Two genetic traits that give Africans natural protection against malaria appear to cancel each other out when they occur together.

Sickle cell trait and thalassaemia, both mutations in red blood cells, appear to hinder the malaria parasite.

But a Kenya Medical Research Institute team found children with both mutations were at no lesser risk of malaria.

The Nature Genetics study was presented at the pan-African Malaria Conference in Yaounde, Cameroon.

The researchers, who examined the genetic and malarial status of more than 2,000 Kenyan children, said their finding showed that natural immunity was underpinned by complex biological mechanisms.

Unexpected result

Lead researcher Dr Tom Williams said: "We've looked at these traits individually and we expected that if people had both of them, they would be really protected.

"But it turns out that when you start combining the two, you can lose the effect of both.

"Our study shows that it can be very complicated to turn up genetic associations and properly understand them.

"If one trait can interfere with the effects of another, you may miss an association where one truly exists.

"Conversely, you may find a trait that seems to provide protection but not see how other traits could alter the effect."

People with sickle cell trait inherit one normal haemoglobin gene from one parent, and a mutated sickle haemoglobin gene from the other.

They do not have sickle cell anaemia, which results from inheriting two copies of the sickle gene.

Research has shown that children with sickle cell trait exposed to malaria develop far fewer parasites in their blood, and are 90% less likely to be hospitalised than those without the trait.

The protective effect increases with age.

Similarly, alpha thalassaemia, a mild blood disorder not associated with major health problems, also helps people fight malaria by reducing the risk of developing severe anaemia.