

Diagnostic and Prognostic Markers of Severe and Cerebral Malaria

Overview of Technology:

Malaria causes an estimated 247 million human infections per year among the 3.3 billion individuals at risk. Although millions are infected only a small proportion of individuals progress to severe and cerebral forms of the disease which account for the majority of the 1 million annual deaths from malaria. Most of these deaths occur in children under 5 years of age, although travelers to malaria-endemic regions are also susceptible to this form of malaria due to their lack of immunity to the disease.

There are currently no simple laboratory tests to determine the severity of infection and to identify individuals at risk for developing cerebral malaria. Current diagnostic methods for cerebral malaria are based on clinical presentation and are unable to accurately differentiate cerebral malaria from neurological conditions or other infectious diseases. Furthermore, these methods cannot predict which patients presenting with uncomplicated malaria will go on to develop the cerebral form of the disease. A better diagnostic for cerebral malaria would allow greater accuracy in choice of treatment. A prognostic method for cerebral malaria would allow limited intensive therapeutic resources to be appropriately allocated to the small proportion of infected individuals who are at risk of developing severe and potentially deadly forms of the disease. This selective intervention has the potential to maximize the impact and effectiveness of limited health resources and to greatly reduce malaria deaths.

We have identified novel serum protein based biomarkers (ANG-1 and ANG-2) that correlate with disease severity and have shown high specificity and sensitivity for diagnosis of cerebral malaria (as high as 100%). These biomarkers can be measured with simple antibody based blood tests or other methods. Validation studies of these markers for prognosis of severe and cerebral malaria in large banked sample sets are underway.

Related Publication:

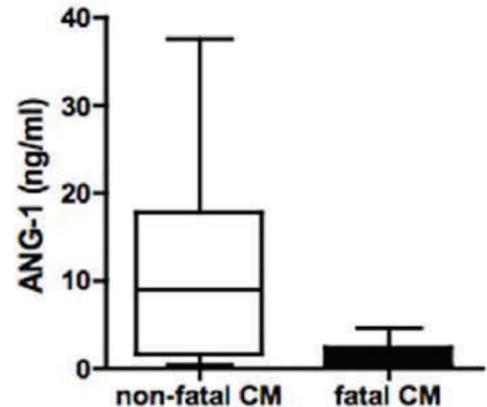
Lovegrove, F.E., *et al.* Serum angiotensin-1 and -2 levels discriminate cerebral malaria from uncomplicated malaria and predict clinical outcome in African children. *PLoS One*. **4(3)**, e4912 (2009)

Patent:

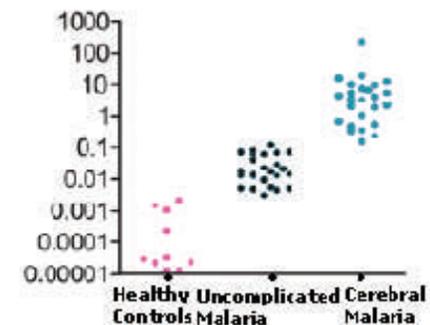
PCT/CA2008/001939 - Filed 5 November 2008

Inventors:

Kevin C. Kain, W. Conrad Liles, Fiona E. Lovegrove



Angiotensin-1 levels are associated with clinical outcome in pediatric cerebral malaria patients from Uganda. Higher ANG-1 levels at presentation were associated with protection from fatal cerebral malaria.



Ratio of ANG-1 and ANG-2

UHN Reference # - 7010