

Occurrence of the erythrocyte band 3 (*AE1*) gene deletion in relation to malaria endemicity in Papua New Guinea

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Abstract

South-east Asian ovalocytosis status was determined in 1629 individuals originating from 12 different geographical areas of Papua New Guinea, representing different ethnic groups and degrees of malaria endemicity. This was achieved by using polymerase chain reaction amplification to demonstrate a 27 base pair deletion in the erythrocyte band 3 (*AE1*) gene. By using this method, the prevalence of erythrocyte band 3 gene deletion was determined to range from zero in both the lowland inland area of Wosera, East Sepik Province and the highland region of Goroka, Eastern Highlands Province to 35% on the north coast of Madang Province. In general, the prevalence correlated well with altitude, being highest on the coast where malaria transmission is high, intermediate in the lowlands, and lowest in the non-malarious highlands. However, Wosera, a lowland area in the Sepik River Plains, which is hyperendemic for malaria, was an exception in that no ovalocytosis was detected. These results largely confirm the prevalence rates that have been reported in the past using microscopy. In keeping with the autosomal dominant mode of inheritance, the male:female ratio was 1.02 and no homozygote was detected, indicating that homozygosity for the ovalocytosis band 3 gene deletion is lethal.

Keyword: [South-east Asian ovalocytosis](#), [band 3 protein deletion](#), [Papua New Guinea](#)