Genetic Characterisation of integrons in Malaysian *Escherichia coli* strains

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**Abstract**

*Escherichia coli* is a common intestinal microbiota in humans and the emergence of multidrug resistant *E. coli* associated with integrons has been reported worldwide. The objective of this study was to determine the prevalence and genetic contents of integrons in Malaysian *E. coli* strains. A total of six types of class 1 integrons and one type of class 2 integrons were detected with amplicon sizes ranging from 700 bp to 2000 bp. *aadA* and *dfr* genes were predominantly found in class 1 and class 2 integron-encoded gene cassettes.

**Introduction**

*Escherichia coli* is one of the most important nosocomial pathogens in Malaysian hospitals. The common occurrence of multidrug resistant *Escherichia coli* isolates is of concern because it limits the treatment options. The emergence of multidrug resistant *E. coli* is often associated with mobile genetic elements such as plasmids and integrons (Machado et al., 2005). Resistance genes in the form of gene cassettes are inserted into integrons and integrons themselves are self-mobile and hence contribute greatly to the dissemination of resistance genes (Cambray et al., 2010). The detection of integrons is hence essential in detecting the potential dissemination of antibiotic resistance genes. Thus, this study was carried out to characterise integrons found in clinical Malaysian *E. coli* strains.

**Materials and Methods**

Detection of class 1, class 2 and class 3 integrases were carried out using PCR as described previously (Machado et al., 2005). Amplification of the variable regions of integrons (gene cassette) was carried out for integrase-positive strains (Machado et al., 2005). DNA sequence analysis of amplified PCR products was then carried out to determine the gene cassettes inserted in integron platform.

**Results and Discussion**

42.7% of *intI1* and 3.6% of *intI2* integrase genes were detected 110 strains. Of the 47 *intI1*-positive strains, only 20 harboured gene cassettes while all *intI2* integrase positive strains were found to harbour variable regions of class 2 integron. Seven types of gene cassettes were identified (Table 1). A predominance of *aadA* and *dfr* genes were detected which confer resistance to aminoglycosides and trimethoprim, respectively. Class 1 integrons remained as the most prevalent class of integrons in Malaysian *E.