

## Genome analysis of ESBL-producing *E. coli* and *K. pneumoniae* isolated from patients who underwent abdominal surgery

Sumalee Kondo, Worawich Phornsiricharoenphant, Lalita Na-rachasima, Wuthiwat Ruangchai, Pimonwan Phokhaphan, Anucha Apisarntharak, Prasit Palittapongarnpim

*Corresponding author: Sumalee Kondo ([flower9great@yahoo.com](mailto:flower9great@yahoo.com)), Faculty of Medicine, Thammasat University, Thailand*

### **ABSTRACT** (250-300 words)

**Background:** Extended-spectrum  $\beta$ -lactamase-producing *Enterobacterales* (ESBL-PE) caused serious global health concern for transmission of multidrug resistant organisms, particularly *Escherichia coli* and *Klebsiella pneumoniae*. Hospital-acquired infections including surgical site infections caused by ESBL-PE, are associated with considerable morbidity and mortality.

**Objective:** To examine resistance genes, virulence genes and relatedness among the strains isolated recovered from rectal swabs of patients who underwent abdominal surgery.

**Methods:** A total of 31 out of 104 patients, who underwent abdominal surgery, carried ESBL producing *E. coli* and *K. pneumoniae* isolated from fecal flora. Forty-six isolates were recovered from 17 patients who yielded ESBL-PE organisms on pre- and post-surgical screening, except for one patient where ESBL-KP and KP<sup>R</sup> phenotypes were found only in the post-operation specimen. The 46 selected isolates were carried out for whole genome sequence analysis.

**Results:** Phylogenetic trees demonstrated the relatedness among the strains. Six different clusters were demonstrated among the ESBL-producing *E. coli* (EPE) and resistant *E. coli* (EP<sup>R</sup>) strains from the tree. The strains carried plasmid encoding extended-spectrum  $\beta$ -lactamase, antimicrobial resistance genes and virulence factors. Most isolates were multidrug resistant and potentially cause high risk of infections during abdominal surgery.

**Conclusion:** It is crucial to screen for ESBL producers to advocate for monitoring and prevention of transmission of prolonged fecal ESBL carriages at high risk to breakout a consequential threat of treatment.

### **BIOGRAPHY** (100-150 words)

- Associate Prof. Dr. Sumalee Kondo has current research topics focus on antibiotic resistance of bacteria, including Methicillin-resistant *S. aureus* and Extended-spectrum  $\beta$ -lactamase - producing *Enterobacterales* (ESBL-PE). The research on screening for ESBL-PE and other resistant bacteria has been urged to be a significant concern on surveillance and prevention of infections in patients who are at high risk in hospital, particularly site specific infections from ESBL carriages.
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