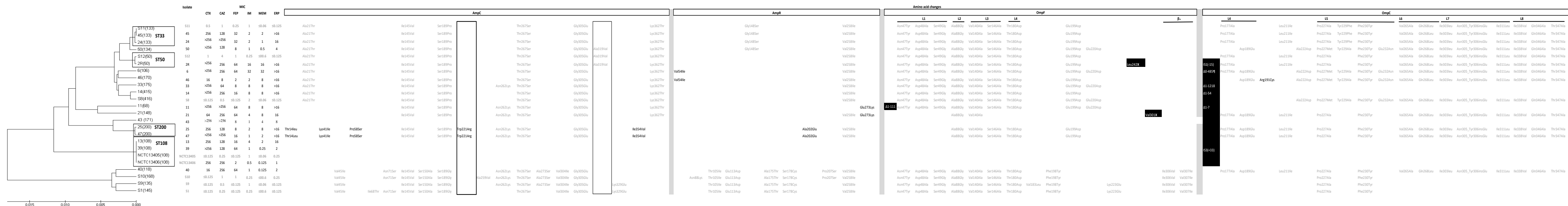


**Table S1.** Primers used in this study

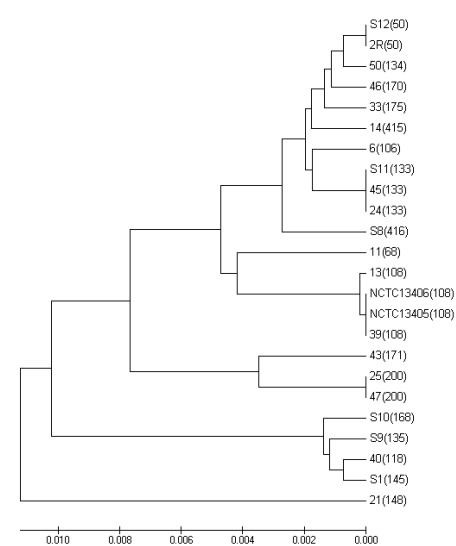
Genes(s)	Sequence 5'→3'	Use	Reference
KPC F	TGTCACGTATCGCCGTC	Gene detection	1
KPC R	CTCAGTGTCTACAGAAAACC	Gene detection	1
OXA-48 F	TTGGTGGCATCGATTATCGG	Gene detection	2
OXA-48 R	GAGCACTCTTTTGATGGC	Gene detection	2
IMI F	GTTCATTACCCATCACAAAC	Gene detection	<i>This study</i>
IMI R	CTACCGCATAATCATTGCGG	Gene detection	<i>This study</i>
New IMI variant F	CTACGCTTAGACTGGC	Gene detection	<i>This study</i>
New IMI variant R	TTGGTACGCTAGCAGCAATA	Gene detection	<i>This study</i>
VIM F	GATGGTGTGGTCGCCATA	Gene detection	3
VIM R	CGAATGCGCAGCACCAG	Gene detection	3
IMP F	GGAAATAGATGGCTTAAATCT	Gene detection	3
IMP R	CCAAACCACACTACGTTATCT	Gene detection	3
FRI-1 F	TGAACCTATCGCCTCTCAG	Gene detection	11
FRI-1 R	CTGCTTCGTCATGTTGTCG	Gene detection	11
TEM F	CATTTTCGTGTCGCCCTTAT	Gene detection	4
TEM R	TCCATAGTTGCCGACTCCC	Gene detection	4
CTX-M multiplex		Gene detection	5
SHV F	ATGCGTTATATCGCCTG	Gene detection	6
SHV R	TTAGCGTTGCCAGTGCTC	Gene detection	6
GES F	TTCCGATCAGCCACCTCTCA	Gene detection	7
GES R	CTGGCAGGATCGCTCACTC	Gene detection	7
ampC multiplex		Gene detection	8
ampC F	GACATCCCCTGACTCGCTA	Whole gene amplification & sequencing	<i>This study</i>
ampC R	GTTTTACTGTAGCGCCTCGA	Whole gene amplification & sequencing	<i>This study</i>
ampR F	TTTCATCTTCTCCACCAGCC	Whole gene amplification & sequencing	<i>This study</i>
ampR R	ATAGCGAGTCAAGGGGATGT	Whole gene amplification & sequencing	<i>This study</i>
ampD F	ATGTTGTTAGAAAACGGATG	Whole gene amplification & sequencing	9
ampD R	TCATGTTATCTCCTTATCTG	Whole gene amplification & sequencing	9
ompC F	TGAGGAGAATGAAATTGCCGAC	Whole gene amplification & sequencing	<i>This study</i>
ompC R	GCGGCAAGAGTACACAAAA	Whole gene amplification & sequencing	<i>This study</i>
ompF F	AGACACCAAACTCTCATCAATAGTTC	Whole gene amplification & sequencing	10
ompF R	CGCTATCAGGTTAACGGTA	Whole gene amplification & sequencing	10
rspL F	ACGTACAGCACACGACG	Expression analysis	<i>This study</i>
rspL R	AGCGTGTCTCCAGACTCAC	Expression analysis	<i>This study</i>
ampC F	GCATGGCGGTGGCCGTTAT	Expression analysis	10
ampC R	CTGCTTCCCGTCAGCTGT	Expression analysis	10
ompF F	TAATGACAGCAACGATGGCGAC	Expression analysis	<i>This study</i>
ompF R	AGCGCCTCAGAGTGTGTACC	Expression analysis	<i>This study</i>
ompC F	GCGCCAGTGGGAATACCAGA	Expression analysis	<i>This study</i>
ompC R	GAATGAACCCGCATCAGCGAA	Expression analysis	<i>This study</i>

**Figure S1: UPGMA tree of concatenated sequences of *ampC*, *ampR*, *ompF* and the corresponding amino acid changes of AmpC, AmpR, OmpF and OmpC and cephalosporin and carbapenem MIC**

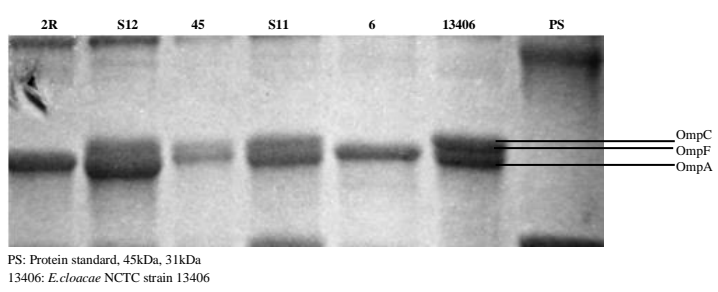


CTX: ceftazidime, CAZ: ceftazidime, FEP: ceftopime, IM: imipenem, MEM: meropenem, ERP: eropenem, MICs in mg/L, NCTC13405: reference wild type *E. coli*, NCTC13406: AmpC- $\beta$ -lactamase derepressed (constitutive hyper-producing) mutant of NCTC 13405. bold square:  $\Omega$ -loop, thin square:  $\Omega$ -loop of residues 289–3101, loops and transmembrane barrels of the outer membrane proteins are indicated as L and  $\beta$  respectively; + and – indicate the position of insertions upstream and downstream of the A of the start codon, OmpC: \* nucleotide 485 is fused to the adjacent two component system. Grey font: amino acid changes that are seen in carbapenem-resistant and -susceptible isolates, black font: amino acid changes that are only seen in carbapenem-resistant isolates, white font on black background: disruptions and indels of the gene

**Figure S2: UPGMA tree of concatenated sequences of the 7 DNA fragments of MLST. Isolate numbers (sequence types by MLST)**



**Figure S 3. Outer membrane profiles of selected isolates on 12% SDS-polyacrylamide gel**



PS: Protein standard, 45kDa, 31kDa  
13406: *E. cloacae* NCTC strain 13406

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