

SUPPLEMENTARY TABLE S2. DESCRIPTIVE SUMMARY OF 179 UNIQUE CLONED *BLA*_{CTX-M} GROUP 1 GENES FROM COASTAL WETLANDS AND WASTEWATER

Reference ^a	Site	Cloned seq. (acc. no.) ^b	Amino acid substitutions ^c	Nucleotide mismatches ^d	Freq. ^e
CTX-M-1	PL WWTP	PLE-2.65 (KJ802548)	T171A	1	1
CTX-M-1	PL WWTP	PLE-2.77 (KJ802558)	T171A, L289W	2	1
CTX-M-3	TRE	TRE-1.01 (KJ802643)	0	6	
CTX-M-3	TRE	TRE-1.02 (KJ802644)	2	4	
CTX-M-3	TRE	TRE-1.81 (KJ802717)	6	1	
CTX-M-3	TRE	TRE-1.61 (KJ802697)	2	1	
CTX-M-3	TRE	TRE-1.75 (KJ802711)	1	1	
CTX-M-3	TRE	TRE-1.13 (KJ802654)	1	1	
CTX-M-3	TRE	TRE-1.31 (KJ802670)	1	1	
CTX-M-3	TRE	TRE-1.35 (KJ802674)	1	1	
CTX-M-3	TRE	TRE-1.36 (KJ802675)	V-1A	4	1
CTX-M-3	TRE	TRE-1.47 (KJ802684)	T7P	1	4
CTX-M-3	TRE	TRE-1.44 (KJ802681)	T15A	1	1
CTX-M-3	TRE	TRE-1.66 (KJ802702)	L169S	1	1
CTX-M-3	TRE	TRE-1.62 (KJ802698)	T209A	1	2
CTX-M-3	TRE	TRE-1.60 (KJ802696)	Q222R	2	1
CTX-M-3	TRE	TRE-1.15 (KJ802656)	G288S	1	1
CTX-M-3	TRE	TRE-1.14 (KJ802655)	S228A, G236D	3	1
CTX-M-3	TRE	TRE-1.25 (KJ802666)	T13A, R275L	6	1
CTX-M-3	TRE	TRE-1.54 (KJ802691)	T13A, R275L	6	1
CTX-M-3	TRE	TRE-1.63 (KJ802699)	T13A, R275V, D287H	6	1
CTX-M-3	TRE	TRE-1.64 (KJ802700)	T13A, I139V, R275L	6	1
CTX-M-3	TRE	TRE-1.72 (KJ802708)	T13A, A134V, R275L	6	1
CTX-M-3	SBI WWTP	SBI-3.02 (KJ802560)	0	25	
CTX-M-3	SBI WWTP	SBI-3.18 (KJ802576)	2	3	
CTX-M-3	SBI WWTP	SBI-3.31 (KJ802589)	1	1	
CTX-M-3	SBI WWTP	SBI-3.32 (KJ802590)	3	1	
CTX-M-3	SBI WWTP	SBI-3.26 (KJ802584)	1	1	
CTX-M-3	SBI WWTP	SBI-3.46 (KJ802603)	1	1	
CTX-M-3	SBI WWTP	SBI-3.48 (KJ802605)	1	1	
CTX-M-3	SBI WWTP	SBI-3.08 (KJ802566)	5	1	
CTX-M-3	SBI WWTP	SBI-3.67 (KJ802624)	1	1	
CTX-M-3	SBI WWTP	SBI-3.70 (KJ802627)	1	1	
CTX-M-3	SBI WWTP	SBI-3.83 (KJ802640)	1	1	
CTX-M-3	SBI WWTP	SBI-3.73 (KJ802630)	1	1	
CTX-M-3	SBI WWTP	SBI-3.85 (KJ802642)	1	1	
CTX-M-3	SBI WWTP	SBI-3.25 (KJ802583)	Q5K	2	1
CTX-M-3	SBI WWTP	SBI-3.56 (KJ802613)	M9V	2	1
CTX-M-3	SBI WWTP	SBI-3.07 (KJ802565)	T13A	4	1
CTX-M-3	SBI WWTP	SBI-3.50 (KJ802607)	T13A	6	1
CTX-M-3	SBI WWTP	SBI-3.24 (KJ802582)	T13A	6	1
CTX-M-3	SBI WWTP	SBI-3.28 (KJ802586)	K33R	1	1
CTX-M-3	SBI WWTP	SBI-3.23 (KJ802581)	D54G	2	1
CTX-M-3	SBI WWTP	SBI-3.39 (KJ802596)	K99E	4	1
CTX-M-3	SBI WWTP	SBI-3.74 (KJ802631)	K111R	1	1
CTX-M-3	SBI WWTP	SBI-3.13 (KJ802571)	N114S	3	1
CTX-M-3	SBI WWTP	SBI-3.35 (KJ802593)	T116A	1	1
CTX-M-3	SBI WWTP	SBI-3.29 (KJ802587)	S130G	1	1
CTX-M-3	SBI WWTP	SBI-3.84 (KJ802641)	T181A	1	1
CTX-M-3	SBI WWTP	SBI-3.05 (KJ802563)	A185T1	1	
CTX-M-3	SBI WWTP	SBI-3.55 (KJ802612)	D233G	2	1
CTX-M-3	SBI WWTP	SBI-3.15 (KJ802573)	E272K	2	1
CTX-M-3	SBI WWTP	SBI-3.12 (KJ802570)	Q5K, V21A	2	1
CTX-M-3	SBI WWTP	SBI-3.01 (KJ802559)	D29G, Q32R	2	1
CTX-M-3	SBI WWTP	SBI-3.14 (KJ802572)	H112R, V277I	5	2
CTX-M-3	SBI WWTP	SBI-3.04 (KJ802562)	N114D, R255C	4	1
CTX-M-3	SBI WWTP	SBI-3.27 (KJ802585)	N114D, T116A	6	1
CTX-M-3	SBI WWTP	SBI-3.37 (KJ802595)	M135V, M186V	2	1
CTX-M-3	SBI WWTP	SBI-3.58 (KJ802615)	E64G, Q128R, D179G	3	1
CTX-M-3	SBI WWTP	SBI-3.42 (KJ802599)	T13A, E110V, R274C R275L	7	1
CTX-M-3	PL WWTP	PLE-2.16 (KJ802499)	0	5	
CTX-M-3	PL WWTP	PLE-2.31 (KJ802514)	6	2	

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SUPPLEMENTARY TABLE S2. (CONTINUED)

Reference ^a	Site	Cloned seq. (acc. no.) ^b	Amino acid substitutions ^c	Nucleotide mismatches ^d	Freq. ^e
CTX-M-3	PL WWTP	PLE-2.05 (KJ802489)	1	1	
CTX-M-3	PL WWTP	PLE-2.07 (KJ802491)	1	1	
CTX-M-3	PL WWTP	PLE-2.17 (KJ802500)	4	1	
CTX-M-3	PL WWTP	PLE-2.29 (KJ802512)	1	1	
CTX-M-3	PL WWTP	PLE-2.47 (KJ802530)	1	1	
CTX-M-3	PL WWTP	PLE-2.54 (KJ802537)	1	1	
CTX-M-3	PL WWTP	PLE-2.55 (KJ802538)	4	1	
CTX-M-3	PL WWTP	PLE-2.64 (KJ802547)	2	1	
CTX-M-3	PL WWTP	PLE-2.11 (KJ802495)	R4P	5	1
CTX-M-3	PL WWTP	PLE-2.18 (KJ802501)	T13A	5	3
CTX-M-3	PL WWTP	PLE-2.43 (KJ802526)	T13A	6	1
CTX-M-3	PL WWTP	PLE-2.08 (KJ802492)	I58V	4	1
CTX-M-3	PL WWTP	PLE-2.42 (KJ802525)	A62V	1	1
CTX-M-3	PL WWTP	PLE-2.38 (KJ802521)	D63N	5	1
CTX-M-3	PL WWTP	PLE-2.49 (KJ802532)	M68T	1	1
CTX-M-3	PL WWTP	PLE-2.45 (KJ802528)	A77V	1	1
CTX-M-3	PL WWTP	PLE-2.32 (KJ802515)	Y129H	7	1
CTX-M-3	PL WWTP	PLE-2.14 (KJ802498)	V142I	4	1
CTX-M-3	PL WWTP	PLE-2.53 (KJ802536)	W251R	4	1
CTX-M-3	PL WWTP	PLE-2.09 (KJ802493)	V277I	1	1
CTX-M-3	PL WWTP	PLE-2.34 (KJ802517)	V277I2	1	
CTX-M-3	PL WWTP	PLE-2.28 (KJ802511)	V285A	4	1
CTX-M-3	PL WWTP	PLE-2.26 (KJ802509)	L289W	4	1
CTX-M-12	TRE	TRE-1.42 (KJ802680)	S89N	1	1
CTX-M-12	TRE	TRE-1.57 (KJ802693)	T286P	1	1
CTX-M-12	TRE	TRE-1.28 (KJ802667)	Q5K, A13T, S89N I277V	5	1
CTX-M-12	TRE	TRE-1.17 (KJ802658)	T7M, A13T, S89N I277V	5	1
CTX-M-12	SBI WWTP	SBI-3.09 (KJ802567)	0	1	
CTX-M-12	SBI WWTP	SBI-3.06 (KJ802564)	S89N	4	1
CTX-M-12	SBI WWTP	SBI-3.52 (KJ802609)	S89N, I277V	3	1
CTX-M-12	SBI WWTP	SBI-3.61 (KJ802618)	A13T, S89N, I277V	4	2
CTX-M-12	PL WWTP	PLE-2.56 (KJ802539)	1	1	
CTX-M-12	PL WWTP	PLE-2.70 (KJ802551)	0	1	
CTX-M-12	PL WWTP	PLE-2.19 (KJ802502)	I277V	3	1
CTX-M-12	PL WWTP	PLE-2.20 (KJ802503)	S89N, I277V 3	1	
CTX-M-12	PL WWTP	PLE-2.73 (KJ802554)	S89N, S147G, F151L	5	1
CTX-M-15	PL WWTP	PLE-2.44 (KJ802527)	1	1	
CTX-M-15	PL WWTP	PLE-2.46 (KJ802529)	1	1	
CTX-M-15	PL WWTP	PLE-2.13 (KJ802497)	1	1	
CTX-M-15	PL WWTP	PLE-2.76 (KJ802557)	2	1	
CTX-M-15	PL WWTP	PLE-2.02 (KJ802487)	V-1M	3	1
CTX-M-15	PL WWTP	PLE-2.61 (KJ802544)	A77V	2	1
CTX-M-15	PL WWTP	PLE-2.39 (KJ802522)	F160L	2	2
CTX-M-15	PL WWTP	PLE-2.69 (KJ802550)	P257L	2	1
CTX-M-15	PL WWTP	PLE-2.33 (KJ802516)	Q26H, Q206R	2	1
CTX-M-15	PL WWTP	PLE-2.52 (KJ802535)	Q5K, R178H, V249A	5	1
CTX-M-22	TRE	TRE-1.20 (KJ802661)	0	1	
CTX-M-22	SBI WWTP	SBI-3.43 (KJ802600)	0	1	
CTX-M-22	PL WWTP	PLE-2.60 (KJ802543)	K98E	1	1
CTX-M-29	SBI WWTP	SBI-3.19 (KJ802577)	G240D, N287D	2	1
CTX-M-29	PL WWTP	PLE-2.51 (KJ802534)	N287D	1	1
CTX-M-29	PL WWTP	PLE-2.10 (KJ802494)	G240D, N287D	3	1
CTX-M-29	PL WWTP	PLE-2.35 (KJ802518)	G240D, N287D	3	1
CTX-M-29	PL WWTP	PLE-2.62 (KJ802545)	G240D, N287D	2	1
CTX-M-29	PL WWTP	PLE-2.06 (KJ802490)	Y24C, G240D, N287D	7	1
CTX-M-30	TRE	TRE-1.12 (KJ802653)	2	6	
CTX-M-30	TRE	TRE-1.16 (KJ802657)	3	2	
CTX-M-30	TRE	TRE-1.18 (KJ802659)	4	1	
CTX-M-30	TRE	TRE-1.50 (KJ802687)	3	1	
CTX-M-30	TRE	TRE-1.84 (KJ802720)	R4C	4	1
CTX-M-30	TRE	TRE-1.80 (KJ802716)	L16P	5	1
CTX-M-30	TRE	TRE-1.30 (KJ802669)	M68T	5	1
CTX-M-30	TRE	TRE-1.76 (KJ802712)	N104S	4	1

(continued)

SUPPLEMENTARY TABLE S2. (CONTINUED)

Reference ^a	Site	Cloned seq. (acc. no.) ^b	Amino acid substitutions ^c	Nucleotide mismatches ^d	Freq. ^e
CTX-M-30	TRE	TRE-1.78 (KJ802714)	E121G	3	1
CTX-M-30	TRE	TRE-1.58 (KJ802694)	T159M	4	1
CTX-M-30	TRE	TRE-1.07 (KJ802648)	V230D	5	1
CTX-M-30	TRE	TRE-1.46 (KJ802683)	D240G	3	1
CTX-M-30	TRE	TRE-1.39 (KJ802677)	T243A	3	2
CTX-M-30	TRE	TRE-1.21 (KJ802662)	V261A	4	1
CTX-M-30	TRE	TRE-1.24 (KJ802665)	L16P, I58M	4	1
CTX-M-30	TRE	TRE-1.05 (KJ802646)	S20R, P257L, K270R	5	1
CTX-M-30	TRE	TRE-1.71 (KJ802707)	L81P, A205T	5	1
CTX-M-30	TRE	TRE-1.08 (KJ802649)	E38G, P107L, L193P	8	1
CTX-M-30	TRE	TRE-1.09 (KJ802650)	S70N, R178C, V208A S280A	7	1
CTX-M-30	TRE	TRE-1.06 (KJ802647)	S100P, V261I, Q268R L289S	7	2
CTX-M-30	SBI WWTP	SBI-3.78 (KJ802635)	4	1	
CTX-M-30	SBI WWTP	SBI-3.63 (KJ802620)	2	1	
CTX-M-30	SBI WWTP	SBI-3.40 (KJ802597)	3	1	
CTX-M-30	SBI WWTP	SBI-3.22 (KJ802580)	K111R	4	1
CTX-M-30	SBI WWTP	SBI-3.11 (KJ802569)	A227T	4	1
CTX-M-30	SBI WWTP	SBI-3.36 (KJ802594)	A227T	61	
CTX-M-30	SBI WWTP	SBI-3.75 (KJ802632)	A282T	5	1
CTX-M-30	SBI WWTP	SBI-3.47 (KJ802604)	A13T, E87G	5	2
CTX-M-30	SBI WWTP	SBI-3.80 (KJ802637)	A13T, Y241C	5	1
CTX-M-30	PL WWTP	PLE-2.24 (KJ802507)	2	2	
CTX-M-30	PL WWTP	PLE-2.50 (KJ802533)	3	1	
CTX-M-30	PL WWTP	PLE-2.63 (KJ802546)	3	1	
CTX-M-30	PL WWTP	PLE-2.22 (KJ802505)	4	1	
CTX-M-30	PL WWTP	PLE-2.74 (KJ802555)	Q5P	4	1
CTX-M-30	PL WWTP	PLE-2.48 (KJ802531)	D114N	5	1
CTX-M-30	PL WWTP	PLE-2.04 (KJ802488)	L289W	5	1
CTX-M-30	PL WWTP	PLE-2.71 (KJ802552)	A79T, L289W	5	1
CTX-M-36	TRE	TRE-1.03 (KJ802645)	2	2	
CTX-M-36	TRE	TRE-1.83 (KJ802719)	0	2	
CTX-M-36	TRE	TRE-1.19 (KJ802660)	3	1	
CTX-M-36	TRE	TRE-1.49 (KJ802686)	1	1	
CTX-M-36	TRE	TRE-1.55 (KJ802692)	2	1	
CTX-M-36	TRE	TRE-1.73 (KJ802709)	2	1	
CTX-M-36	TRE	TRE-1.53 (KJ802690)	Q5R	3	1
CTX-M-36	TRE	TRE-1.52 (KJ802689)	V47M	3	1
CTX-M-36	TRE	TRE-1.74 (KJ802710)	I139V	1	1
CTX-M-36	TRE	TRE-1.48 (KJ802685)	L289S	1	1
CTX-M-36	TRE	TRE-1.59 (KJ802695)	T7P, T209I	2	1
CTX-M-36	TRE	TRE-1.82 (KJ802718)	M9T, D101G	2	1
CTX-M-36	TRE	TRE-1.69 (KJ802705)	M68T, S70I	5	1
CTX-M-36	TRE	TRE-1.79 (KJ802715)	S70I, S280L	4	1
CTX-M-36	TRE	TRE-1.29 (KJ802668)	L3R, R4V, N245S	4	1
CTX-M-36	SBI WWTP	SBI-3.16 (KJ802574)	N287D	2	1
CTX-M-36	PL WWTP	PLE-2.01 (KJ802486)	2	2	
CTX-M-36	PL WWTP	PLE-2.40 (KJ802523)	0	1	
CTX-M-36	PL WWTP	PLE-2.67 (KJ802549)	S140A	3	1
CTX-M-36	PL WWTP	PLE-2.27 (KJ802510)	T149I	3	1
CTX-M-61	SBI WWTP	SBI-3.68 (KJ802625)	1	1	
CTX-M-62	PL WWTP	PLE-2.57 (KJ802540)	D63N, S167P	7	1
CTX-M-62	PL WWTP	PLE-2.37 (KJ802520)	N89S, S167P	5	1
CTX-M-62	PL WWTP	PLE-2.12 (KJ802496)	V30A, D63N, S167P V208A	8	1
CTX-M-66	SBI WWTP	SBI-3.60 (KJ802617)	0	1	

^aThe most similar *bla*_{CTX-M} sequence from those in the curated collection maintained by the Lahey Clinic (www.lahey.org/Studies/).

^bThe cloned sequence designation and its accession number in the GenBank/DDBJ/EMBL databases.

^cDeduced amino acid substitutions relative to the most similar CTX-M reference sequence. In keeping with β -lactamase numbering conventions³, CTX-M amino acid numbering in this report originates with S70 and counts forward and backward from there. As a result, all amino acid numbers are offset by three relative to the *N*-terminal methionine, which is designated M-2. Additionally, as CTX-M enzymes do not have an amino acid at position 239 relative to staphylococcal penicillinases (Karen Bush, personal communication), the amino acid sequences in this report skip from position 238 to 240, making all positions after 238 offset by two amino acids relative to the *N*-terminal methionine.

^dThe number of nucleotide differences between the cloned sequence and the most similar *bla*_{CTX-M} reference sequence.

^eThe number of times the sequence was recovered in its library.

PL WWTP, Point Loma Waste Water Treatment Plant (effluent); SBI WWTP, South Bay International Waste Water Treatment Plant (all fractions combined); TRE, Tijuana River Estuary (wet season).