

CYP6 overexpression in pyrethroid resistant *Anopheles funestus*

Amenya, D.A.^{1,2}, Koekemoer, L.L.^{1,2}, Brooke, B.D.^{1,2}, Vaughan, A.³, Morgan, J.M.,
Ranson, H.³, Hemingway, J.^{1,2}, Coetzee, M.^{1,2}

¹Vector Control Reference Unit, National Institute for Communicable Diseases, Private bag X 4 Sandringham 2131, South Africa

²School of Animal, Plant and Environmental Sciences, University of Witwatersrand, Private bag X 3 Wits 2080 South Africa

³Liverpool School of Tropical Medicine Medicine, Pembroke Place, Liverpool L3, 5QA, UK

Anopheles funestus is one of the major vectors of malaria in Africa and can be more devastating than *An. gambiae s.s* in some circumstances. Pyrethroid resistance in a population of *Anopheles funestus* from South Africa has previously been associated with a seven-fold increase in malaria transmission during the period 1996-2000. Biochemical analysis implicated metabolic detoxification based on the overproduction of monooxygenase (p450) as the principal resistance mechanism.

We report the isolation of multiple P450's from an *Anopheles funestus* laboratory colony originating from southern Mozambique. All isolates belong to one of three P450 families, namely CYP4, 6 and 9. Expression studies reveal that the CYP6 family is overexpressed when comparing a colony selected for pyrethroid resistance against a pyrethroid susceptible colony. Further studies implicate the gene CYP6P9, an ortholog of *An. gambiae* CYP6P3.