Novel mcr-3.40 variant co-located with mcr-2.3 and blaCTX-M-63 on an IncHI1B/IncFIB plasmid found in Klebsiella pneumoniae from a healthy carrier in Thailand

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Figure 1. (a) Linear comparison of p90CM2 and three reference plasmids (pNDM-MAR, pENVA and pUNNAMED1). (b) Linear comparison of the MDR region of p90CM2-MCR with segments from different plasmids.
the MDR region demonstrated a high similarity to several different plasmid segments. The two largest modules (module I containing mcr-2.3 and module II containing mcr-3.40) were highly similar (~99%) to regions located on plasmid pQnrB4_020042 (accession number CP028537) and plasmid pT38_MCR3 (accession number MK770642), respectively. Within module I, a putative composite transposon (~5 kb) harbouring mcr-2.3 was flanked by duplicates of novel IS elements, designated as ISKpn71 (IS256 family) by ISfinder. A pair of direct repeats, ATTATTTTT, flanking the putative composite transposon, indicated its previous insertion into this region and, thus, possible mobilization. Additionally, the putative transposon contained ISSpu2, located right upstream of mcr-2.3. To the best of our knowledge, this is the first report of an mcr gene associated with ISSpu2.

Conversely, mcr-3.40 was detected in a known mcr-3 genetic context, mcr-3.40-dgkA-ISKpn40, within a region flanked by complete copies of IS4321. A similar segment was discovered on plasmid pT38-MCR3 (Figure 1b, module II) within antibiotic resistance island (‘ARI’)-A. Moreover, this region was bracketed by three copies of IS26; one identified upstream and the other two identified downstream from the IS4321-flanked region. Due to the opposite directions of IS26, a segment encompassing modules I-II-III could potentially be moved by a new composite transposon. However, it is inconclusive whether the identified putative transposons were involved in the events that tailored the highly mosaic structure of the MDR region of p90CM2-MCR.

Self-transferability of p90CM2-MCR and possible mobilization of individual MDR segments could ultimately pose a public health threat. Moreover, coexistence of resistance and virulence plasmids within a single K. pneumoniae clone recovered from an asymptomatic carrier is also of concern.

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Transparency declarations
None to declare.

Supplementary data
Tables S1 and S2, Figures S1 and S2 and Supplementary Materials and methods are available as Supplementary data at JAC Online.

References