

# Deteksi gen penyandi Secretion System ATPase type III (ssaN) Salmonella enterica subsp. enterica pada spesimen darah pasien demam tifoid = Detection of Gene Encoding Secretion System ATPase type III (ssaN) in Salmonella enterica subsp. enterica from Blood Specimen of Typhoid Fever Patients

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## Abstrak

Demam tifoid adalah penyakit infeksi umum akut yang disebabkan oleh *Salmonella typhi*. Penyakit yang tersebar hampir di seluruh dunia ini merupakan penyakit tropik sistemik, bersifat endemis dan masih merupakan problem kesehatan masyarakat di dunia, terutama di negara-negara berkembang, termasuk Indonesia. Uji Widal merupakan salah satu uji serologis yang sampai saat ini masih digunakan secara luas, khususnya di negara berkembang termasuk Indonesia. Uji serologi Widal memiliki sensitivitas dan spesifisitas yang rendah serta sering memberikan hasil positif palsu maupun negatif palsu. Oleh karena itu dilakukan deteksi molekuler real time PCR terhadap gen penyandi secretion system ATPase type III ssaN *Salmonella enterica subsp. enterica* dari spesimen darah pasien demam tifoid.

Uji spesifisitas teknik real time PCR didapatkan bahwa primer dan probe yang digunakan tidak bereaksi silang terhadap mikroorganisme lain yang diuji pada penelitian ini. Pada uji sensitivitas teknik didapatkan kemampuan deteksi minimal adalah 10 cfu/ml pada spesimen darah. Pada penerapan uji terhadap spesimen darah, didapatkan real time PCR dapat mendeteksi 19/38 sampel positif *Salmonella enterica subsp. enterica* dari 50 spesimen darah pasien yang diduga terinfeksi demam tifoid. Sebelas sampel dengan serologi Widal negatif memberikan hasil positif pada real time PCR. Dengan demikian, uji real time PCR terhadap target gen ssaN yang digunakan dalam penelitian ini dapat meningkatkan tingkat pengujian positif sebesar 22 dibandingkan uji Widal.

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Typhoid fever is an acute infectious disease caused by *Salmonella typhi*. Diseases spread almost all over the world is a tropical disease systemic, endemic and remains a public health problem in the world, especially in developing countries, including Indonesia. In areas where typhoid fever occur, the clinical diagnosis of typhoid fever is inadequate, because the symptoms are not specific and overlapping with other febrile illnesses. Diagnosis of typhoid fever is often enforced only based on clinical symptoms and serological tests alone. Widal test is a serological test which is still widely used, particularly in developing countries, including Indonesia. Widal serological test has a very low sensitivity and specificity and often give false positives or false negatives result. Therefore, were performed detection of gene encoding secretion system ATPase type III ssaN in *Salmonella enterica subsp. enterica* from blood specimen of typhoid fever patients. Specificity test of real time PCR technique showed that the primers and probes used are not cross react against other microorganisms tested in this study. On the sensitivity test techniques obtained minimal detection is at least 10 cfu ml of blood specimen. On the application of test in blood clinical specimens, real time PCR could detect 19/38 *Salmonella enterica subsp. enterica* positive samples of 50 blood specimen from suspected typhoid fever patients. Eleven samples with negative Widal serology gives positive results in real time PCR. Thus, real time PCR test with the ssaN gene target used in this study could increase rate of

positive testing about 22 compared with Widal test.