

Efikasi Kandidat Vaksin DNA, pcDNA3.1-rpfD Berdasarkan Time to positivity pertumbuhan Mycobacterium tuberculosis dan Hubungannya dengan Interferon Gamma = Efficacy of the DNA Vaccine Candidate, pcDNA3.1-rpfD Based on Time to Positivity of Mycobacterium tuberculosis Growth and Its Correlation with Gamma Interferon Level

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Abstrak

Resuscitation-promoting factor D (RpfD) merupakan protein imunogenik yang berperan untuk proses resusitasi Mycobacterium tuberculosis yang dorman menjadi bakteri yang aktif. Seed vaksin yang membawa gen pengkode protein tersebut, pcDNA3.1-rpfD telah berhasil dikonstruksi serta terbukti mampu menginduksi respon imun seluler dan humoral. Pada penelitian ini, efikasi seed vaksin pcDNA3.1-rpfD terhadap pertumbuhan M. tuberculosis dianalisis melalui mycobacterial growth inhibition assay (MGIA). Delapan belas ekor mencit BALB/c diimunisasi dengan pcDNA3.1-rpfD, pcDNA3.1 atau BCG sebanyak 3x dengan interval 2 pekan. Satu pekan setelah imunisasi terakhir, splenosit dan PBMC mencit diko-kultur dengan bakteri M. tuberculosis pada 3×10^4 CFU selama 96 jam kemudian bakteri dire-kultur kembali dalam sistem kultur otomatis BACTECTM MGITM. Time to positivity (TTP) tiap perlakuan dibandingkan sebagai indikator penghambatan pertumbuhan M. tuberculosis. Hasil penelitian menunjukkan bahwa splenosit dan PBMC mencit yang diimunisasi dengan pcDNA3.1-rpfD memberikan penundaan waktu TTP yang signifikan dibandingkan pcDNA3.1 ($p=0,024$ dan $p=0,047$) dan BCG ($p=0,412$ dan $p=0,081$). Hasil penelitian ini menunjukkan kemampuan pcDNA3.1-rpfD dalam menghambat pertumbuhan M. tuberculosis. Adapun pengukuran kadar IFN dengan metode ELISA tidak menunjukkan adanya perbedaan yang bermakna antar kelompok perlakuan. Selain itu, tidak terdapat korelasi antara kadar IFN tersebut dengan nilai TTP.

.....Resuscitation-promoting factor D (RpfD) is a protein involved in the resuscitation of dormant Mycobacterium tuberculosis into active bacteria. The seed vaccine carrying the rpfD gene, pcDNA3.1-rpfD has been successfully constructed. It was demonstrated that this vaccine induce cellular and humoral immune responses. In this study, the efficacy of pcDNA3.1-rpfD against the growth of M. tuberculosis was analyzed using mycobacterial growth inhibition assay (MGIA). Eighteen BALB/c mice were immunized with pcDNA3.1-rpfD, pcDNA3.1 or BCG 3 times at 2-week intervals. One week after the last immunization, splenocytes and PBMCs of mice were co-cultured with M. tuberculosis at 3×10^4 CFU for 96 hours then the bacteria were re-cultured in the BACTECTM MGITM automated culture system. Time to positivity (TTP) of each treatment was compared as an indicator of M. tuberculosis growth inhibition. The results showed that splenocytes and PBMCs of mice immunized with pcDNA3.1-rpfD gave a significant delay in TTP compared to pcDNA3.1 ($p=0.024$ and $p=0.047$) and BCG ($p=0.412$ and $p=0.081$). The results of this study showed the ability of pcDNA3.1-rpfD to inhibit the growth of M. tuberculosis. No significant difference of IFN level measured with ELISA between the treatment groups. Besides, there was no correlation between the IFN level and the TTP value.