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Scientists Discover Potential Vaccine for Malaria

Dec. 16, 2013 — Scientists from Singapore's Nanyang Technological University (NTU) have discovered a key process during the invasion of the blood cell by the Malaria parasite, and more importantly, found a way to block this invasion.

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With this new knowledge, NTU is looking to collaborate with the industry on a vaccine against Malaria which can be developed within the next five years if accelerated by vaccine development companies, says lead scientist Professor Peter Preiser.

Prof Preiser, Chair of NTU's School of Biological Sciences, said his team's scientific breakthrough, which was published last month in the top scientific journal Nature Communications, will be instrumental in paving the way towards eradicating Malaria in the long run.

According to the World Health Organisation, about 3.3 billion people -- half of the world's population -- are at risk of Malaria. This mosquito-borne disease causes fever and headache and in serious cases, can cause a patient to go into a coma or result in death. The disease infected about 219 million people in 2010, and kills around 860,000 people worldwide annually.

If there can be a low-cost vaccine which is effective in rendering the parasite harmless, then millions of lives can be saved and this will also benefit the economy by millions of dollars each year, says Prof Preiser.

"What we have identified is a region of the Malaria parasite which it uses to attach to a healthy blood cell then pushes itself into the cell," says the parasitic diseases expert.

"To prevent this invasion, we developed antibodies which can interfere with this invasion process. So imagine the parasite has the key to unlock a door to the red blood cell, but we muck the key up, so no matter how hard the parasite tries, the door just refuses to open."

The patented discovery also opens the doors to new drug targets, which will allow scientists to develop more methods to interfere and disrupt the parasite's act of invasion.

Prof Preiser's research team of six from NTU's School of Biological Sciences includes a post-doctoral researcher, three doctoral students and one undergraduate student.

They spent five years on this study. This research outcome was made possible with the development of a new screening assay that allows the rapid characterization of parasite signalling, which is significantly faster than conventional methods.

The newly invented technique utilises a high-throughput fluorescence scanning approach -- if antibodies or drugs fail to prevent the invasion of the red blood cell by the malaria parasites, the sample will light up. If the antibodies work, then the sample remains dark. This allows for rapid characterisation of thousands of compounds as well as antibodies for their ability to interfere with the invasion process.

The discovery is an important contribution to the University's research effort in Future Healthcare, which is one of NTU's Five Peaks of Excellence -- interdisciplinary research areas in which the university aims to make a global mark. The other four peaks include Sustainable Earth, New Media, the East-West knowledge hub and Innovation.

Besides ground-breaking research, NTU has had remarkable success translating its research into innovative applications. Most recently ranked 41st globally by higher education information provider Quacquarelli Symonds, NTU was also ranked No. 1 in the world for industry income and innovation by Times Higher Education.

Moving forward, the NTU team will be using their new technique to identify other antibodies which can target the different components of the Malaria parasite, and potentially lead to future treatment and vaccine breakthroughs for the fatal Malaria disease. They are also looking to collaborate with industry partners to develop new vaccines based on their latest discoveries.

If there can be a low-cost vaccine which is effective in rendering the parasite harmless, then millions of lives can be saved and this will also benefit the economy by millions of dollars each year, says Prof Preiser. (Credit: Nanyang Technological University)

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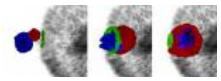

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