

## **The effects of polymorphisms in 7 candidate genes on resistance to *Salmonella* Enteritidis in native chickens**

### **ABSTRACT**

*Salmonella enterica* serovar Enteritidis infection is a common concern in poultry production for its negative effects on growth as well as food safety for humans. Identification of molecular markers that are linked to resistance to *Salmonella* Enteritidis may lead to appropriate solutions to control *Salmonella* infection in chickens. This study investigated the association of candidate genes with resistance to *Salmonella* Enteritidis in young chickens. Two native breeds of Malaysian chickens, namely, Village Chickens and Red Junglefowl, were evaluated for bacterial colonization after *Salmonella* Enteritidis inoculation. Seven candidate genes were selected on the basis of their physiological role in immune response, as determined by prior studies in other genetic lines: natural resistance-associated protein 1 (NRAMP1), transforming growth factor 3 (TGF 3), transforming growth factor 4 (TGF 4), inhibitor of apoptosis protein 1 (IAP1), caspase 1 (CASP1), lipopolysaccharide-induced tumor necrosis factor (TNF) factor (LITAF), and TNF-related apoptosis-inducing ligand (TRAIL). Polymerase chain reaction-RFLP was used to identify polymorphisms in the candidate genes; all genes exhibited polymorphisms in at least one breed. The NRAMP1-SacI polymorphism correlated with the differences in *Salmonella* Enteritidis load in the cecum ( $P = 0.002$ ) and spleen ( $P = 0.01$ ) of Village Chickens. Polymorphisms in the restriction sites of TGF 3-BsrI, TGF 4-MboII, and TRAIL-StyI were associated with *Salmonella* Enteritidis burden in the cecum, spleen, and liver of Village Chickens and Red Junglefowl ( $P < 0.05$ ). These results indicate that the NRAMP1, TGF 3, TGF 4, and TRAIL genes are potential candidates for use in selection programs for increasing genetic resistance against *Salmonella* Enteritidis in native Malaysian chickens.

**Keyword:** Candidate gene; Genetic resistance; Native chicken; *Salmonella* Enteritidis