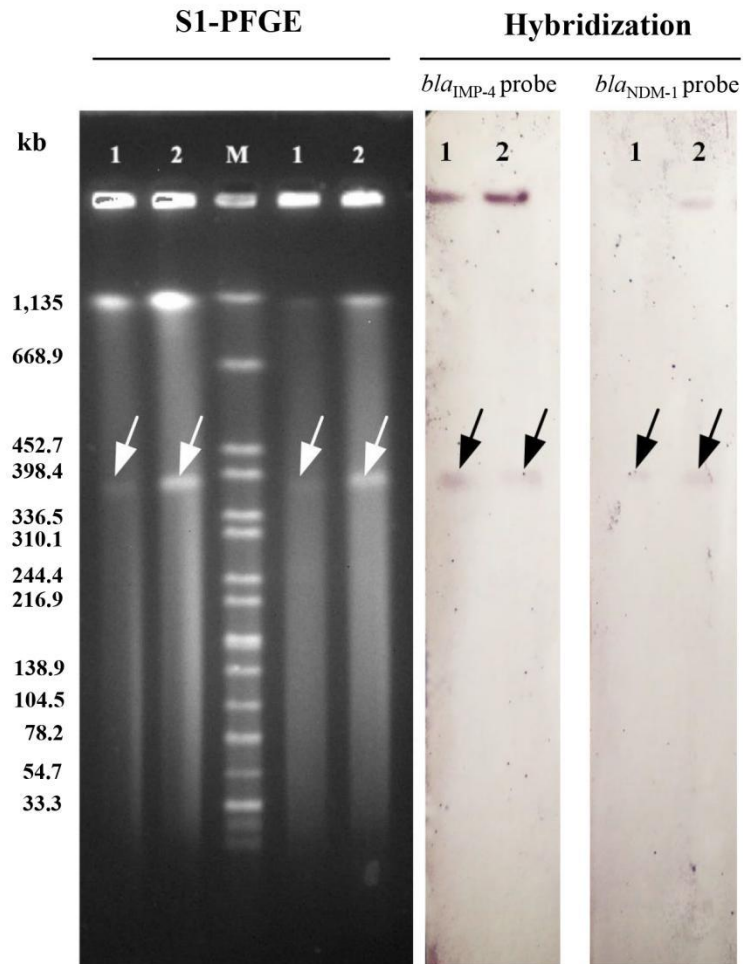
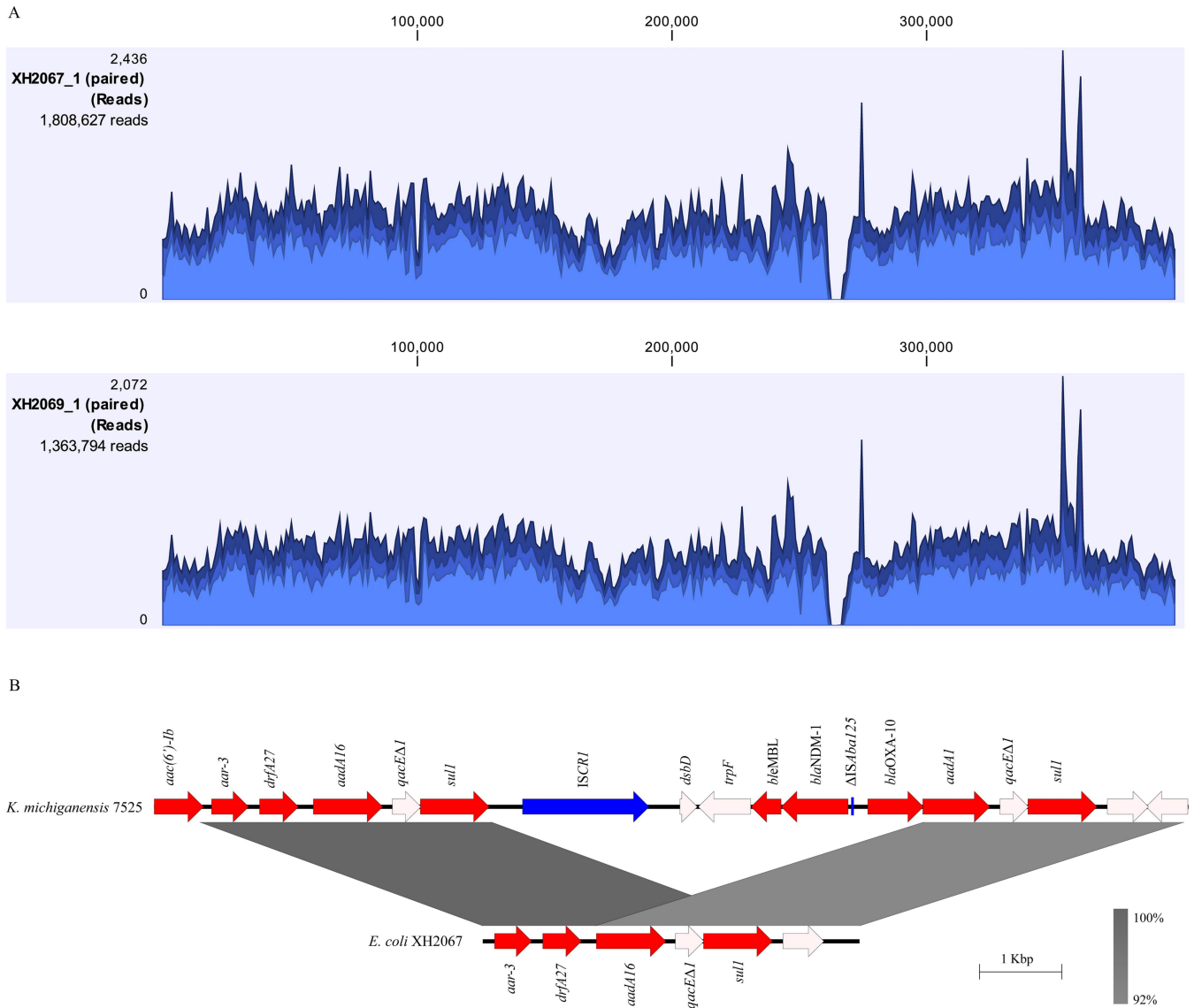


## Supplementary Materials



Supplementary Figure 1. S1-PFGE and Southern blot hybridization

1, *K. michiganensis* strain 7525; 2, transconjugant *E. coli* J53 (pKOX7525\_1); M, *Salmonella enterica*, serotype Braenderup H9812 digested by XbaI restriction enzyme. The black arrows are the positive signals via southern blot hybridization with *bla*<sub>IMP-4</sub>-specific or *bla*<sub>NDM-1</sub>-specific probe, respectively.



Supplementary Figure 2. Genome alignment between the *E. coli* transconjugants after experimental passage and *K. michiganensis* strain 7525 in the complete plasmid pKOX7525\_1.

(A) Mapping graphs representing read coverage difference between the genome of XH2067 (or XH2069) and the reference sequence (pKOX7525\_1). (B) Scaled, linear diagrams comparing the sequences between XH2057 and pKOX7525\_1. Gray shading and squares in colors indicate homologies between the corresponding genetic loci on each plasmid. Arrows indicate open reading frames, with arrowheads indicating the direction of transcription: red, antibiotic-resistant encoding genes; blue, transposon- and integron-associated genes; Other genes are shown as white arrows.

Supplementary table 1. Strain list used in this study

Name	Description
<i>Klebsiellia michiganensis</i> strain 7525	Clinical strain studied in our work co-harboring <i>bla</i> <sub>IMP-4</sub> and <i>bla</i> <sub>NDM-1</sub> on the same plasmid, wild-type
<i>E. coli</i> J53	Lab stain <i>Escherichia coli</i> J53, recipient used for transconjugation experiment, sodium azide-resistant
<i>E. coli</i> J53 (pKOX7525_1)	Transconjugant, <i>E. coli</i> J53 containing pKOX7525_1
XH2065	Single colony being positive with both <i>bla</i> <sub>IMP-4</sub> and <i>bla</i> <sub>NDM-1</sub> gene, selected from population of <i>E. coli</i> J53 (pKOX7525_1) after ten days of passage in LB broth with 1µg/mL ciprofloxacin
XH2066	Single colony being positive with <i>bla</i> <sub>IMP-4</sub> gene but negative with <i>bla</i> <sub>NDM-1</sub> , selected from population of <i>E. coli</i> J53 (pKOX7525_1) after ten days of passage in LB broth with 1µg/mL ciprofloxacin
XH2067	Single colony being positive with <i>bla</i> <sub>IMP-4</sub> gene but negative with <i>bla</i> <sub>NDM-1</sub> , selected from population of <i>E. coli</i> J53 (pKOX7525_1) after ten days of passage in LB broth without antibiotic,
XH2068	Single colony being negative with both <i>bla</i> <sub>IMP-4</sub> and <i>bla</i> <sub>NDM-1</sub> , selected from population of <i>E. coli</i> J53 (pKOX7525_1) after ten days of passage in LB broth without antibiotic
XH2069	Single colony being positive with <i>bla</i> <sub>IMP-4</sub> but negative with <i>bla</i> <sub>NDM-1</sub> , selected from population of <i>E. coli</i> J53 (pKOX7525_1) after five days of passage in LB broth without antibiotic

**Supplemental table 2. Genomic information and antimicrobial resistance gene of *K. michiganensis* strain 7525**

Name	Size(bp)	G+C (%)	Antimicrobial resistance genes (copy number)	Accession number
<i>K. michiganensis</i> strain 7525 chromosome	5,847,354	55.69	<i>bla</i> <sub>OXY-5</sub> , <i>bla</i> <sub>CTX-M-15</sub>	CP065474
pKOX7525_1	397,447	49.10	<i>bla</i> <sub>OXA-16</sub> , <i>bla</i> <sub>SFO-1</sub> , <i>bla</i> <sub>IMP-4</sub> , <i>bla</i> <sub>NDM-1</sub> , <i>aac</i> (6')-Ib-cr (3 copies), <i>aac</i> (6')-Ib3, <i>aph</i> (6)-Id, <i>aph</i> (3'')-Ib, <i>qnrS1</i> , <i>qacE</i> (2), <i>aadA16</i> , <i>aadA1</i> (2), <i>sul1</i> (2), <i>mph</i> (A), <i>catB3</i> , <i>ARR-3</i> , <i>dfrA27</i>	CP065475
Plasmid 2	6,397	44.35	ND	NA
Plasmid 3	3,662	46.56	ND	NA

NA, not applied. ND, not detected.

**Supplementary table 3. Bioinformatic information of multiple carbapenemase producing CREs reported in China**

Case.	Species (Number)	Isolate name	Plasmid name	Carbapenem-resistant gene	Size (bp)	Inc type	year	GenBank No.	Reference
1	<i>Klebsiella oxytoca</i> (1)	KOX3	pKOX3-P5-KPC	<i>bla</i> <sub>KPC-2</sub>	40,277	IncP6	2017	KY913901	[1]
			pKOX3-P3-NDM	<i>bla</i> <sub>NDM-1</sub>	55,246	IncX3		KY913899	
			pKOX3-P4-IMP	<i>bla</i> <sub>IMP-4</sub>	61,680	IncN		KY913900	
2	<i>Providencia rettgeri</i> (1)	Strain 2055	p2055-IMP	<i>bla</i> <sub>NDM-1</sub> , <i>bla</i> <sub>IMP-4</sub>	41,936	IncW	2018	MH882484	None
3	<i>Enterobacter cloacae</i> (2)	SZECL1	pKPC3_SZ	<i>bla</i> <sub>KPC-3</sub>	43,333	IncX6	2016	KU302800	[2]
			pNDM1_SZ1	<i>bla</i> <sub>NDM-1</sub>	130,573	IncA/C2+IncR		KU302801	
		SZECL2	pKPC3_SZ	<i>bla</i> <sub>KPC-3</sub>	43,333	IncX6		KU302800	
			pNDM1_SZ2	<i>bla</i> <sub>NDM-1</sub>	132,232	IncA/C2		KU302802	
4	<i>Citrobacter freundii</i> (1)	Strain 112298	p112298-KPC	<i>bla</i> <sub>KPC-2</sub>	117,288	No hit found	2015	KP987215	[3]
			p112298-NDM	<i>bla</i> <sub>NDM-1</sub>	53,489	IncX3		KP987216	
6	<i>Klebsiella pneumoniae</i> (7)	C2315	pC2315-4-KPC	<i>bla</i> <sub>KPC-2</sub>	175,540	IncFIA(HI1)+IncFII	2020	NZ_CP039831	[4]
			pC2315-2-NDM	<i>bla</i> <sub>NDM-1</sub>	317,231	IncHI1B		NZ_CP039829	
		C2343	pC2343-4-KPC	<i>bla</i> <sub>KPC-2</sub>	175,540	IncFIA(HI1)+IncFII		NZ_CP039826	
			pC2343-2-NDM	<i>bla</i> <sub>NDM-1</sub>	318,848	IncHI1B		NZ_CP039824	
		C2414	pC2414-2-KPC	<i>bla</i> <sub>KPC-2</sub>	172,001	IncFII(pHN7A8)+IncR		NZ_CP039820	
			pC2414-3-NDM	<i>bla</i> <sub>NDM-1</sub>	63,046	IncN		NZ_CP039821	
		C2660	pC2660-3-KPC	<i>bla</i> <sub>KPC-2</sub>	153,556	IncFII(pHN7A8)+IncR		NZ_CP039810	
			pC2660-4-NDM	<i>bla</i> <sub>NDM-1</sub>	53,097	IncX3		NZ_CP039811	
		C2601	pC2601-3-KPC	<i>bla</i> <sub>KPC-2</sub>	97,386	IncFII(Yp)		NZ_CP039815	
			pC2601-5-NDM	<i>bla</i> <sub>NDM-1</sub>	51,995	IncN2		NZ_CP039817	
		C2972	pC2972-4-KPC	<i>bla</i> <sub>KPC-2</sub>	97,386	IncFII (Yp)		NZ_CP039805	
			pC2972-5-NDM	<i>bla</i> <sub>NDM-1</sub>	51,995	IncN2		NZ_CP039806	
		C2974	pC2974-4-KPC	<i>bla</i> <sub>KPC-2</sub>	97,466	IncFII(Yp)		NZ_CP039798	
			pC2974-6-NDM	<i>bla</i> <sub>NDM-1</sub>	51,995	IncN2		NZ_CP039800	

**References**

### Plasmid co-harboring *bla*<sub>IMP-4</sub> and *bla*<sub>NDM-1</sub>

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