotica subsp. asymbiotica ATCC 43949 darABC operon	KP258227.1	KP258227.1
Non-AHL-Synthases-2-PpyS	Non-AHL-Synthases	Photorhabdus temperata subsp. thracensis strain DSM 15199 photopyrone synthase gene	KF218577.1	KF218577.1
Non-AHL-Synthases-3-RpaI	Non-AHL-Synthases	p-coumaryl-homoserine lactone synthase	Q6NCZ6.1	Q6NCZ6.1
Non-AHL-Receptors-1-QscR	Non-AHL-Receptors	quorum-sensing control repressor	NP_250589.1	NP_250589.1
Non-AHL-Receptors-2-RpaR	Non-AHL-Receptors	4-coumaroyl-homoserine lactone receptor	Q6NCZ5.1	Q6NCZ5.1
Non-AHL-Receptors-3-VqmA	Non-AHL-Receptors	Chain A, VqmA	pdb 7DWM A	pdb 7DWM A
Non-AHL-Receptors-4-PhcR	Non-AHL-Receptors	hybrid sensor histidine kinase/response regulator [Ralstonia solanacearum]	WP_003262523.1	WP_003262523.1
Non-AHL-Receptors-5-OryR	Non-AHL-Receptors	Transcriptional regulator AhyR/AsaR family	CAH2707836.1	CAH2707836.1
PQS-Synthase-PqsABC	PQS-Synthase	Chain A, PQS biosynthetic enzyme	pdb 3H77 A	pdb 3H77 A
PQS-Receptor-PqsR	PQS-Receptor	transcriptional regulator PqsR	QDL04481.1	QDL04481.1
LuxS-1- <i>V. harveyi</i>	LuxS (AI-2-Synthase)	autoinducer-2 production protein LuxS [Vibrio harveyi]	AAD17292.1	AAD17292.1 ANW92499.1 NP-417172.1 AAR88507.1 CAL28543.1
LuxS-2- <i>S. pyogenes</i>	LuxS (AI-2-Synthase)	LuxS [Streptococcus pyogenes]	AAG28749.1	AAG28749.1 CDK34488.1
LuxS-3- <i>B. thuringiensis</i>	LuxS (AI-2-Synthase)	S-ribosylhomocysteine lyase LuxS [Bacillus thuringiensis]	OFC89811.1	OFC89811.1
LuxS-4- <i>B. heparinolyticus</i>	LuxS (AI-2-Synthase)	quorum-sensing autoinducer 2 (AI-2), LuxS [Bacteroides heparinolyticus]	VFB13531.1	WP-028584559.1 CDB53682.1 VFB13531.1
AI-2-Receptors-1-LsrR	AI-2-Receptors	Transcriptional regulator LsrR	Q8ZKQ5.1	Q8ZKQ5.1
AI-2-Receptors-2-LuxP	AI-2-Receptors	autoinducer 2-binding periplasmic protein LuxP	WP_137357207.1	WP_137357207.1

QQ-acylases-1-Aac	QQ-enzymes-acylases	acy-homoserine lactone acylase [Shewanella sp. MIB015]	BAF94155.1	BAF94155.1 WP-064663481.1
QQ-acylases-2-PfmA-MomL	QQ-enzymes-acylases	AhlA protein gene (translated)	ASS36259.1	ASS36259.1 KR232934.1 AKN24550.1 AKN24545.1 AKN24549.1 AKN24548.1 AKN24547.1 WP-034041734.1 AIY30473.1
QQ-acylases-3-PvdQ	QQ-enzymes-acylases	N-acylhomoserine lactone-degrading acylase [Streptomyces sp. M664]	NP-251075.1	NP-251075.1 NC-007005.1:2285834
QQ-acylases-4-QuiP-QlcA	QQ-enzymes-acylases	AHL acylase [[Ochrobactrum] quorumnocens]	AAG04421.1	AAG04421.1 ABV58973.1
QQ-acylases-5-PheA	QQ-enzymes-acylases	acylhomoserine lactone acylase [Acinetobacter sp. Ooi24]	KON65911.1	KON65911.1
QQ-acylases-6-HacB	QQ-enzymes-acylases	penicillin acylase family protein [Pseudoalteromonas sp. MQS005]	NC-007005.1:5764268-576655	NC-007005.1:5764268 NP-248996.1
QQ-acylases-7-KcPGA	QQ-enzymes-acylases	N-Acyl-L-homoserine lactone acylase [Acidovorax sp. MR-S7]	WP-061283079.1	WP-061283079.1
QQ-acylases-8-Aibp	QQ-enzymes-acylases	AHL acylase, partial [Pseudoalteromonas flavipulchra JG1]	AAL53453.1	AAL53453.1
QQ-acylases-9-AiiC	QQ-enzymes-acylases	acyl-homoserine lactone acylase PvdQ [Pseudomonas aeruginosa PAO1]	WP-010998065.1	WP-010998065.1
QQ-acylases-10-AhlA	QQ-enzymes-acylases	QuiP [Pseudomonas aeruginosa PAO1]	EU839661.1:1174-2145	EU839661.1:1174-214
QQ-acylases-11-AhlM	QQ-enzymes-acylases	P-protein [Komagataebacter europaeus]	AAT68473.1	WP-011002462.1 AAO41113.1 AAT68473.1
QQ-acylases-12-AiiO	QQ-enzymes-acylases	Pseudomonas syringae pv. syringae B728a (translated)	ADI80348.1	ADI80348.1
QQ-acylases-13-AmiE	QQ-enzymes-acylases	penicillin acylase family protein [Kluyvera cryocrescens]	BAP18758.1	BAP18758.1
QQ-acylases-14-APTM01	QQ-enzymes-acylases	penicillin acylase [Brucella melitensis bv. 1 str. 16M]	WP-064663184.1	WP-064663184.1
QQ-acylases-15-MacQ	QQ-enzymes-acylases	penicillin acylase family protein [Nostoc sp. PCC 7120]	BAV56778.1	BAV56778.1
QQ-lactonases-1-AidA	QQ-enzymes-lactonases	RecName: Full=Quorum-quenching protein AidA; AltName: Full=Quorum-quenching enzyme; Short=QQ enzyme	sp G2JHL6.1 AIDA-ACIBM	sp.G2JHL6.1.AIDA-AC ODA53988.1
QQ-lactonases-3-Bpi04	QQ-enzymes-lactonases	cold-adapted N-acylhomoserine lactonase Aii810 [uncultured bacterium]	ABU51107.1	ABU51107.1
QQ-lactonases-4-Bpi05	QQ-enzymes-lactonases	N-acylhomoserine lactonase [Microbacterium testaceum StLB037]	ABU51109.1	ABU51109.1
QQ-lactonases-5-AidB12C	QQ-enzymes-lactonases	acyl homoserine lactone degrading enzyme [Arthrobacter sp. IBN110]	MN240477.1	MN240477.1
QQ-lactonases-6-CarA/CarB	QQ-enzymes-lactonases	Klebsiella pneumoniae AhlK (ahlK) gene (translated)	EU162747.1	EU162747.1
QQ-lactonases-7-RmmL	QQ-enzymes-lactonases	Mammaliococcus sciuri ATCC 29060 ahlS gene for N-acylhomoserine lactonase (translated)	AYM45058.1	AYM45058.1
QQ-lactonases-8-Y2-AiiA	QQ-enzymes-lactonases	acylhomoserine lactonase [Chryseobacterium sp. StRB126]	KIQ72097.1	KIQ72097.1
QQ-lactonases-9-YtnP	QQ-enzymes-lactonases	putative metallohydrolase [Bacillus sp. 240B1]	KIQ73938.1	KIQ73938.1
QQ-lactonases-10-AidH	QQ-enzymes-lactonases	mlr6805 [Mesorhizobium japonicum MAFF 303099]	ACZ73823.1	ACZ73823.1
QQ-lactonases-11-Aii810	QQ-enzymes-lactonases	metallo-lactamase family protein [Muricauda olearia]	ASY06633.1	ASY06633.1
QQ-lactonases-12-AiiM	QQ-enzymes-lactonases	QlcA [uncultured Acidobacteria bacterium cosmid p2H8]	BAJ75775.1	BAJ75775.1
QQ-lactonases-13-AhlD	QQ-enzymes-lactonases	metal dependent hydrolase (plasmid) [Sinorhizobium fredii NGR234]	AAP57766.1	AAP57766.1
QQ-lactonases-14-AhlK	QQ-enzymes-lactonases	3-isopropylmalate dehydratase small subunit [Sphingomonas ursincola]	AY222324.1	AY222324.1 AWI14311.1 AY052389.1:3565-435
QQ-lactonases-15-AhIS	QQ-enzymes-lactonases	N-acyl homoserine lactonase family protein [Pseudorhizobium banfieldiae]	LC128625.1	AMS36875.1 BAK54003.1 LC128625.1 LC128626.1 LC128627.1 WP-049694637.1 BAO85041.1 sp.A9CKY2.1.AHLLB-A WP-021296945.1 WP-017434252.1
QQ-lactonases-16-AidC	QQ-enzymes-lactonases	Aryldialkylphosphatase [Sulfolobus islandicus M.16.4]	BAM28988.1	BAM28988.1
QQ-lactonases-17-AiiA	QQ-enzymes-lactonases	serum paraoxonase/arylesterase 1 precursor [Homo sapiens]	AAF62398.1	AAF62398.1 ADK91097.1 AHE80976.1 AHE80974.1 AKS43589.1 ALD49083.1 ALD49082.1 AHA91696.1 AHE80975.1 ALD49084.1 CAD44268.1
QQ-lactonases-18-mlr6805	QQ-enzymes-lactonases	Chain B, Organophosphorus hydrolase	BAB53031.1	BAB53031.1
QQ-lactonases-20-QsdR1	QQ-enzymes-lactonases	RND-type efflux transporter protein, partial [Pseudoalteromonas byunsanensis]	ACP23138.1	ACP23138.1
QQ-lactonases-21-QsdS	QQ-enzymes-lactonases	BpiB01 [uncultured bacterium Bio1]	BAV69341.1	BAV69341.1
QQ-lactonases-22-AHL-lactonase	QQ-enzymes-lactonases	BpiB04 [uncultured bacterium Bio7]	WP-052638829.1	WP-052638829.1
QQ-lactonases-23-SisLac	QQ-enzymes-lactonases	BpiB05 [uncultured bacterium Bio8]	ACR40964.1	ACR40964.1 sp.Q97VT7.1.PHP-SAC
QQ-lactonases-25-GsP	QQ-enzymes-lactonases	Pseudomonas sp. G carbamoyl-phosphate synthase small subunit (carA) and large subunit (carB) genes (translated)	pdb 3F4D B	pdb.4H9U.A pdb.3F4D.B
QQ-lactonases-26-MCP	QQ-enzymes-lactonases	RmmL, partial [Tritonibacter mobilis]	AAS06218.1	AAS06218.1 ASZ24809.1 AAT06802.1 pdb.4RE0.A
QQ-lactonases-27-QsdH	QQ-enzymes-lactonases	N-acyl homoserine lactonase [Acinetobacter baumannii]	AFV15299.1	AFV15299.1
QQ-lactonases-28-Bpi01	QQ-enzymes-lactonases	putative quorum-quenching lactonase YtnP [Acinetobacter baumannii]	ABU51084.1	ABU51084.1
QQ-paraoxonases-PON	QQ-enzymes-lactonases	Bosea thiooxidans strain 12C N-acylhomoserine lactonase gene (translated)	NP-000437.3	NP-000437.3 NP-000296.2 NP-000931.1

Supplementary Table S5. Identification codes and accession links to the 118 Human Microbiome Project supragingival shotgun metagenomes used in this study.

SRS ID	GFF3 Download	GFF3 File Size	Nucleotide Multifasta Download	Nucl. File Size	Protein Multifasta Download	Protein File Size	https://downloads.hmpdacc.org/
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SRS058808	/data/HMGI/supragingival_plaque/SRS058808.with_fasta.gff3.bz2	70325972	/data/HMGI/supragingival_plaque/SRS058808_nucleotide.fasta.bz2	34370510	/data/HMGI/supragingival_plaque/SRS058808_aa.fasta.bz2	22179417	https://downloads.hmpdacc.org/data/HMGI/supragingival_plaque/SRS058808_aa.fasta.bz2
SRS063603	/data/HMGI/supragingival_plaque/SRS063603.with_fasta.gff3.bz2	86435943	/data/HMGI/supragingival_plaque/SRS063603_nucleotide.fasta.bz2	41731925	/data/HMGI/supragingival_plaque/SRS063603_aa.fasta.bz2	26947524	https://downloads.hmpdacc.org/data/HMGI/supragingival_plaque/SRS063603_aa.fasta.bz2
SRS021960	/data/HMGI/supragingival_plaque/SRS021960.with_fasta.gff3.bz2	31873077	/data/HMGI/supragingival_plaque/SRS021960_nucleotide.fasta.bz2	15398083	/data/HMGI/supragingival_plaque/SRS021960_aa.fasta.bz2	9947254	https://downloads.hmpdacc.org/data/HMGI/supragingival_plaque/SRS021960_aa.fasta.bz2
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Supplementary Table S6. Accession numbers of the genomic sequences used to build the synthetic subgingival metagenome.

Species representative of the subgingival niche	Accession number
<i>Actinomyces oris</i> strain FDAARGOS_1051	GCF_016127955.1
<i>Aggregatibacter actinomycetemcomitans</i> strain 4S	GCF_023518055.1
<i>Campylobacter gracilis</i> ATCC 33236	GCF_001190745.1
<i>Capnocytophaga ochracea</i> DSM 7271	GCF_000023285.1
<i>Corynebacterium durum</i> F0235	GCF_000318135.1
<i>Fusobacterium nucleatum</i> subsp. <i>polymorphum</i> NCTC10562	GCF_001457555.1
<i>Haemophilus influenzae</i> strain 477	GCF_000931575.1
<i>Kingella oralis</i> DSM 18271	GCF_014054985.1
<i>Lautropia mirabilis</i> NCTC12852	GCF_900637555.1
<i>Leptotrichia buccalis</i> C-1013-b	GCF_000023905.1
<i>Neisseria mucosa</i> NCTC 10774	GCF_900454435.1
<i>Porphyromonas endodontalis</i> NCTC13058	GCF_900454815.1
<i>Porphyromonas gingivalis</i> ATCC 33277	GCF_000010505.1
<i>Prevotella intermedia</i> ATCC 25611	GCF_001953955.1
<i>Rothia dentocariosa</i> ATCC 17931	GCF_000164695.2
<i>Rothia dentocariosa</i> NCTC10207	GCF_900637985.1
<i>Rothia mucilaginosa</i> ATCC 25296	GCF_000175615.1
<i>Selenomonas noxia</i> F0398	GCF_000234135.1
<i>Streptococcus constellatus</i> NCTC11325	GCF_900459125.1
<i>Streptococcus oralis</i> ATCC 35037	GCF_900637025.1
<i>Treponema denticola</i> ATCC 35405	GCF_000008185.1
<i>Veillonella parvula</i> NCTC11810	GCF_900186885.1

Supplementary Table S7. Proportion (in percentage) of the bacterial genera present in supragingival and subgingival sites, based on the 16S rRNA gene information available in the Human Microbiome Project database.

Bacterial genera	Supragingival plaque (%)	Subgingival plaque (%)
<i>Fusobacterium</i>	5.1473649	11.0306199
<i>Streptococcus</i>	14.3459463	11.0177072
<i>Actinomyces</i>	9.4572169	8.0431097
<i>Capnocytophaga</i>	9.3199440	8.0406768
<i>Corynebacterium</i>	10.2235033	7.3093319
<i>Prevotella</i>	2.1991420	6.9427238
<i>Neisseria</i>	8.2208355	5.5408546
<i>Veillonella</i>	4.5956831	4.3777767
<i>Leptotrichia</i>	4.0932124	3.3846223
<i>Rothia</i>	4.9891865	3.3415800
<i>Porphyromonas</i>	2.7972597	3.2023475
<i>Haemophilus</i>	5.3980452	3.0346696
<i>Lautropia</i>	3.2964004	2.3076290
<i>Selenomonas</i>	1.1919804	2.2707623
<i>Treponema</i>	0.3487324	2.0424509
<i>Campylobacter</i>	1.0295470	1.4699883
<i>Kingella</i>	1.8552196	1.3339372
uncultured TM7	1.0104916	1.2755494
<i>Aggregatibacter</i>	1.5653184	1.2560867
<i>Propionibacterium</i>	1.2593219	1.2049974
<i>Alloprevotella</i>	0.4301342	0.9839845
<i>Bergeyella</i>	1.3508988	0.9658319
<i>Paludibacter</i>	0.2386551	0.9214796
<i>Candidata</i>	0.5979328	0.8191138
<i>Actinobaculum</i>	0.7102302	0.6671557
<i>Lactobacillus</i>	0.0234955	0.6417046
<i>Eikenella</i>	0.5043208	0.4949865
<i>Dialister</i>	0.0997171	0.4523185
<i>Tannerella</i>	0.1724237	0.3946792
<i>Lachnoanaerobaculum</i>	0.3505825	0.3765266
<i>Granulicatella</i>	0.4593648	0.3639882
Incertae	0.1628035	0.3364785
<i>Cardiobacterium</i>	0.3085866	0.2663009
<i>Comamonas</i>	0.1672436	0.2537625
<i>Catonella</i>	0.0899119	0.2386041
<i>Johnsonella</i>	0.1585484	0.2105330
<i>Abiotrophia</i>	0.3531725	0.2075388
<i>Staphylococcus</i>	0.0919470	0.1796548
<i>Atopobium</i>	0.0284906	0.1102257
<i>Oribacterium</i>	0.0294156	0.1047987
<i>Actinobacillus</i>	0.0958320	0.1008687
<i>Gracilibacteria</i>	0.1224726	0.0903888

Quorum jupyter notebook-2023

January 16, 2023

```
[2]: library(phyloseq)
library(ggplot2)
library('ggrepel')
library('vegan')
library('RColorBrewer')
```

Loading required package: permute

Loading required package: lattice

This is vegan 2.6-4

```
[3]: otu <- as.data.frame(read.table("tbout2023.clstr.tsv", header=T, row.names=1))
print(otu)
```

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AHL-Receptors-7	0	0	0	0	0	0	0
AHL-Synthases-1	0	1	0	0	0	14	0
LuxS-1	0	2	2	1	0	48	0
LuxS-2	0	3	1	1	0	26	0
LuxS-3	0	3	1	2	0	28	1
LuxS-4	0	1	1	0	0	1	0
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QQ-enzymes-acylases-3	0	0	0	0	0	0	0
QQ-enzymes-acylases-4	0	0	0	0	0	0	0
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QQ-enzymes-acylases-14	0	0	0	0	0	0	0

QQ-enzymes-acylases-15	0	0	0	0	0	0	0
QQ-enzymes-lactonases-1	0	1	2	2	2	16	3
QQ-enzymes-lactonases-6	0	0	0	0	0	0	0
QQ-enzymes-lactonases-7	0	0	0	0	0	0	0
QQ-enzymes-lactonases-8	0	0	0	0	0	0	0
QQ-enzymes-lactonases-9	0	0	0	0	0	0	0
QQ-enzymes-lactonases-13	0	0	0	0	0	0	0
QQ-enzymes-lactonases-14	0	1	2	2	2	16	3
QQ-enzymes-lactonases-15	0	0	0	0	0	0	0
QQ-enzymes-lactonases-16	0	0	0	0	0	0	0
QQ-enzymes-lactonases-18	0	0	0	0	0	0	0
QQ-enzymes-lactonases-19	0	0	0	0	0	0	0
QQ-enzymes-lactonases-20	0	1	2	4	1	0	2
QQ-enzymes-lactonases-24	0	0	0	0	0	0	0
QQ-enzymes-lactonases-25	0	10	7	15	6	163	12
QQ-enzymes-lactonases-26	0	0	0	0	0	0	0
QQ-enzymes-lactonases-27	0	0	0	0	0	0	0
QQ-enzymes-lactonases-28	0	0	0	0	0	0	0
DarABC-1	0	1	0	1	1	0	0
LsrR-1	0	0	0	0	0	0	0
LuxN-1	0	0	1	0	0	0	0
PqsABC-1	0	2	2	1	2	17	3
QscR-1	0	0	0	0	0	0	0
RpaR-1	0	0	0	0	0	0	0

SRS011098 SRS011126 SRS011152 SRS011255 SRS011343

AHL-Receptors-4	1	0	1	1	1
AHL-Receptors-6	2	3	2	2	2
AHL-Receptors-7	3	1	2	2	2
AHL-Synthases-1	3	5	4	5	2
LuxS-1	10	21	14	12	16
LuxS-2	8	16	15	10	11
LuxS-3	7	15	11	12	14
LuxS-4	10	14	9	13	7
QQ-enzymes-acylases-1	7	6	12	9	10
QQ-enzymes-acylases-3	0	2	0	0	0
QQ-enzymes-acylases-4	0	0	0	0	0
QQ-enzymes-acylases-5	3	12	9	6	12
QQ-enzymes-acylases-6	1	2	1	0	0
QQ-enzymes-acylases-7	0	2	0	0	0
QQ-enzymes-acylases-8	0	1	2	0	1
QQ-enzymes-acylases-9	0	2	0	0	0
QQ-enzymes-acylases-10	1	2	1	2	1
QQ-enzymes-acylases-11	5	1	7	7	8
QQ-enzymes-acylases-12	0	1	3	0	0
QQ-enzymes-acylases-13	0	1	2	0	0
QQ-enzymes-acylases-14	2	1	0	1	1
QQ-enzymes-acylases-15	2	4	5	2	2
QQ-enzymes-lactonases-1	17	18	8	21	14

QQ-enzymes-lactonases-6	0	2	0	0	0
QQ-enzymes-lactonases-7	0	0	0	0	0
QQ-enzymes-lactonases-8	0	1	1	2	0
QQ-enzymes-lactonases-9	0	0	0	0	0
QQ-enzymes-lactonases-13	0	0	1	2	0
QQ-enzymes-lactonases-14	16	13	6	17	13
QQ-enzymes-lactonases-15	0	1	0	0	0
QQ-enzymes-lactonases-16	1	2	0	1	1
QQ-enzymes-lactonases-18	1	3	1	1	0
QQ-enzymes-lactonases-19	1	1	0	1	0
QQ-enzymes-lactonases-20	19	23	13	25	20
QQ-enzymes-lactonases-24	1	2	1	1	0
QQ-enzymes-lactonases-25	59	133	89	116	88
QQ-enzymes-lactonases-26	3	4	2	3	3
QQ-enzymes-lactonases-27	0	0	0	0	0
QQ-enzymes-lactonases-28	3	5	3	3	2
DarABC-1	3	10	4	8	6
LsrR-1	3	5	5	4	7
LuxN-1	0	1	2	1	1
PqsABC-1	14	29	13	18	18
QscR-1	0	1	0	0	0
RpaR-1	1	1	2	2	2
	SRS012285	SRS013170	SRS013252	SRS013533	SRS013723
AHL-Receptors-4	0	1	0	1	1
AHL-Receptors-6	2	2	0	1	3
AHL-Receptors-7	2	2	0	2	3
AHL-Synthases-1	6	3	4	1	6
LuxS-1	23	17	19	11	26
LuxS-2	17	13	18	11	23
LuxS-3	16	14	10	14	20
LuxS-4	14	24	19	15	23
QQ-enzymes-acylases-1	11	15	17	8	16
QQ-enzymes-acylases-3	0	0	0	0	0
QQ-enzymes-acylases-4	0	0	0	0	0
QQ-enzymes-acylases-5	7	10	16	7	13
QQ-enzymes-acylases-6	0	0	0	1	1
QQ-enzymes-acylases-7	0	0	0	0	0
QQ-enzymes-acylases-8	1	1	2	2	3
QQ-enzymes-acylases-9	0	0	0	0	0
QQ-enzymes-acylases-10	2	1	1	0	2
QQ-enzymes-acylases-11	6	9	12	5	11
QQ-enzymes-acylases-12	1	1	1	1	2
QQ-enzymes-acylases-13	0	0	0	0	0
QQ-enzymes-acylases-14	1	1	0	1	1
QQ-enzymes-acylases-15	4	6	4	3	4
QQ-enzymes-lactonases-1	19	23	25	5	19
QQ-enzymes-lactonases-6	1	1	0	1	2
QQ-enzymes-lactonases-7	0	0	0	0	0

QQ-enzymes-lactonases-8	0	2	1	0	2
QQ-enzymes-lactonases-9	0	0	0	0	0
QQ-enzymes-lactonases-13	0	1	1	0	1
QQ-enzymes-lactonases-14	16	20	20	5	14
QQ-enzymes-lactonases-15	0	0	0	0	1
QQ-enzymes-lactonases-16	2	0	2	0	1
QQ-enzymes-lactonases-18	2	2	3	0	2
QQ-enzymes-lactonases-19	1	2	2	0	1
QQ-enzymes-lactonases-20	19	31	27	17	27
QQ-enzymes-lactonases-24	1	1	0	2	1
QQ-enzymes-lactonases-25	112	164	125	98	138
QQ-enzymes-lactonases-26	3	3	4	2	6
QQ-enzymes-lactonases-27	1	0	1	1	0
QQ-enzymes-lactonases-28	2	3	3	0	3
DarABC-1	10	11	6	4	10
LsrR-1	6	9	8	4	7
LuxN-1	3	2	2	0	1
PqsABC-1	22	33	26	20	27
QscR-1	0	0	0	0	0
RpaR-1	0	1	0	1	3
	SRS013836	SRS013949	SRS014476	SRS014578	SRS014690
AHL-Receptors-4	0	0	2	1	0
AHL-Receptors-6	0	1	3	2	0
AHL-Receptors-7	0	1	2	2	0
AHL-Synthases-1	1	4	4	6	1
LuxS-1	6	12	13	12	12
LuxS-2	5	10	7	12	10
LuxS-3	6	12	10	14	10
LuxS-4	15	10	11	9	10
QQ-enzymes-acylases-1	5	11	10	6	13
QQ-enzymes-acylases-3	0	0	1	0	0
QQ-enzymes-acylases-4	0	0	0	0	0
QQ-enzymes-acylases-5	6	8	10	10	8
QQ-enzymes-acylases-6	0	0	1	0	0
QQ-enzymes-acylases-7	0	0	1	0	0
QQ-enzymes-acylases-8	0	1	0	0	4
QQ-enzymes-acylases-9	0	0	1	0	0
QQ-enzymes-acylases-10	0	1	2	0	0
QQ-enzymes-acylases-11	5	6	6	5	8
QQ-enzymes-acylases-12	0	1	1	0	3
QQ-enzymes-acylases-13	0	0	0	0	0
QQ-enzymes-acylases-14	0	0	1	0	0
QQ-enzymes-acylases-15	0	4	2	1	5
QQ-enzymes-lactonases-1	8	17	11	22	11
QQ-enzymes-lactonases-6	1	1	1	0	1
QQ-enzymes-lactonases-7	0	0	0	0	0
QQ-enzymes-lactonases-8	0	1	3	4	1
QQ-enzymes-lactonases-9	0	0	0	0	0

QQ-enzymes-lactonases-13	0	1	0	1	0
QQ-enzymes-lactonases-14	6	12	11	19	10
QQ-enzymes-lactonases-15	1	0	0	0	0
QQ-enzymes-lactonases-16	1	1	0	2	0
QQ-enzymes-lactonases-18	0	3	0	1	1
QQ-enzymes-lactonases-19	0	2	0	1	1
QQ-enzymes-lactonases-20	14	10	15	20	7
QQ-enzymes-lactonases-24	0	1	1	1	0
QQ-enzymes-lactonases-25	102	66	92	92	62
QQ-enzymes-lactonases-26	1	2	2	2	2
QQ-enzymes-lactonases-27	1	0	0	0	0
QQ-enzymes-lactonases-28	0	3	2	3	3
DarABC-1	1	6	6	8	4
LsrR-1	2	5	1	4	3
LuxN-1	0	1	2	2	0
PqsABC-1	15	9	17	17	9
QscR-1	0	0	1	0	0
RpaR-1	0	1	2	2	0
	SRS014894	SRS015044	SRS015063	SRS015158	SRS015215
AHL-Receptors-4	0	1	4	0	0
AHL-Receptors-6	3	0	4	0	0
AHL-Receptors-7	1	1	5	0	0
AHL-Synthases-1	6	3	6	2	1
LuxS-1	7	13	8	7	19
LuxS-2	7	13	7	5	17
LuxS-3	7	13	10	6	13
LuxS-4	2	13	2	5	16
QQ-enzymes-acylases-1	6	9	4	7	10
QQ-enzymes-acylases-3	0	0	1	0	0
QQ-enzymes-acylases-4	0	0	0	0	0
QQ-enzymes-acylases-5	5	10	4	2	10
QQ-enzymes-acylases-6	0	0	0	0	0
QQ-enzymes-acylases-7	0	0	1	0	0
QQ-enzymes-acylases-8	1	1	0	0	0
QQ-enzymes-acylases-9	0	0	1	0	0
QQ-enzymes-acylases-10	0	1	1	0	0
QQ-enzymes-acylases-11	3	5	1	3	9
QQ-enzymes-acylases-12	0	2	0	0	0
QQ-enzymes-acylases-13	0	0	0	0	0
QQ-enzymes-acylases-14	0	2	0	0	0
QQ-enzymes-acylases-15	3	3	2	4	1
QQ-enzymes-lactonases-1	13	13	15	13	11
QQ-enzymes-lactonases-6	0	1	1	2	0
QQ-enzymes-lactonases-7	0	0	0	0	0
QQ-enzymes-lactonases-8	2	2	2	1	1
QQ-enzymes-lactonases-9	0	0	0	0	0
QQ-enzymes-lactonases-13	1	1	1	0	1
QQ-enzymes-lactonases-14	11	10	13	13	9

QQ-enzymes-lactonases-15	0	0	0	0	0
QQ-enzymes-lactonases-16	0	1	1	0	1
QQ-enzymes-lactonases-18	1	1	1	0	1
QQ-enzymes-lactonases-19	0	0	0	0	1
QQ-enzymes-lactonases-20	8	19	10	11	21
QQ-enzymes-lactonases-24	1	0	2	0	0
QQ-enzymes-lactonases-25	74	101	50	68	125
QQ-enzymes-lactonases-26	3	3	3	2	1
QQ-enzymes-lactonases-27	1	1	0	1	0
QQ-enzymes-lactonases-28	3	1	3	3	0
DarABC-1	8	5	5	6	6
LsrR-1	2	2	2	2	3
LuxN-1	1	1	0	2	0
PqsABC-1	10	12	10	9	16
QscR-1	0	0	1	0	0
RpaR-1	0	0	4	0	0
	SRS015278	SRS015378	SRS015440	SRS015470	SRS015574
AHL-Receptors-4	0	0	3	3	0
AHL-Receptors-6	0	0	3	4	0
AHL-Receptors-7	0	0	4	5	0
AHL-Synthases-1	1	2	3	3	7
LuxS-1	7	5	12	16	14
LuxS-2	8	3	15	14	12
LuxS-3	10	7	14	16	12
LuxS-4	10	2	8	11	17
QQ-enzymes-acylases-1	4	5	14	12	13
QQ-enzymes-acylases-3	0	0	1	1	0
QQ-enzymes-acylases-4	0	0	0	0	0
QQ-enzymes-acylases-5	6	3	7	12	9
QQ-enzymes-acylases-6	0	0	1	2	1
QQ-enzymes-acylases-7	0	0	1	1	0
QQ-enzymes-acylases-8	0	1	3	3	2
QQ-enzymes-acylases-9	0	0	1	1	0
QQ-enzymes-acylases-10	1	0	1	2	2
QQ-enzymes-acylases-11	3	2	8	6	9
QQ-enzymes-acylases-12	0	1	3	2	2
QQ-enzymes-acylases-13	0	1	1	1	0
QQ-enzymes-acylases-14	0	1	1	3	1
QQ-enzymes-acylases-15	0	3	5	4	3
QQ-enzymes-lactonases-1	16	6	16	15	15
QQ-enzymes-lactonases-6	1	2	2	2	3
QQ-enzymes-lactonases-7	0	0	0	0	0
QQ-enzymes-lactonases-8	2	0	2	2	1
QQ-enzymes-lactonases-9	0	0	0	0	0
QQ-enzymes-lactonases-13	2	0	1	1	0
QQ-enzymes-lactonases-14	13	6	13	13	13
QQ-enzymes-lactonases-15	0	0	0	0	1
QQ-enzymes-lactonases-16	0	0	1	0	1

QQ-enzymes-lactonases-18	1	0	1	1	1
QQ-enzymes-lactonases-19	0	0	1	1	1
QQ-enzymes-lactonases-20	11	2	11	14	26
QQ-enzymes-lactonases-24	0	0	1	2	0
QQ-enzymes-lactonases-25	78	39	71	79	126
QQ-enzymes-lactonases-26	3	1	1	1	3
QQ-enzymes-lactonases-27	0	0	1	1	0
QQ-enzymes-lactonases-28	2	0	3	2	2
DarABC-1	3	1	6	5	9
LsrR-1	4	2	5	7	7
LuxN-1	2	0	1	3	0
PqsABC-1	10	2	13	16	20
QscR-1	0	0	1	1	0
RpaR-1	0	0	3	4	0
	SRS015650	SRS015755	SRS015803	SRS015899	SRS015947
AHL-Receptors-4	1	0	0	0	0
AHL-Receptors-6	2	0	0	1	0
AHL-Receptors-7	2	0	0	1	0
AHL-Synthases-1	3	3	5	5	2
LuxS-1	6	4	17	13	4
LuxS-2	7	5	12	8	6
LuxS-3	8	4	14	13	6
LuxS-4	3	5	14	8	4
QQ-enzymes-acylases-1	1	2	8	7	4
QQ-enzymes-acylases-3	0	0	0	0	0
QQ-enzymes-acylases-4	0	0	1	0	0
QQ-enzymes-acylases-5	3	1	3	3	6
QQ-enzymes-acylases-6	0	0	1	0	0
QQ-enzymes-acylases-7	0	0	0	0	0
QQ-enzymes-acylases-8	0	0	3	0	0
QQ-enzymes-acylases-9	0	0	0	0	0
QQ-enzymes-acylases-10	0	2	0	1	2
QQ-enzymes-acylases-11	1	0	4	5	2
QQ-enzymes-acylases-12	0	0	2	0	0
QQ-enzymes-acylases-13	0	0	0	0	0
QQ-enzymes-acylases-14	0	1	2	0	1
QQ-enzymes-acylases-15	0	2	4	2	1
QQ-enzymes-lactonases-1	10	9	11	15	10
QQ-enzymes-lactonases-6	0	1	1	2	0
QQ-enzymes-lactonases-7	0	0	0	0	0
QQ-enzymes-lactonases-8	1	1	0	1	1
QQ-enzymes-lactonases-9	0	1	0	0	0
QQ-enzymes-lactonases-13	1	1	0	0	0
QQ-enzymes-lactonases-14	9	7	10	13	9
QQ-enzymes-lactonases-15	0	0	0	0	1
QQ-enzymes-lactonases-16	0	0	0	0	0
QQ-enzymes-lactonases-18	0	1	1	2	0
QQ-enzymes-lactonases-19	0	0	0	1	0

QQ-enzymes-lactonases-20	12	13	12	14	8
QQ-enzymes-lactonases-24	1	0	0	2	0
QQ-enzymes-lactonases-25	52	50	59	66	43
QQ-enzymes-lactonases-26	2	3	2	4	0
QQ-enzymes-lactonases-27	1	1	0	0	0
QQ-enzymes-lactonases-28	1	4	2	3	0
DarABC-1	4	2	10	7	3
LsrR-1	0	1	2	2	1
LuxN-1	0	1	2	0	0
PqsABC-1	6	5	18	16	6
QscR-1	0	0	0	0	0
RpaR-1	2	0	0	0	0
	SRS015989	SRS016043	SRS016092	SRS016200	SRS016331
AHL-Receptors-4	0	1	0	1	1
AHL-Receptors-6	0	1	1	1	0
AHL-Receptors-7	0	3	1	1	2
AHL-Synthases-1	4	5	4	5	3
LuxS-1	11	15	9	8	6
LuxS-2	11	12	9	8	3
LuxS-3	12	12	12	12	6
LuxS-4	5	11	4	4	8
QQ-enzymes-acylases-1	4	4	5	10	9
QQ-enzymes-acylases-3	0	0	0	0	0
QQ-enzymes-acylases-4	0	0	0	0	0
QQ-enzymes-acylases-5	6	9	3	10	15
QQ-enzymes-acylases-6	0	0	0	0	0
QQ-enzymes-acylases-7	0	0	0	0	0
QQ-enzymes-acylases-8	1	0	2	0	0
QQ-enzymes-acylases-9	0	0	0	0	0
QQ-enzymes-acylases-10	1	0	0	0	0
QQ-enzymes-acylases-11	1	3	3	6	7
QQ-enzymes-acylases-12	1	0	2	0	0
QQ-enzymes-acylases-13	0	0	1	0	0
QQ-enzymes-acylases-14	1	1	1	0	0
QQ-enzymes-acylases-15	3	1	2	4	2
QQ-enzymes-lactonases-1	12	18	9	12	9
QQ-enzymes-lactonases-6	1	1	0	2	2
QQ-enzymes-lactonases-7	0	0	0	0	0
QQ-enzymes-lactonases-8	2	2	1	3	0
QQ-enzymes-lactonases-9	0	0	0	0	0
QQ-enzymes-lactonases-13	1	2	0	1	0
QQ-enzymes-lactonases-14	9	15	8	10	7
QQ-enzymes-lactonases-15	0	0	0	0	0
QQ-enzymes-lactonases-16	1	1	0	0	1
QQ-enzymes-lactonases-18	2	1	1	1	1
QQ-enzymes-lactonases-19	2	1	1	1	0
QQ-enzymes-lactonases-20	17	17	13	14	10
QQ-enzymes-lactonases-24	0	1	0	1	0

QQ-enzymes-lactonases-25	77	78	40	75	89
QQ-enzymes-lactonases-26	3	4	0	2	0
QQ-enzymes-lactonases-27	1	1	0	1	1
QQ-enzymes-lactonases-28	2	4	1	2	0
DarABC-1	6	1	3	4	7
LsrR-1	3	2	0	6	3
LuxN-1	0	1	0	0	3
PqsABC-1	14	12	15	13	11
QscR-1	0	0	0	0	0
RpaR-1	0	1	1	1	0
	SRS016360	SRS016575	SRS016746	SRS017025	SRS017139
AHL-Receptors-4	1	1	0	0	2
AHL-Receptors-6	2	0	0	2	2
AHL-Receptors-7	2	2	0	1	3
AHL-Synthases-1	6	9	4	4	3
LuxS-1	15	22	12	11	14
LuxS-2	13	17	11	13	13
LuxS-3	13	19	10	17	13
LuxS-4	10	16	13	6	10
QQ-enzymes-acylases-1	3	15	7	3	12
QQ-enzymes-acylases-3	0	0	0	0	0
QQ-enzymes-acylases-4	0	0	0	0	0
QQ-enzymes-acylases-5	7	14	9	6	11
QQ-enzymes-acylases-6	0	0	0	0	0
QQ-enzymes-acylases-7	0	0	0	0	0
QQ-enzymes-acylases-8	0	2	0	0	0
QQ-enzymes-acylases-9	0	0	0	0	0
QQ-enzymes-acylases-10	0	0	1	0	1
QQ-enzymes-acylases-11	1	11	6	2	8
QQ-enzymes-acylases-12	0	1	0	0	1
QQ-enzymes-acylases-13	0	0	0	0	0
QQ-enzymes-acylases-14	0	1	0	0	0
QQ-enzymes-acylases-15	2	4	1	1	3
QQ-enzymes-lactonases-1	9	21	14	13	15
QQ-enzymes-lactonases-6	0	2	1	2	1
QQ-enzymes-lactonases-7	0	0	1	0	0
QQ-enzymes-lactonases-8	2	3	1	2	1
QQ-enzymes-lactonases-9	0	0	0	0	0
QQ-enzymes-lactonases-13	0	2	0	2	0
QQ-enzymes-lactonases-14	7	17	13	9	12
QQ-enzymes-lactonases-15	0	0	0	1	0
QQ-enzymes-lactonases-16	1	2	1	0	2
QQ-enzymes-lactonases-18	2	2	0	1	3
QQ-enzymes-lactonases-19	2	2	0	0	3
QQ-enzymes-lactonases-20	15	26	18	12	20
QQ-enzymes-lactonases-24	0	1	0	1	1
QQ-enzymes-lactonases-25	70	140	95	60	132
QQ-enzymes-lactonases-26	4	5	2	2	2

QQ-enzymes-lactonases-27	0	1	1	0	0
QQ-enzymes-lactonases-28	3	3	1	2	1
DarABC-1	10	8	7	6	10
LsrR-1	1	5	6	1	7
LuxN-1	2	1	0	1	2
PqsABC-1	19	33	18	8	29
QscR-1	0	0	0	0	1
RpaR-1	2	0	0	1	2
	SRS017227	SRS017304	SRS017445	SRS017511	SRS017691
AHL-Receptors-4	4	3	1	1	1
AHL-Receptors-6	6	4	2	2	2
AHL-Receptors-7	6	4	2	2	2
AHL-Synthases-1	7	4	6	4	5
LuxS-1	24	15	17	12	12
LuxS-2	19	12	16	7	11
LuxS-3	23	13	15	10	14
LuxS-4	32	8	13	16	24
QQ-enzymes-acylases-1	18	10	14	10	14
QQ-enzymes-acylases-3	1	2	0	0	0
QQ-enzymes-acylases-4	0	0	0	0	0
QQ-enzymes-acylases-5	18	7	12	11	11
QQ-enzymes-acylases-6	0	0	0	1	0
QQ-enzymes-acylases-7	1	2	0	0	0
QQ-enzymes-acylases-8	3	0	3	2	2
QQ-enzymes-acylases-9	1	2	0	0	0
QQ-enzymes-acylases-10	0	1	2	2	0
QQ-enzymes-acylases-11	11	7	6	6	11
QQ-enzymes-acylases-12	2	0	2	1	1
QQ-enzymes-acylases-13	1	0	0	0	0
QQ-enzymes-acylases-14	1	1	2	1	0
QQ-enzymes-acylases-15	6	2	6	4	3
QQ-enzymes-lactonases-1	29	22	22	21	21
QQ-enzymes-lactonases-6	2	0	1	1	1
QQ-enzymes-lactonases-7	0	0	0	0	0
QQ-enzymes-lactonases-8	3	2	2	2	1
QQ-enzymes-lactonases-9	0	1	0	0	0
QQ-enzymes-lactonases-13	1	1	1	1	0
QQ-enzymes-lactonases-14	25	21	17	16	19
QQ-enzymes-lactonases-15	0	0	0	0	1
QQ-enzymes-lactonases-16	2	0	2	3	0
QQ-enzymes-lactonases-18	2	0	3	3	1
QQ-enzymes-lactonases-19	2	0	1	2	0
QQ-enzymes-lactonases-20	38	12	19	33	25
QQ-enzymes-lactonases-24	1	1	1	1	0
QQ-enzymes-lactonases-25	175	85	96	106	147
QQ-enzymes-lactonases-26	3	3	2	2	1
QQ-enzymes-lactonases-27	0	0	0	1	0
QQ-enzymes-lactonases-28	4	3	3	2	3

DarABC-1	15	4	7	8	10
LsrR-1	10	3	9	5	4
LuxN-1	1	0	1	3	1
PqsABC-1	46	12	23	22	29
QscR-1	1	1	0	0	0
RpaR-1	4	4	2	2	2
	SRS017814	SRS018157	SRS018337	SRS018394	SRS018573
AHL-Receptors-4	2	1	0	1	1
AHL-Receptors-6	4	3	0	1	1
AHL-Receptors-7	3	1	0	2	1
AHL-Synthases-1	3	6	3	4	2
LuxS-1	4	18	11	14	12
LuxS-2	2	10	5	8	11
LuxS-3	3	13	8	9	14
LuxS-4	2	14	4	12	9
QQ-enzymes-acylases-1	0	8	2	5	6
QQ-enzymes-acylases-3	0	1	0	0	0
QQ-enzymes-acylases-4	0	0	0	0	0
QQ-enzymes-acylases-5	1	12	7	9	7
QQ-enzymes-acylases-6	0	0	0	0	0
QQ-enzymes-acylases-7	0	2	0	0	0
QQ-enzymes-acylases-8	0	2	0	0	0
QQ-enzymes-acylases-9	0	2	0	0	0
QQ-enzymes-acylases-10	0	1	0	1	2
QQ-enzymes-acylases-11	0	3	2	2	3
QQ-enzymes-acylases-12	0	2	0	0	0
QQ-enzymes-acylases-13	0	1	0	0	0
QQ-enzymes-acylases-14	0	1	0	0	0
QQ-enzymes-acylases-15	0	4	0	3	1
QQ-enzymes-lactonases-1	6	19	10	16	9
QQ-enzymes-lactonases-6	1	2	2	0	2
QQ-enzymes-lactonases-7	0	0	0	0	0
QQ-enzymes-lactonases-8	2	3	0	1	1
QQ-enzymes-lactonases-9	1	0	0	0	0
QQ-enzymes-lactonases-13	1	2	0	0	1
QQ-enzymes-lactonases-14	5	15	10	15	7
QQ-enzymes-lactonases-15	0	0	0	0	0
QQ-enzymes-lactonases-16	0	1	0	0	0
QQ-enzymes-lactonases-18	0	2	0	1	1
QQ-enzymes-lactonases-19	0	1	0	1	0
QQ-enzymes-lactonases-20	4	22	5	22	16
QQ-enzymes-lactonases-24	2	2	0	1	1
QQ-enzymes-lactonases-25	52	108	49	99	82
QQ-enzymes-lactonases-26	3	6	2	3	5
QQ-enzymes-lactonases-27	1	1	0	1	0
QQ-enzymes-lactonases-28	3	3	2	3	5
DarABC-1	3	15	1	11	8
LsrR-1	1	7	2	3	5

LuxN-1	0	3	0	0	2
PqsABC-1	5	26	7	16	14
QscR-1	0	1	0	0	0
RpaR-1	0	1	0	0	0
	SRS018665	SRS018778	SRS018975	SRS019028	SRS019077
AHL-Receptors-4	1	0	1	0	0
AHL-Receptors-6	1	0	2	0	1
AHL-Receptors-7	2	0	2	0	2
AHL-Synthases-1	8	1	7	2	3
LuxS-1	20	2	16	18	11
LuxS-2	16	2	14	13	13
LuxS-3	16	3	18	13	13
LuxS-4	15	1	12	13	11
QQ-enzymes-acylases-1	15	1	7	9	10
QQ-enzymes-acylases-3	0	0	0	0	0
QQ-enzymes-acylases-4	0	0	0	0	0
QQ-enzymes-acylases-5	11	1	6	10	9
QQ-enzymes-acylases-6	1	0	0	1	1
QQ-enzymes-acylases-7	0	0	0	0	0
QQ-enzymes-acylases-8	5	0	0	2	2
QQ-enzymes-acylases-9	0	0	0	0	0
QQ-enzymes-acylases-10	1	0	2	0	1
QQ-enzymes-acylases-11	6	1	5	5	5
QQ-enzymes-acylases-12	5	0	0	3	1
QQ-enzymes-acylases-13	1	0	0	0	0
QQ-enzymes-acylases-14	2	0	0	0	2
QQ-enzymes-acylases-15	8	0	2	3	5
QQ-enzymes-lactonases-1	12	5	19	8	12
QQ-enzymes-lactonases-6	0	1	1	0	1
QQ-enzymes-lactonases-7	0	0	0	0	0
QQ-enzymes-lactonases-8	2	0	2	2	1
QQ-enzymes-lactonases-9	0	0	0	0	0
QQ-enzymes-lactonases-13	1	0	1	0	0
QQ-enzymes-lactonases-14	9	5	15	7	10
QQ-enzymes-lactonases-15	0	0	0	0	0
QQ-enzymes-lactonases-16	0	0	2	1	2
QQ-enzymes-lactonases-18	2	0	3	1	1
QQ-enzymes-lactonases-19	0	0	2	1	1
QQ-enzymes-lactonases-20	20	5	22	19	18
QQ-enzymes-lactonases-24	1	0	1	0	1
QQ-enzymes-lactonases-25	104	25	80	83	87
QQ-enzymes-lactonases-26	3	0	3	2	2
QQ-enzymes-lactonases-27	0	0	1	0	1
QQ-enzymes-lactonases-28	3	0	3	2	3
DarABC-1	11	2	8	3	11
LsrR-1	6	0	5	1	3
LuxN-1	0	0	1	1	2
PqsABC-1	23	3	22	20	14

QscR-1	0	0	0	0	0
RpaR-1	1	0	2	0	0
	SRS019128	SRS019225	SRS019333	SRS019387	SRS019591
AHL-Receptors-4	0	0	0	0	0
AHL-Receptors-6	0	2	1	0	0
AHL-Receptors-7	1	1	1	0	0
AHL-Synthases-1	4	3	2	3	3
LuxS-1	11	6	3	8	12
LuxS-2	9	7	5	7	18
LuxS-3	10	8	7	9	15
LuxS-4	10	6	4	5	8
QQ-enzymes-acylases-1	8	3	4	8	8
QQ-enzymes-acylases-3	0	0	0	0	0
QQ-enzymes-acylases-4	0	0	0	0	0
QQ-enzymes-acylases-5	7	4	5	2	8
QQ-enzymes-acylases-6	0	0	0	0	1
QQ-enzymes-acylases-7	0	0	0	0	0
QQ-enzymes-acylases-8	1	0	0	0	2
QQ-enzymes-acylases-9	0	0	0	0	0
QQ-enzymes-acylases-10	0	1	1	3	1
QQ-enzymes-acylases-11	3	2	2	5	4
QQ-enzymes-acylases-12	1	0	0	0	1
QQ-enzymes-acylases-13	0	0	0	0	0
QQ-enzymes-acylases-14	0	0	0	1	0
QQ-enzymes-acylases-15	5	1	2	2	3
QQ-enzymes-lactonases-1	13	12	10	15	15
QQ-enzymes-lactonases-6	1	0	3	1	2
QQ-enzymes-lactonases-7	0	0	0	0	0
QQ-enzymes-lactonases-8	1	2	1	0	1
QQ-enzymes-lactonases-9	0	0	0	0	0
QQ-enzymes-lactonases-13	0	2	1	0	0
QQ-enzymes-lactonases-14	9	9	9	14	14
QQ-enzymes-lactonases-15	0	0	0	0	0
QQ-enzymes-lactonases-16	2	0	0	0	1
QQ-enzymes-lactonases-18	4	1	0	1	1
QQ-enzymes-lactonases-19	3	0	0	0	1
QQ-enzymes-lactonases-20	18	8	4	7	10
QQ-enzymes-lactonases-24	0	2	2	0	0
QQ-enzymes-lactonases-25	105	67	48	69	68
QQ-enzymes-lactonases-26	1	2	4	1	2
QQ-enzymes-lactonases-27	0	0	0	0	0
QQ-enzymes-lactonases-28	2	2	4	0	1
DarABC-1	12	4	3	3	4
LsrR-1	5	5	2	5	2
LuxN-1	2	0	0	0	1
PqsABC-1	15	11	5	3	12
QscR-1	0	0	0	0	0
RpaR-1	0	0	0	0	0

	SRS019906	SRS019980	SRS020226	SRS020340	SRS020862
AHL-Receptors-4	0	1	1	1	0
AHL-Receptors-6	0	2	1	2	0
AHL-Receptors-7	0	2	2	2	0
AHL-Synthases-1	6	4	5	1	2
LuxS-1	8	16	18	13	7
LuxS-2	6	19	16	14	10
LuxS-3	6	17	13	16	8
LuxS-4	8	16	17	10	4
QQ-enzymes-acylases-1	4	12	9	10	6
QQ-enzymes-acylases-3	0	0	0	0	0
QQ-enzymes-acylases-4	0	0	0	0	0
QQ-enzymes-acylases-5	6	12	14	6	4
QQ-enzymes-acylases-6	0	0	0	1	0
QQ-enzymes-acylases-7	0	0	0	0	0
QQ-enzymes-acylases-8	0	2	0	0	0
QQ-enzymes-acylases-9	0	0	0	0	0
QQ-enzymes-acylases-10	0	0	0	3	0
QQ-enzymes-acylases-11	3	9	8	6	5
QQ-enzymes-acylases-12	0	1	1	0	0
QQ-enzymes-acylases-13	0	0	0	0	0
QQ-enzymes-acylases-14	0	0	0	1	1
QQ-enzymes-acylases-15	1	3	0	4	1
QQ-enzymes-lactonases-1	10	16	21	9	9
QQ-enzymes-lactonases-6	0	1	1	1	1
QQ-enzymes-lactonases-7	0	0	0	0	0
QQ-enzymes-lactonases-8	3	2	2	1	0
QQ-enzymes-lactonases-9	0	0	0	0	0
QQ-enzymes-lactonases-13	0	1	2	1	0
QQ-enzymes-lactonases-14	9	13	16	7	9
QQ-enzymes-lactonases-15	0	0	1	0	0
QQ-enzymes-lactonases-16	1	1	1	0	0
QQ-enzymes-lactonases-18	1	2	2	1	0
QQ-enzymes-lactonases-19	1	1	2	1	0
QQ-enzymes-lactonases-20	13	34	25	11	10
QQ-enzymes-lactonases-24	0	1	1	1	0
QQ-enzymes-lactonases-25	52	123	105	85	51
QQ-enzymes-lactonases-26	2	3	2	2	1
QQ-enzymes-lactonases-27	0	0	0	0	1
QQ-enzymes-lactonases-28	1	3	2	1	0
DarABC-1	8	9	8	3	3
LsrR-1	1	3	7	3	2
LuxN-1	0	1	1	0	0
PqsABC-1	10	28	23	7	7
QscR-1	0	0	0	0	0
RpaR-1	0	2	0	1	0
	SRS021477	SRS021960	SRS022083	SRS022149	SRS022536
AHL-Receptors-4	2	0	0	0	0

AHL-Receptors-6	3	0	2	0	0
AHL-Receptors-7	3	0	2	0	0
AHL-Synthases-1	5	3	2	1	3
LuxS-1	15	7	8	5	21
LuxS-2	16	7	9	6	22
LuxS-3	16	9	8	6	22
LuxS-4	9	7	6	9	20
QQ-enzymes-acylases-1	9	5	7	8	16
QQ-enzymes-acylases-3	0	0	0	0	0
QQ-enzymes-acylases-4	0	0	0	0	0
QQ-enzymes-acylases-5	14	7	5	9	12
QQ-enzymes-acylases-6	1	0	0	0	0
QQ-enzymes-acylases-7	0	0	0	0	0
QQ-enzymes-acylases-8	0	0	0	0	2
QQ-enzymes-acylases-9	0	0	0	0	0
QQ-enzymes-acylases-10	2	0	2	0	1
QQ-enzymes-acylases-11	6	4	5	8	11
QQ-enzymes-acylases-12	0	0	0	0	1
QQ-enzymes-acylases-13	0	0	0	0	1
QQ-enzymes-acylases-14	3	0	1	0	1
QQ-enzymes-acylases-15	3	1	1	0	5
QQ-enzymes-lactonases-1	18	10	9	10	20
QQ-enzymes-lactonases-6	3	1	0	0	1
QQ-enzymes-lactonases-7	0	0	0	0	0
QQ-enzymes-lactonases-8	1	0	1	0	1
QQ-enzymes-lactonases-9	0	1	0	0	0
QQ-enzymes-lactonases-13	1	0	0	0	1
QQ-enzymes-lactonases-14	16	9	9	8	15
QQ-enzymes-lactonases-15	0	0	0	0	1
QQ-enzymes-lactonases-16	0	0	0	1	1
QQ-enzymes-lactonases-18	1	1	0	2	2
QQ-enzymes-lactonases-19	0	0	0	1	3
QQ-enzymes-lactonases-20	27	22	10	10	33
QQ-enzymes-lactonases-24	1	0	1	1	1
QQ-enzymes-lactonases-25	113	61	60	82	124
QQ-enzymes-lactonases-26	2	0	5	1	4
QQ-enzymes-lactonases-27	1	0	0	0	1
QQ-enzymes-lactonases-28	2	0	2	2	4
DarABC-1	4	4	4	0	10
LsrR-1	8	2	2	4	6
LuxN-1	0	0	1	1	1
PqsABC-1	24	10	8	7	25
QscR-1	1	0	0	0	0
RpaR-1	2	0	0	0	0
SRS022725 SRS023358 SRS023538 SRS023595 SRS023938					
AHL-Receptors-4	1	0	0	1	1
AHL-Receptors-6	2	0	0	1	2
AHL-Receptors-7	2	0	0	2	2

AHL-Synthases-1	5	1	2	7	3
LuxS-1	22	12	13	16	17
LuxS-2	17	10	13	14	16
LuxS-3	19	11	15	15	15
LuxS-4	20	8	7	22	15
QQ-enzymes-acylases-1	13	4	5	18	5
QQ-enzymes-acylases-3	0	0	0	0	0
QQ-enzymes-acylases-4	0	0	0	0	0
QQ-enzymes-acylases-5	9	2	3	16	12
QQ-enzymes-acylases-6	2	0	0	0	0
QQ-enzymes-acylases-7	0	0	0	0	0
QQ-enzymes-acylases-8	1	2	0	2	0
QQ-enzymes-acylases-9	0	0	0	0	0
QQ-enzymes-acylases-10	1	1	0	1	0
QQ-enzymes-acylases-11	11	1	5	12	5
QQ-enzymes-acylases-12	1	2	0	2	0
QQ-enzymes-acylases-13	0	1	0	0	0
QQ-enzymes-acylases-14	1	2	0	1	0
QQ-enzymes-acylases-15	2	3	0	5	0
QQ-enzymes-lactonases-1	27	8	13	20	17
QQ-enzymes-lactonases-6	2	0	2	0	0
QQ-enzymes-lactonases-7	0	0	0	0	0
QQ-enzymes-lactonases-8	4	1	2	1	1
QQ-enzymes-lactonases-9	0	0	0	0	0
QQ-enzymes-lactonases-13	3	1	2	0	1
QQ-enzymes-lactonases-14	20	6	9	19	13
QQ-enzymes-lactonases-15	0	0	1	0	0
QQ-enzymes-lactonases-16	1	1	0	0	2
QQ-enzymes-lactonases-18	4	0	1	1	2
QQ-enzymes-lactonases-19	1	0	0	0	2
QQ-enzymes-lactonases-20	40	8	14	23	28
QQ-enzymes-lactonases-24	1	0	0	1	1
QQ-enzymes-lactonases-25	128	53	59	172	106
QQ-enzymes-lactonases-26	4	3	4	6	3
QQ-enzymes-lactonases-27	1	1	0	1	0
QQ-enzymes-lactonases-28	3	2	3	3	2
DarABC-1	11	3	5	11	10
LsrR-1	11	2	2	7	3
LuxN-1	1	0	1	2	0
PqsABC-1	29	4	12	26	21
QscR-1	0	0	0	0	0
RpaR-1	2	0	0	1	1
SRS023964 SRS024021 SRS024087 SRS024144 SRS024289					
AHL-Receptors-4	1	2	1	1	1
AHL-Receptors-6	2	3	2	1	2
AHL-Receptors-7	2	3	2	1	2
AHL-Synthases-1	3	4	3	1	7
LuxS-1	12	8	21	14	15

LuxS-2	10	11	13	8	14
LuxS-3	13	11	14	11	16
LuxS-4	11	8	22	8	14
QQ-enzymes-acylases-1	7	5	13	3	9
QQ-enzymes-acylases-3	0	0	0	0	0
QQ-enzymes-acylases-4	0	0	0	0	0
QQ-enzymes-acylases-5	5	8	15	6	5
QQ-enzymes-acylases-6	0	0	1	0	0
QQ-enzymes-acylases-7	0	0	0	1	0
QQ-enzymes-acylases-8	1	0	1	0	1
QQ-enzymes-acylases-9	0	0	0	1	0
QQ-enzymes-acylases-10	0	0	1	0	0
QQ-enzymes-acylases-11	4	5	10	2	7
QQ-enzymes-acylases-12	1	0	1	0	1
QQ-enzymes-acylases-13	0	0	1	0	1
QQ-enzymes-acylases-14	0	0	2	1	1
QQ-enzymes-acylases-15	3	0	3	1	2
QQ-enzymes-lactonases-1	19	16	20	12	19
QQ-enzymes-lactonases-6	1	1	2	0	0
QQ-enzymes-lactonases-7	0	0	0	0	0
QQ-enzymes-lactonases-8	3	2	2	1	2
QQ-enzymes-lactonases-9	0	0	0	1	0
QQ-enzymes-lactonases-13	1	1	3	0	2
QQ-enzymes-lactonases-14	17	14	16	12	16
QQ-enzymes-lactonases-15	0	0	0	0	0
QQ-enzymes-lactonases-16	1	0	1	0	1
QQ-enzymes-lactonases-18	1	1	1	0	1
QQ-enzymes-lactonases-19	1	0	1	0	1
QQ-enzymes-lactonases-20	23	10	40	12	25
QQ-enzymes-lactonases-24	1	1	1	0	1
QQ-enzymes-lactonases-25	98	74	161	82	104
QQ-enzymes-lactonases-26	2	4	4	2	2
QQ-enzymes-lactonases-27	0	1	0	0	0
QQ-enzymes-lactonases-28	3	4	3	2	1
DarABC-1	7	4	11	8	8
LsrR-1	1	5	6	2	8
LuxN-1	3	0	2	0	0
PqsABC-1	15	14	35	18	24
QscR-1	0	0	0	1	0
RpaR-1	2	3	2	0	2
	SRS024355	SRS024381	SRS024447	SRS024561	SRS024649
AHL-Receptors-4	1	1	0	1	0
AHL-Receptors-6	3	2	1	2	0
AHL-Receptors-7	3	2	2	2	0
AHL-Synthases-1	5	3	3	4	3
LuxS-1	14	13	13	17	8
LuxS-2	12	16	15	15	8
LuxS-3	13	10	12	12	9

LuxS-4	13	11	9	16	15
QQ-enzymes-acylases-1	8	7	3	7	12
QQ-enzymes-acylases-3	0	0	0	0	0
QQ-enzymes-acylases-4	0	0	0	0	0
QQ-enzymes-acylases-5	13	7	7	8	10
QQ-enzymes-acylases-6	0	0	0	0	1
QQ-enzymes-acylases-7	0	0	0	0	0
QQ-enzymes-acylases-8	0	0	1	0	0
QQ-enzymes-acylases-9	0	0	0	0	0
QQ-enzymes-acylases-10	2	0	0	0	2
QQ-enzymes-acylases-11	5	6	2	7	9
QQ-enzymes-acylases-12	0	0	1	0	1
QQ-enzymes-acylases-13	0	0	0	0	0
QQ-enzymes-acylases-14	1	0	0	0	1
QQ-enzymes-acylases-15	3	1	1	0	2
QQ-enzymes-lactonases-1	19	13	13	15	9
QQ-enzymes-lactonases-6	2	2	0	1	2
QQ-enzymes-lactonases-7	0	0	0	0	0
QQ-enzymes-lactonases-8	1	3	0	3	1
QQ-enzymes-lactonases-9	0	0	0	0	0
QQ-enzymes-lactonases-13	0	2	0	1	0
QQ-enzymes-lactonases-14	16	10	11	13	9
QQ-enzymes-lactonases-15	0	0	0	0	0
QQ-enzymes-lactonases-16	0	0	1	1	0
QQ-enzymes-lactonases-18	2	1	2	0	0
QQ-enzymes-lactonases-19	1	1	1	0	0
QQ-enzymes-lactonases-20	24	30	14	25	21
QQ-enzymes-lactonases-24	1	1	0	1	0
QQ-enzymes-lactonases-25	116	83	81	108	105
QQ-enzymes-lactonases-26	3	3	2	3	1
QQ-enzymes-lactonases-27	0	1	1	0	0
QQ-enzymes-lactonases-28	3	2	2	2	1
DarABC-1	6	6	4	9	6
LsrR-1	5	4	6	3	6
LuxN-1	2	1	3	0	2
PqsABC-1	30	21	15	22	19
QscR-1	0	0	0	0	0
RpaR-1	3	2	1	2	0
	SRS042984	SRS043018	SRS043755	SRS043772	SRS045197
AHL-Receptors-4	4	0	0	0	1
AHL-Receptors-6	4	0	0	0	2
AHL-Receptors-7	5	0	0	0	2
AHL-Synthases-1	4	1	4	1	4
LuxS-1	18	4	9	9	28
LuxS-2	6	5	5	8	19
LuxS-3	11	9	9	10	20
LuxS-4	13	11	9	10	22
QQ-enzymes-acylases-1	8	6	6	2	13

QQ-enzymes-acylases-3	1	0	0	0	0
QQ-enzymes-acylases-4	0	0	0	0	0
QQ-enzymes-acylases-5	9	9	3	3	9
QQ-enzymes-acylases-6	1	0	0	0	0
QQ-enzymes-acylases-7	1	0	0	0	0
QQ-enzymes-acylases-8	1	1	0	0	1
QQ-enzymes-acylases-9	1	0	0	0	0
QQ-enzymes-acylases-10	1	0	0	0	1
QQ-enzymes-acylases-11	5	3	3	2	8
QQ-enzymes-acylases-12	1	0	0	0	0
QQ-enzymes-acylases-13	1	0	0	0	0
QQ-enzymes-acylases-14	0	0	0	0	0
QQ-enzymes-acylases-15	2	3	3	0	4
QQ-enzymes-lactonases-1	17	13	10	12	17
QQ-enzymes-lactonases-6	1	1	1	1	3
QQ-enzymes-lactonases-7	1	0	0	0	0
QQ-enzymes-lactonases-8	2	1	1	1	1
QQ-enzymes-lactonases-9	0	0	0	0	0
QQ-enzymes-lactonases-13	2	0	1	1	1
QQ-enzymes-lactonases-14	13	12	5	10	13
QQ-enzymes-lactonases-15	1	0	1	0	0
QQ-enzymes-lactonases-16	0	1	2	0	2
QQ-enzymes-lactonases-18	1	0	1	1	3
QQ-enzymes-lactonases-19	0	0	1	0	2
QQ-enzymes-lactonases-20	28	14	10	20	23
QQ-enzymes-lactonases-24	1	0	0	0	1
QQ-enzymes-lactonases-25	103	76	70	79	92
QQ-enzymes-lactonases-26	5	0	2	2	2
QQ-enzymes-lactonases-27	0	1	0	0	0
QQ-enzymes-lactonases-28	5	2	1	2	2
DarABC-1	11	7	7	5	13
LsrR-1	4	3	2	1	5
LuxN-1	1	0	2	0	1
PqsABC-1	28	14	10	7	26
QscR-1	1	0	0	0	0
RpaR-1	4	0	0	0	2
	SRS045313	SRS047100	SRS047113	SRS047265	SRS047634
AHL-Receptors-4	0	1	0	0	2
AHL-Receptors-6	0	2	2	0	2
AHL-Receptors-7	0	2	1	1	3
AHL-Synthases-1	0	5	3	2	7
LuxS-1	4	7	15	5	19
LuxS-2	4	6	11	6	14
LuxS-3	4	9	13	6	14
LuxS-4	9	2	18	9	33
QQ-enzymes-acylases-1	3	0	6	2	16
QQ-enzymes-acylases-3	0	0	0	0	0
QQ-enzymes-acylases-4	0	0	0	0	0

QQ-enzymes-acylases-5	1	7	9	1	20
QQ-enzymes-acylases-6	0	0	1	0	1
QQ-enzymes-acylases-7	0	0	2	0	0
QQ-enzymes-acylases-8	0	0	2	0	1
QQ-enzymes-acylases-9	0	0	2	0	0
QQ-enzymes-acylases-10	0	0	0	0	0
QQ-enzymes-acylases-11	3	0	3	2	13
QQ-enzymes-acylases-12	0	0	2	0	1
QQ-enzymes-acylases-13	0	0	1	0	1
QQ-enzymes-acylases-14	0	0	1	0	1
QQ-enzymes-acylases-15	0	0	1	0	3
QQ-enzymes-lactonases-1	6	5	13	9	21
QQ-enzymes-lactonases-6	0	1	1	2	0
QQ-enzymes-lactonases-7	0	0	0	0	0
QQ-enzymes-lactonases-8	0	1	2	0	0
QQ-enzymes-lactonases-9	0	0	0	0	0
QQ-enzymes-lactonases-13	0	1	0	0	0
QQ-enzymes-lactonases-14	6	4	12	8	19
QQ-enzymes-lactonases-15	0	0	0	1	0
QQ-enzymes-lactonases-16	0	0	0	0	1
QQ-enzymes-lactonases-18	0	0	1	0	2
QQ-enzymes-lactonases-19	0	0	0	0	1
QQ-enzymes-lactonases-20	5	9	24	3	40
QQ-enzymes-lactonases-24	0	1	1	0	1
QQ-enzymes-lactonases-25	33	56	132	44	130
QQ-enzymes-lactonases-26	1	2	4	1	3
QQ-enzymes-lactonases-27	0	0	0	1	1
QQ-enzymes-lactonases-28	0	1	4	0	4
DarABC-1	1	3	14	2	15
LsrR-1	0	4	8	1	8
LuxN-1	0	1	2	1	1
PqsABC-1	6	7	25	4	34
QscR-1	0	0	1	0	0
RpaR-1	0	2	1	0	2
	SRS049268	SRS049318	SRS051244	SRS051378	SRS051930
AHL-Receptors-4	0	1	1	0	2
AHL-Receptors-6	0	0	0	0	3
AHL-Receptors-7	1	2	2	0	4
AHL-Synthases-1	4	5	5	3	3
LuxS-1	17	17	12	9	15
LuxS-2	11	12	14	5	17
LuxS-3	11	10	11	7	15
LuxS-4	21	30	10	6	10
QQ-enzymes-acylases-1	9	14	7	4	11
QQ-enzymes-acylases-3	0	0	0	0	0
QQ-enzymes-acylases-4	0	0	0	0	0
QQ-enzymes-acylases-5	10	10	5	5	13
QQ-enzymes-acylases-6	1	1	0	0	0

QQ-enzymes-acylases-7	0	0	0	0	0
QQ-enzymes-acylases-8	2	3	0	0	1
QQ-enzymes-acylases-9	0	0	0	0	0
QQ-enzymes-acylases-10	1	0	2	1	3
QQ-enzymes-acylases-11	5	10	4	3	6
QQ-enzymes-acylases-12	2	3	1	0	1
QQ-enzymes-acylases-13	0	0	0	0	0
QQ-enzymes-acylases-14	0	1	1	1	3
QQ-enzymes-acylases-15	3	4	2	1	4
QQ-enzymes-lactonases-1	13	12	12	13	10
QQ-enzymes-lactonases-6	2	1	1	1	0
QQ-enzymes-lactonases-7	1	0	0	0	0
QQ-enzymes-lactonases-8	0	3	1	1	2
QQ-enzymes-lactonases-9	0	1	0	0	1
QQ-enzymes-lactonases-13	0	2	0	0	1
QQ-enzymes-lactonases-14	12	8	10	12	8
QQ-enzymes-lactonases-15	0	0	0	0	0
QQ-enzymes-lactonases-16	1	2	1	1	0
QQ-enzymes-lactonases-18	0	2	1	1	1
QQ-enzymes-lactonases-19	0	2	1	1	1
QQ-enzymes-lactonases-20	26	32	17	12	24
QQ-enzymes-lactonases-24	0	1	0	0	1
QQ-enzymes-lactonases-25	128	136	90	63	109
QQ-enzymes-lactonases-26	3	2	1	1	4
QQ-enzymes-lactonases-27	0	0	0	1	0
QQ-enzymes-lactonases-28	4	3	1	1	3
DarABC-1	6	8	3	4	7
LsrR-1	7	2	2	1	5
LuxN-1	2	2	0	0	0
PqsABC-1	23	27	15	11	22
QscR-1	0	0	0	0	0
RpaR-1	0	0	0	0	3
SRS051941 SRS052604 SRS052876 SRS053584 SRS054430					
AHL-Receptors-4	1	0	0	1	1
AHL-Receptors-6	2	0	0	1	2
AHL-Receptors-7	1	0	0	1	2
AHL-Synthases-1	3	2	3	4	4
LuxS-1	9	5	18	9	13
LuxS-2	8	4	18	10	9
LuxS-3	10	4	13	12	6
LuxS-4	8	8	11	4	8
QQ-enzymes-acylases-1	3	2	12	7	6
QQ-enzymes-acylases-3	0	0	0	0	0
QQ-enzymes-acylases-4	0	0	0	0	0
QQ-enzymes-acylases-5	8	2	15	4	3
QQ-enzymes-acylases-6	0	0	0	0	0
QQ-enzymes-acylases-7	0	0	0	0	0
QQ-enzymes-acylases-8	0	0	3	0	0

QQ-enzymes-acylases-9	0	0	0	0	0
QQ-enzymes-acylases-10	0	0	0	1	2
QQ-enzymes-acylases-11	2	2	8	4	4
QQ-enzymes-acylases-12	0	0	2	0	0
QQ-enzymes-acylases-13	0	0	0	0	0
QQ-enzymes-acylases-14	0	0	0	0	1
QQ-enzymes-acylases-15	1	0	4	3	1
QQ-enzymes-lactonases-1	11	11	15	9	11
QQ-enzymes-lactonases-6	2	0	0	1	2
QQ-enzymes-lactonases-7	0	0	0	0	0
QQ-enzymes-lactonases-8	1	1	1	1	2
QQ-enzymes-lactonases-9	0	0	0	1	0
QQ-enzymes-lactonases-13	0	1	1	1	1
QQ-enzymes-lactonases-14	9	8	10	8	9
QQ-enzymes-lactonases-15	0	0	0	0	1
QQ-enzymes-lactonases-16	1	0	1	0	0
QQ-enzymes-lactonases-18	1	2	3	0	0
QQ-enzymes-lactonases-19	2	0	0	0	0
QQ-enzymes-lactonases-20	25	15	23	13	12
QQ-enzymes-lactonases-24	1	0	0	1	1
QQ-enzymes-lactonases-25	78	51	98	61	64
QQ-enzymes-lactonases-26	1	1	2	2	2
QQ-enzymes-lactonases-27	0	0	0	1	0
QQ-enzymes-lactonases-28	2	1	2	2	2
DarABC-1	7	4	9	9	9
LsrR-1	3	2	2	3	1
LuxN-1	3	1	2	0	1
PqsABC-1	21	10	20	15	7
QscR-1	0	0	0	0	0
RpaR-1	1	0	0	1	2
	SRS054653	SRS055378	SRS055401	SRS055450	SRS058053
AHL-Receptors-4	2	0	1	0	1
AHL-Receptors-6	2	0	1	0	2
AHL-Receptors-7	4	0	1	0	2
AHL-Synthases-1	2	5	5	0	5
LuxS-1	6	11	14	9	11
LuxS-2	7	7	12	6	4
LuxS-3	9	8	15	6	11
LuxS-4	1	13	6	6	10
QQ-enzymes-acylases-1	4	13	4	6	7
QQ-enzymes-acylases-3	0	0	0	0	0
QQ-enzymes-acylases-4	0	0	0	0	0
QQ-enzymes-acylases-5	3	12	3	6	6
QQ-enzymes-acylases-6	0	1	0	0	0
QQ-enzymes-acylases-7	0	0	0	0	0
QQ-enzymes-acylases-8	0	1	0	1	0
QQ-enzymes-acylases-9	0	0	0	0	0
QQ-enzymes-acylases-10	1	0	0	0	2

QQ-enzymes-acylases-11	1	10	4	5	5
QQ-enzymes-acylases-12	0	1	0	0	0
QQ-enzymes-acylases-13	0	0	0	0	0
QQ-enzymes-acylases-14	0	0	0	0	1
QQ-enzymes-acylases-15	2	3	0	1	1
QQ-enzymes-lactonases-1	12	16	9	12	12
QQ-enzymes-lactonases-6	0	0	1	0	1
QQ-enzymes-lactonases-7	0	0	0	0	0
QQ-enzymes-lactonases-8	0	1	2	1	2
QQ-enzymes-lactonases-9	0	0	0	0	0
QQ-enzymes-lactonases-13	0	1	1	1	2
QQ-enzymes-lactonases-14	11	14	7	9	9
QQ-enzymes-lactonases-15	0	0	0	0	1
QQ-enzymes-lactonases-16	0	0	0	1	0
QQ-enzymes-lactonases-18	1	1	1	2	0
QQ-enzymes-lactonases-19	0	0	1	1	0
QQ-enzymes-lactonases-20	8	30	15	17	18
QQ-enzymes-lactonases-24	1	1	1	0	1
QQ-enzymes-lactonases-25	44	130	83	65	118
QQ-enzymes-lactonases-26	1	3	2	1	2
QQ-enzymes-lactonases-27	1	1	0	0	0
QQ-enzymes-lactonases-28	1	3	1	1	3
DarABC-1	2	10	5	5	5
LsrR-1	2	9	3	0	3
LuxN-1	2	1	1	1	1
PqsABC-1	7	21	10	8	18
QscR-1	0	0	0	0	0
RpaR-1	2	0	0	0	2
	SRS058808	SRS063603	SRS063999	SRS064449	SRS064493
AHL-Receptors-4	0	0	0	1	0
AHL-Receptors-6	0	0	0	0	0
AHL-Receptors-7	0	0	0	1	0
AHL-Synthases-1	3	2	5	7	0
LuxS-1	20	17	20	12	3
LuxS-2	16	15	9	12	3
LuxS-3	13	12	15	14	5
LuxS-4	30	25	21	16	2
QQ-enzymes-acylases-1	9	11	12	6	4
QQ-enzymes-acylases-3	0	0	0	0	0
QQ-enzymes-acylases-4	0	0	0	0	0
QQ-enzymes-acylases-5	11	15	7	2	3
QQ-enzymes-acylases-6	0	0	1	0	1
QQ-enzymes-acylases-7	0	0	0	0	0
QQ-enzymes-acylases-8	0	0	1	0	2
QQ-enzymes-acylases-9	0	0	0	0	0
QQ-enzymes-acylases-10	0	1	0	1	0
QQ-enzymes-acylases-11	9	8	10	4	2
QQ-enzymes-acylases-12	0	0	1	0	2

QQ-enzymes-acylases-13	0	0	0	0	0
QQ-enzymes-acylases-14	0	0	2	0	1
QQ-enzymes-acylases-15	0	2	2	2	2
QQ-enzymes-lactonases-1	18	21	20	16	6
QQ-enzymes-lactonases-6	3	1	2	1	2
QQ-enzymes-lactonases-7	0	0	0	0	0
QQ-enzymes-lactonases-8	3	2	0	2	0
QQ-enzymes-lactonases-9	0	1	0	0	0
QQ-enzymes-lactonases-13	0	2	1	1	0
QQ-enzymes-lactonases-14	16	16	17	12	6
QQ-enzymes-lactonases-15	0	0	0	0	0
QQ-enzymes-lactonases-16	1	1	2	1	0
QQ-enzymes-lactonases-18	1	3	2	3	0
QQ-enzymes-lactonases-19	0	2	2	2	0
QQ-enzymes-lactonases-20	34	32	26	14	0
QQ-enzymes-lactonases-24	0	0	0	1	0
QQ-enzymes-lactonases-25	104	123	111	81	24
QQ-enzymes-lactonases-26	3	3	2	3	1
QQ-enzymes-lactonases-27	0	0	0	0	0
QQ-enzymes-lactonases-28	1	2	2	3	0
DarABC-1	8	9	10	12	1
LsrR-1	6	4	8	3	1
LuxN-1	4	0	1	0	0
PqsABC-1	15	28	25	18	2
QscR-1	0	0	0	0	0
RpaR-1	0	0	0	0	0
	SRS065099	SRS065310	SRS075410	subgingival	
AHL-Receptors-4	1	0	2	1	
AHL-Receptors-6	1	0	6	2	
AHL-Receptors-7	2	0	4	2	
AHL-Synthases-1	4	1	10	2	
LuxS-1	16	4	10	9	
LuxS-2	20	5	9	9	
LuxS-3	16	8	10	12	
LuxS-4	20	6	4	8	
QQ-enzymes-acylases-1	8	1	7	5	
QQ-enzymes-acylases-3	0	0	1	0	
QQ-enzymes-acylases-4	0	0	0	0	
QQ-enzymes-acylases-5	5	1	6	8	
QQ-enzymes-acylases-6	1	0	0	0	
QQ-enzymes-acylases-7	0	0	1	0	
QQ-enzymes-acylases-8	2	0	0	0	
QQ-enzymes-acylases-9	0	0	1	0	
QQ-enzymes-acylases-10	0	1	0	0	
QQ-enzymes-acylases-11	6	0	4	5	
QQ-enzymes-acylases-12	1	0	0	0	
QQ-enzymes-acylases-13	0	0	0	0	
QQ-enzymes-acylases-14	1	0	0	0	

QQ-enzymes-acylases-15	2	1	2	0
QQ-enzymes-lactonases-1	18	7	16	18
QQ-enzymes-lactonases-6	1	1	0	1
QQ-enzymes-lactonases-7	0	0	0	0
QQ-enzymes-lactonases-8	2	0	1	3
QQ-enzymes-lactonases-9	0	0	0	0
QQ-enzymes-lactonases-13	1	0	0	3
QQ-enzymes-lactonases-14	15	5	14	15
QQ-enzymes-lactonases-15	0	0	0	0
QQ-enzymes-lactonases-16	0	1	0	0
QQ-enzymes-lactonases-18	2	2	2	0
QQ-enzymes-lactonases-19	2	1	1	0
QQ-enzymes-lactonases-20	27	12	13	17
QQ-enzymes-lactonases-24	1	0	3	1
QQ-enzymes-lactonases-25	101	60	69	18
QQ-enzymes-lactonases-26	2	0	5	3
QQ-enzymes-lactonases-27	1	0	0	0
QQ-enzymes-lactonases-28	1	0	5	3
DarABC-1	10	3	9	2
LsrR-1	5	2	4	3
LuxN-1	2	0	0	0
PqsABC-1	20	4	20	13
QscR-1	0	0	1	0
RpaR-1	1	0	3	2

[8]:

```
#normalizing by predicted proteins for each metagenome from metagenome_norm.txt
vecnorm <-
  c(6266,8924,11539,15784,3843,146008,13004,120288,279009,207088,208177,172270,231720,310688,
    258578,260380,193617,174046,210877,194510,123961,127734,195986,104185,139734,201207,159066,
    161080,161822,248646,75099,113543,160533,129723,74250,112845,173751,85615,131008,204627,157
    268038,207912,113886,241990,371149,127446,193398,230069,315002,84406,264435,91803,211906,14
    242200,39469,152094,203222,177345,226406,97304,72535,106559,118180,135169,219548,244747,145
    203619,119634,109931,162510,325852,315060,110055,104667,390735,194224,174843,122968,304260,
    185172,256145,165500,181019,217294,195067,228964,202893,132003,118570,253977,67257,110290,3
    68465,344851,235839,389276,193439,107331,212768,211521,107010,188371,116293,123826,93368,28
    137758,130514,241830,240205,304829,278640,216545,39161,230667,85864,136029,46349)
divnorm <- sweep(otu,2,vecnorm,'/') #2 is for column operation

OTU = otu_table(otu, taxa_are_rows=T) # raw OTU table
```

```

OTUn = otu_table(divnorm, taxa_are_rows=T) #normalized OTU table
taximat <- as.matrix(read.table("taxonomy2023.txt", header=T, row.names=1,
↪sep="\t"))
taxi = tax_table(taximat)
quorum <- phyloseq(OTU, taxi)
data = read.table("samples.txt", header=T, row.names=1, sep="\t")
sampledata = sample_data(data.frame(id=data$id, project=data$project, row.names=
↪= sample_names(quorum)))
quorum = phyloseq (OTU, sampledata, taxi) #raw OTU object
quorumN =phyloseq (OTUn, sampledata, taxi) #normalized

tax_table(quorumN)

```

A taxonomyTable: 43 × 6 of type chr

	L0	L1
AHL-Receptors-4	AHL-Receptors-4-SdiA	AHL-Receptor
AHL-Receptors-6	AHL-Receptors-6-RhlR	AHL-Receptor
AHL-Receptors-7	AHL-Receptors-7-AbaR	AHL-Receptor
AHL-Synthases-1	AHL-Synthases-1-HdtS	AHL-Synthases
LuxS-1	LuxS-1-V._harveyi	LuxS
LuxS-2	LuxS-2-S._pyogenes	LuxS
LuxS-3	LuxS-3-B._thuringiensis	LuxS
LuxS-4	LuxS-4-B._heparinolyticus	LuxS
QQ-enzymes-acylases-1	QQ-acylases-1-Aac	QQ-enzymes-ac
QQ-enzymes-acylases-3	QQ-acylases-3-PvdQ	QQ-enzymes-ac
QQ-enzymes-acylases-4	QQ-acylases-4-QuiP-QlcA	QQ-enzymes-ac
QQ-enzymes-acylases-5	QQ-acylases-5-PheA	QQ-enzymes-ac
QQ-enzymes-acylases-6	QQ-acylases-6-HacB	QQ-enzymes-ac
QQ-enzymes-acylases-7	QQ-acylases-7-KcPGA	QQ-enzymes-ac
QQ-enzymes-acylases-8	QQ-acylases-8-Aibp	QQ-enzymes-ac
QQ-enzymes-acylases-9	QQ-acylases-9-AiiC	QQ-enzymes-ac
QQ-enzymes-acylases-10	QQ-acylases-10-AhlA	QQ-enzymes-ac
QQ-enzymes-acylases-11	QQ-acylases-11-AhlM	QQ-enzymes-ac
QQ-enzymes-acylases-12	QQ-acylases-12-AiiO	QQ-enzymes-ac
QQ-enzymes-acylases-13	QQ-acylases-13-AmiE	QQ-enzymes-ac
QQ-enzymes-acylases-14	QQ-acylases-14-APTM01	QQ-enzymes-ac
QQ-enzymes-acylases-15	QQ-acylases-15-MacQ	QQ-enzymes-ac
QQ-enzymes-lactonases-1	QQ-lactonases-1-AidA	QQ-enzymes-la
QQ-enzymes-lactonases-6	QQ-lactonases-6-CarA/CarB	QQ-enzymes-la
QQ-enzymes-lactonases-7	QQ-lactonases-7-RmmL	QQ-enzymes-la
QQ-enzymes-lactonases-8	QQ-lactonases-8-Y2-AiiA	QQ-enzymes-la
QQ-enzymes-lactonases-9	QQ-lactonases-9-YtnP	QQ-enzymes-la
QQ-enzymes-lactonases-13	QQ-lactonases-13-AhlD	QQ-enzymes-la
QQ-enzymes-lactonases-14	QQ-lactonases-14-AhlK	QQ-enzymes-la
QQ-enzymes-lactonases-15	QQ-lactonases-15-AhlS	QQ-enzymes-la
QQ-enzymes-lactonases-16	QQ-lactonases-16-AidC	QQ-enzymes-la
QQ-enzymes-lactonases-18	QQ-lactonases-18-mlr6805	QQ-enzymes-la
QQ-enzymes-lactonases-20	QQ-lactonases-20-QsdR1	QQ-enzymes-la
QQ-enzymes-lactonases-24	QQ-paraoxonases-PON	QQ-enzymes-la
QQ-enzymes-lactonases-25	QQ-lactonases-25-GsP	QQ-enzymes-la
QQ-enzymes-lactonases-26	QQ-lactonases-26-MCP	QQ-enzymes-la
QQ-enzymes-lactonases-27	QQ-lactonases-27-QsdH	QQ-enzymes-la
QQ-enzymes-lactonases-28	QQ-lactonases-28-Bpi01	QQ-enzymes-la
LsrR-1	AI-2-Receptors-1-LsrR	LsrR-1
LuxN-1	AHL-Receptors-10-LuxN	LuxN-1
PqsABC-1	PQS-Synthase-PqsABC	PqsABC-1
QscR-1	Non-AHL-Receptors-1-QscR	QscR-1
RpaR-1	Non-AHL-Receptors-2-RpaR	RpaR-1

```
[26]: p <- plot_bar(quorumN, "L0")
p
```

```

#
data <- psmelt(quorumN)
head(data)
data$L0 <- as.character(data$L0)

# install.packages("tidyverse")
library("tidyverse")

pd <- data %>%
  as_tibble %>%
  mutate(L0 = as.character(L0)) # %>%
#   replace_na(list(Genus = "unknown"))
genus_abun <- pd %>%
  group_by(L0) %>%
  summarize(Abundance = sum(Abundance)) %>%
  arrange(Abundance)
genus_levels <- genus_abun$L0
pd0 <- pd %>%
  mutate(L0 = factor(L0, genus_levels))

print(pd0)
z <- factor(unique(data$L0))
z <- nlevels(z)

head(pd0)
# p <- ggplot(pd0, aes(x = Sample, y = Abundance, fill= pd0$L1, color= pd0$L1)) +
#   geom_bar(stat = "identity", position="stack") +
#
#   scale_fill_manual(values=rev(colorRampPalette(brewer.pal(12,"Paired"))(z))) +
#
#   scale_color_manual(values=rev(colorRampPalette(brewer.pal(12,"Paired"))(z)))

# p
p2 <- ggplot(pd0, aes(x = L0, y = Sample, fill= Abundance)) +
  scale_fill_gradient(low="#B9DDF1", high="#2A5783", na.value = "white", transp
  = "log2") + geom_tile() + coord_flip() + theme(axis.text.x = element_text(s
  ize=3, angle = 90, hjust = 1), axis.text.y = element_text(size = 6)) +
  labs(y = "Metagenome", x="")

# p2 <- ggplot(pd0, aes(x = L0, y = Sample, fill= Abundance)) +
  scale_fill_gradient(low="#bebebe", high="#000000", na.value = "white", transp
  = "log2") + geom_tile() + coord_flip() + theme(axis.text.x = element_text(s
  ize=4, angle = 90, hjust = 1), axis.text.y = element_text(size = 6)) +
  labs(y = "Metagenome", x="")

```

```
# p2 <- ggplot(pd0, aes(x = L0, y = Sample, fill= Abundance)) +
  ↳ scale_fill_gradient(low="#B9DDF1", high="#2A5783", na.value = "white", trans_
  ↳ = "log2") + geom_tile() + coord_flip() + theme(axis.text.x = element_text(
  ↳ size=2, angle = 90, hjust = 1), axis.text.y = element_text(size = 6)) +
  ↳ labs(y = "Metagenome", x="")
```

p2

```
ggsave("Quorum_heatmap.pdf", , width=21, height=27, units="cm")
```

		OTU	Sample	Abundance	id	project	
		<chr>	<chr>	<dbl>	<chr>	<chr>	<chr>
A data.frame: 6 × 11	4173	QQ-enzymes-lactonases-25	NCA008	0.0015612802	NCA008	Spain	C
	4203	QQ-enzymes-lactonases-25	NCA001	0.0011205737	NCA001	Spain	C
	4185	QQ-enzymes-lactonases-25	NOCA002P	0.0011163772	NOCA002P	Spain	C
	4182	QQ-enzymes-lactonases-25	NCA004	0.0009503294	NCA004	Spain	C
	4189	QQ-enzymes-lactonases-25	RL7Ale	0.0009227930	RL7Ale	Spain	C
	4164	QQ-enzymes-lactonases-25	SRS065310	0.0006987795	SRS065310	HMP	C

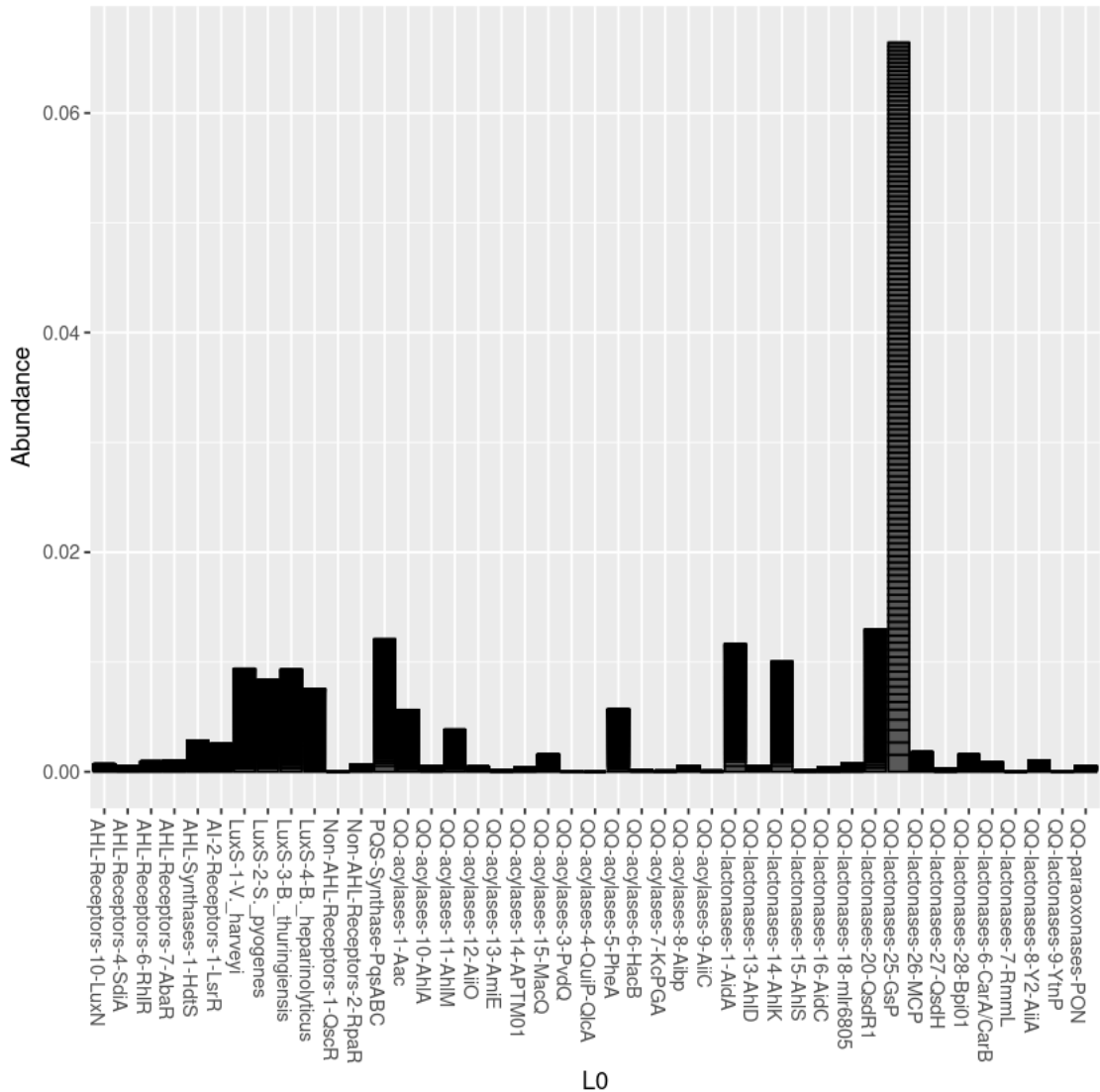
```
# A tibble: 5,418 × 11
```

	OTU	Sample	Abund... ¹	id	project	L0	L1	L2	L3	L4	L5
	<chr>	<chr>									
1	QQ-enzymes-...	NCA008	1.56e-3	NCA0...	Spain	QQ-1...					
	QQ-e... Pseu...	pdb ...	pdb...	NA							
2	QQ-enzymes-...	NCA001	1.12e-3	NCA0...	Spain	QQ-1...					
	QQ-e... Pseu...	pdb ...	pdb...	NA							
3	QQ-enzymes-...	NOCA0...	1.12e-3	NOCA...	Spain	QQ-1...					
	QQ-e... Pseu...	pdb ...	pdb...	NA							
4	QQ-enzymes-...	NCA004	9.50e-4	NCA0...	Spain	QQ-1...					
	QQ-e... Pseu...	pdb ...	pdb...	NA							
5	QQ-enzymes-...	RL7Ale	9.23e-4	RL7A...	Spain	QQ-1...					
	QQ-e... Pseu...	pdb ...	pdb...	NA							
6	QQ-enzymes-...	SRS06...	6.99e-4	SRS0...	HMP	QQ-1...					
	QQ-e... Pseu...	pdb ...	pdb...	NA							
7	QQ-enzymes-...	SRS01...	6.92e-4	SRS0...	HMP	QQ-1...					
	QQ-e... Pseu...	pdb ...	pdb...	NA							
8	QQ-enzymes-...	SRS02...	6.92e-4	SRS0...	HMP	QQ-1...					
	QQ-e... Pseu...	pdb ...	pdb...	NA							
9	QQ-enzymes-...	SRS01...	6.89e-4	SRS0...	HMP	QQ-1...					
	QQ-e... Pseu...	pdb ...	pdb...	NA							
10	QQ-enzymes-...	SRS01...	6.82e-4	SRS0...	HMP	QQ-1...					
	QQ-e... Pseu...	pdb ...	pdb...	NA							

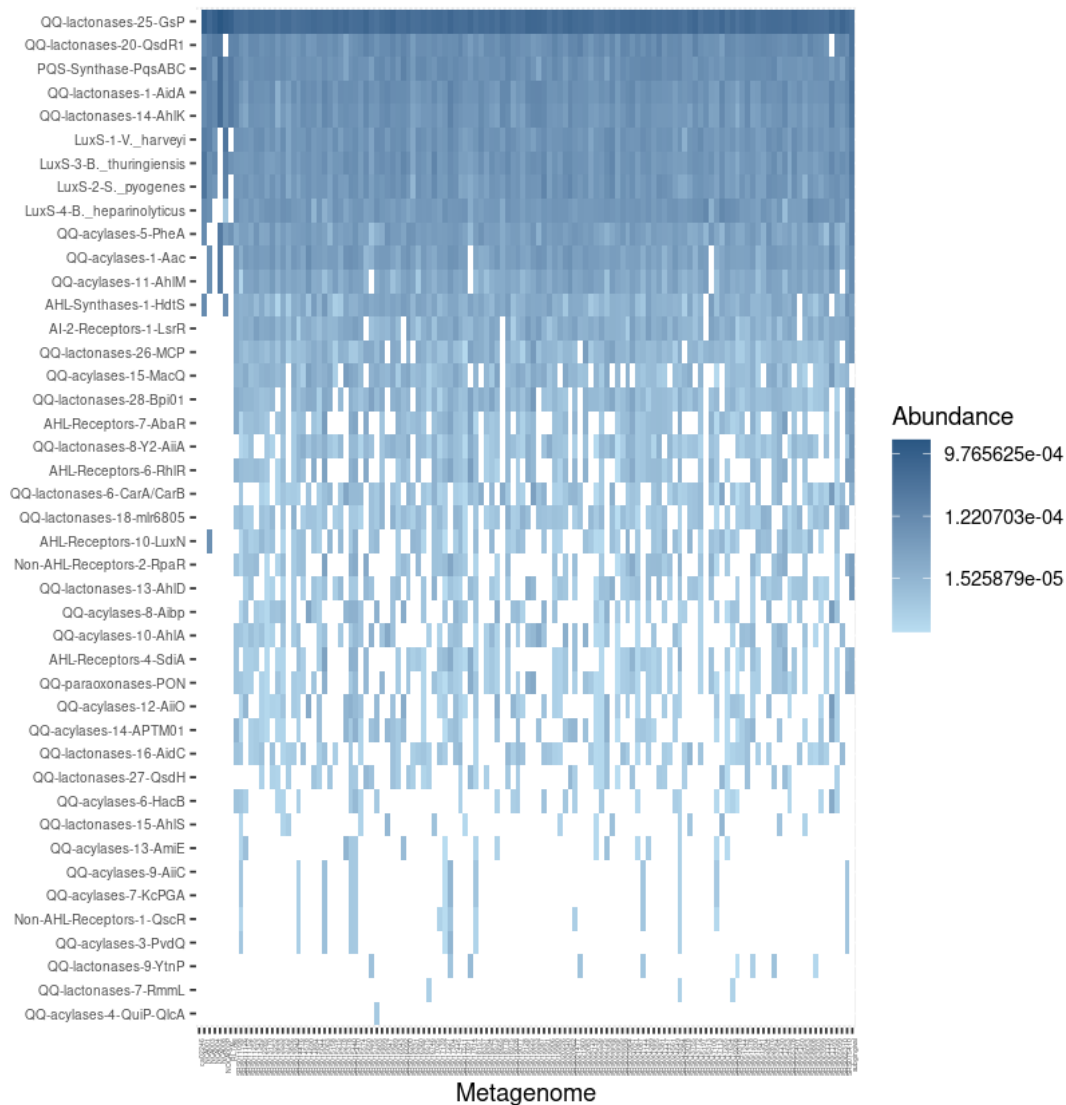
```
# ... with 5,408 more rows, and abbreviated variable name 1Abundance
```


A tibble: 6 × 11	OTU <chr>	Sample <chr>	Abundance <dbl>	id <chr>	project <chr>	L0 <fct>
	QQ-enzymes-lactonases-25	NCA008	0.0015612802	NCA008	Spain	QQ-lactonases
	QQ-enzymes-lactonases-25	NCA001	0.0011205737	NCA001	Spain	QQ-lactonases
	QQ-enzymes-lactonases-25	NOCA002P	0.0011163772	NOCA002P	Spain	QQ-lactonases
	QQ-enzymes-lactonases-25	NCA004	0.0009503294	NCA004	Spain	QQ-lactonases
	QQ-enzymes-lactonases-25	RL7Ale	0.0009227930	RL7Ale	Spain	QQ-lactonases
	QQ-enzymes-lactonases-25	SRS065310	0.0006987795	SRS065310	HMP	QQ-lactonases

Warning message:
 "Transformation introduced infinite values in discrete y-axis"



Warning message:
 "Transformation introduced infinite values in discrete y-axis"



[]:

2 References

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