

# 禽源致病性大腸桿菌及沙門氏菌之第一型整合子檢測

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## 摘要

2013年至2015年間，自禽類細菌性病例分離得禽源致病性大腸桿菌（avian pathogenic *Escherichia coli*; APEC）91及沙門氏菌65株，其中沙門氏菌依血清型分別為33株*Salmonella Pullorum*，6株*Salmonella Typhimurium*，3株*Salmonella Enteritidis*，1株*Salmonella Haifa*，其餘22株為*Salmonella sp.*。整合子（integron）是一種細菌產生抗藥性的機制，為可移動的DNA組成，其上攜帶的抗藥性基因片匣可能影響細菌的抗藥性。本研究以聚合酶連鎖反應檢測禽源致病性大腸桿菌及禽類沙門氏菌是否帶有第一型整合子，並定序其上帶有的抗藥性基因片匣。其中60.7% (61/91)禽源致病性大腸桿菌及36.9% (24/65)沙門氏菌株可測得第一型整合子，其大小為721 bp到1,900 bp不等。第一型整合子所攜帶的基因片匣種類主要為aminoglycosides抗藥性基因(*aadA*)；trimethoprim抗藥性基因(*dfr*) 及一種 $\beta$ -lactamase基因(*Bla<sub>PSE1</sub>*)。帶有*dfr*基因之菌株對於trimethoprim/sulfamethoxazole皆有抗藥性，帶有*aadA*基因之菌株對於streptomycin的最小抑制濃度 (minimum inhibitory concentration; MIC)則有明顯上升的情形，顯示菌株的抗藥性與第一型整合子帶有的抗藥性基因卡匣有關。然而，抗藥性基因卡匣的種類僅包含部分菌株的抗藥性，顯示還有其他抗藥機制存在。

# Detection of class I integrons in avian pathogenic *Escherichia coli* and avian *Salmonella*

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## Abstract

Ninety-one isolates of avian pathogenic *Escherichia coli* (APEC) and 65 isolates of avian *Salmonella* were cultured from bacterial infection cases in poultry from 2013 to 2015. Based on the Modified Kauffmann-White Scheme, 33 isolates of *Salmonella* Pullorum, six isolates of *Salmonella* Typhimurium, three isolates of *Salmonella* Enteritidis, one isolate of *Salmonella* Haifa, and 22 isolates of *Salmonella* sp. were included. Integrons are an important mechanism of antimicrobial resistance, since they are mobile genetic elements that can be transferred horizontally among bacteria and which in some cases can contain one to several resistant gene cassettes. In this study, class I integrons were detected by PCR and gene sequencing. The results revealed that 60.7% (61/91) of APEC and 36.9% (24/65) of avian *Salmonella* isolates carried class I integrons of various size (721 bp -1,900 bp). These class I integrons contained gene cassettes encoding resistance to aminoglycosides (*aadA*), trimethoprim (*dfr*) and  $\beta$ -lactamase (*Bla<sub>PSE1</sub>*). All the *dfr*-positive isolates were resistant to trimethoprim/sulfamethoxazole and the *aadA*-positive isolates were increased in the minimum inhibitory concentration of streptomycin. These results indicate that these types of resistant cassette assays reflect the relevant antimicrobial resistances in APEC and *Salmonella* isolates.