

Analisis keragaman haplotipe gen EBA-140 dan gen gypc pada isolat klinis plasmodium falciparum dari beberapa daerah endemik malaria di Indonesia = Analysis of EBA-140 and gypc gene polymorphisms of plasmodium falciparum clinical isolates from endemic malaria regions in Indonesia

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Abstrak

Plasmodium falciparum menggunakan protein EBA140 sebagai salah satu protein yang berperan pada proses invasi ke dalam sel darah merah. Polimorfisme domain F1 gen EBA-140 diketahui memengaruhi spesifisitas perlekatan protein EBA-140 pada reseptor di permukaan sel darah merah. Variasi tipe alel Gerbich pada gen GYPC yang merupakan reseptor bagi EBA-140 juga dapat memengaruhi kemampuan protein ligan EBA-140 dalam berikatan dengan reseptor GYPC di permukaan sel darah merah.

Penelitian mengenai keragaman sekuens asam amino domain F1 gen EBA-140 dan variasi alel Gerbich gen GYPC telah dilakukan terhadap 18 isolat klinis *P. falciparum* yang berasal dari kabupaten Bangka Barat (n = 5), kabupaten Bangka Tengah (n = 4), dan kabupaten Mimika (n = 9). Amplifikasi gen EBA-140 dari isolat parasit malaria dilakukan dengan teknik Polymerase Chain Reaction (PCR). Selanjutnya fragmen DNA parasit diperbanyak dengan metode kloning ke dalam sel bakteri *Escherichia coli*.

Analisis hasil sekuens asam amino domain F1 menunjukkan adanya 7 haplotipe gen EBA-140 dari ketiga daerah tersebut. Tiga haplotipe yaitu ISTK, DSTK, dan ISRE merupakan haplotipe baru yang belum pernah dilaporkan sebelumnya. Analisis variasi alel Gerbich pada gen GYPC menunjukkan tidak ada delesi ekson 3 pada gen GYPC pada ketiga daerah tersebut. Informasi mengenai keragaman haplotipe gen EBA-140 dan gen GYPC dapat dijadikan sebagai acuan dalam mendesain vaksin berbasis gen EBA-140 yang efektif memberantas *P. falciparum* di Indonesia.

.....Plasmodium falciparum utilizes the EBA140 as one of its proteins to invade the red cells.

Polymorphisms at the domain F1 of EBA-140 gene have been known to affect the ligand recognition to its corresponding protein receptors glycophorin C (GYPC) or Gerbich antigen. Deletion on the GYPC gene, known as Gerbich blood-type, is known to prevent the parasite invasion using this pathway. Polymorphisms on the GYPC gene could alter the ability of EBA-140 ligand to bind to GYPC receptor on the surface of erythrocyte. Plasmodium falciparum clinical isolates from West Bangka (n = 5), Central Bangka (n = 4), and Mimika regencies (n = 9) were studied for their EBA-140 and GYPC gene polymorphisms. Parasite DNA was amplified using Polymerase Chain Reaction (PCR) and subsequently cloned into *Escherichia coli*.

Amino acid sequence analysis of the F1 domain showed that there were seven haplotypes of EBA-140 gene from all locations. Three haplotypes of EBA-140 (ISTK, DSTK, ISRE) detected in this study were new haplotypes that had not been reported previously. Analysis on the Gerbich allele detected no exon 3 deletion on the GYPC gene from all location. These findings provide useful information if the vaccine involving the EBA-140 component would be developed.