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Cyclin' out of gear: Malaria parasites grinding to a halt

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Credit: CDC

Scientists from The University of Nottingham have uncovered the role of cyclin—the protein molecule that drives the growth of malaria within mosquitoes.

The research, led by Professor Rita Tewari and Dr Bill Wickstead in the University's School of Life Sciences and published in the scientific

journal *PLoS Pathogens*, could pave the way to better understanding of how the malaria parasite thrives within its insect and human hosts and lead to potential new treatments.

Dr Magali Roques, who is the lead author said: "This first functional study of cyclin in the malaria parasite and its consequences in parasite development within pathogen-carrying mosquitoes will definitely further our understanding of parasite cell division, which I hope will lead to the elimination of this disease in the future."

Malaria is responsible for almost half a million deaths a year, mainly in developing countries. The parasite undergoes a complex life cycle that requires two hosts—a mosquito and a mammal.

The research, focused on the role of cyclin, one of the most important protein molecules needed for cell division. It describes the identification of three different types of cyclin in the parasite, followed by a more detailed analysis of the function of the 'P-type' cyclin which is closely related to cyclins found within plants.

All complex cells tightly control their growth and division to ensure that important biological processes only occur at the right time. This is known as the cell cycle and cyclins and their partners, cyclin-dependant kinases, are its master control proteins. They are crucial to successful cell cycle progression and have been well-studied in several organisms including humans, yeasts and plants.

However, until now, very little was known about cyclins in the malaria parasite, Plasmodium, which undergoes atypical types of cell cycle during its development both in the human host where the disease is manifested and in the vector mosquito which transmits the disease.

This research is the first time that experts have been able to classify the

number and type of cyclins present in Plasmodium and a set of related parasites called Apicomplexa, and have also performed the first in-depth analysis of a cyclin in the malaria parasite.

Dr Bill Wickstead, who along with his master's student Alexander Douglass characterised cyclin-like genes across Apicomplexa, said: "Cyclins are a really diverse class of proteins comprising many different types in different organisms. What's interesting is that Plasmodium contains a really small set of unusual composition. It was clear that this was likely to be related to their unusual cell and life-cycles and Professor Tewari's group was in a great position to be able to test this."

The paper Plasmodium P-Type Cyclin CYC3 Modulates Endomitotic Growth during Oocyst Development in Mosquitoes is published in the journal *PLoS Pathogens*.

Provided by University of Nottingham