New findings about immune system reaction to malaria and sickle cell disease

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Scientists have discovered in more detail than ever before how the human body's immune system reacts to malaria and sickle cell disease.

The researchers from the universities of Aberdeen, Edinburgh, Exeter and Imperial College, London have published their findings in *Nature Communications*.

Every year there are ~200 million cases of malaria, which causes ~400,000 deaths.

As it causes resistance against malaria, the sickle cell disease mutation has spread widely, especially in people from Africa.

But if a child inherits a double dose of the gene—from both mother and father—they will develop sickle cell disease. Around 20,000 children are born with sickle cell disease every year and it is now the commonest single-gene disorder among the UK population. Despite this, much about it remains poorly understood.

The researchers discovered that sugars called mannoses are expressed on the surfaces of both red blood cells infected with malarial parasites and also affected by sickle cell disease. The mannoses cause both infected cells and sickle cells to be eaten in the spleen.

The study was funded by the Wellcome Trust and the University of Aberdeen Development Trust.The team hope the findings will eventually help inform new treatments for malaria.

Lead investigator, Professor Mark Vickers, Chair in Applied Medicine at the University of Aberdeen, said: "Malaria and sickle cell disease are responsible for hundreds of thousands of deaths a year but many aspects of how the body's immune system reacts to these diseases are not fully understood.

"This collaborative project has revealed more than ever before about the chains of events that occur in these diseases and can hopefully contribute

to research into new treatments."

Co-author Professor Gordon Brown, at the University of Exeter, said: "This is a truly seminal discovery that sheds light on how abnormal red blood cells are recognised and cleared by the immune system, with exciting implications for future therapeutic approaches to treat a range of diseases including malaria and sickle cell disease described here"

Provided by University of Exeter

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