A new era in malaria prevention?

Interview with ITM PhD alumnus and CRUN-researcher Dr H Magloire Natama

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Dit is de omschrijving

The first day of World Immunisation Week coincides with World Malaria Day. The world is waiting impatiently for the development of a malaria vaccine. In light of World Malaria Day, ITM PhD alumnus and CRUN-researcher Dr H Magloire Natama, shares the research findings and results of the development and clinical evaluation of the vaccine candidate R21/Matrix-M, currently in the last testing phase. The Clinical Research Unit of Nanoro (CRUN) in Burkina Faso, one of ITM's longstanding partner institutions, is developing the vaccine, in collaboration with their partners at the University of Oxford in the UK. Preliminary results show that this is the first malaria vaccine to reach the 75% efficacy target set by WHO, a promising breakthrough in the fight against malaria.

How is this vaccine a beacon of hope for the most affected regions?

Hamtadi Nagloire Natama: Malaria remains one of the leading causes of morbidity and mortality worldwide. An estimated 228 million cases occurred in 2020 with 70% of the cases that occurred in 11 countries including Burkina Faso. The problem is that there is a stalled progress in reducing malaria burden since 2015 highlighting the limitations of current malaria control strategies in endemic regions. An effective and deployable vaccine would mark the beginning of a new era in the fight against malaria.

What does the development of this vaccine mean in the fight against malaria?

Hamtadi Nagloire Natama: WHO recently recommended the RTS,S for children in moderate-to-high transmission settings. In a phase III trial, this malaria vaccine showed 36% efficacy after four doses, over a median of 48 months follow-up. They observed 56% efficacy in children aged 5–17 months over the first year. The new vaccine, R21 adjuvanted with 50 µg Matrix-M (R21/MM), administered before the malaria season, demonstrates high-level efficacy, reaching the WHO-specified efficacy goal of at least 75% in the target population of African children over 1 year. If this efficacy is confirmed in the ongoing phase III trial, significant progress in the fight against malaria could be completed in the near future.

Will this be enough to eradicate malaria?

Hamtadi Nagloire Natama: The fight against malaria consists of different components, including vector control and clinical case management for which continuous improvements are required for the overall fight against malaria. In addition, continuous efforts to improve the effectiveness of next generation malaria vaccines are required.

Why is it such a challenge to find an effective vaccine for malaria?

Hamtadi Nagloire Natama: Malaria vaccine development is hindered by the sheer complexity of the parasite and its life cycle, extensive antigenic variation, and a poor understanding of the interaction between P. falciparum and the human immune system.

Can you tell us more about the next steps in the development process?

Hamtadi Nagloire Natama: First results of the Phase III trial in the seasonal vaccination sites will soon be available and WHO is helping by accepting a submission for

both R21/Matrix-M Prequalification and a policy recommendation by 30 September this year, making it possible that a lot of vaccine could be supplied next year.

What are the prospects in terms of manufacturing?

Hamtadi Nagloire Natama: With our partner Serum Institute of India (SII), our provision of hundreds of millions of doses of R21/MM at a few dollars a dose should alleviate the great supply problem that RTS,S has, with a provision of only about 7 million doses a year for the foreseeable future.

Which roles do CRUN and the University of Oxford play in the development phase?

Hamtadi Nagloire Natama: Within the R21/Matrix-M vaccine development research group, CRUN wasin charge of the implementation of the phase II trial that demonstrated that this new vaccine is safe and very immunogenic in African children with a promising high-level efficacy. In addition, CRUN is one of the 5 sites of the phase III trial assessing the safety, immunogenicity and the efficacity of R21/matrix-M among children aged 5-36 months living in different transmission settings.

The collaboration between CRUN and ITM has contributed to significantly improve CRUN's capacities with both the development of human resources capable under the leadership of Prof. Tinto Halidou to conduct high-quality clinical trials, as well as the development of a biomedical research lab where samples from R21 clinical trials are processed for future immunological investigations.

The University of Oxford develops the R21 malaria vaccine candidate and sponsors the R21/Matrix-M clinical trials.

BioNTech, which developed a COVID-19 vaccine in collaboration with Pfizer, plans to start clinical trials of the first mRNA-based malaria vaccine by the end of this year. What are the differences and similarities with this vaccine?

Hamtadi Nagloire Natama: R21 is produced by using recombinant HBsAg particles expressing the central repeat and the C-terminus of the *Plasmodium falciparum* circumsporozoite protein (CSP) with the aim to induce an immune response able to prevent hepatocyte invasion, the stage before the erythrocytic phase when clinical symptoms appear.

The principal of nucleic-based vaccines is that the mRNA used, prompts the human body to make a protein that is part of the pathogen, triggering an immune response. They are also quicker to develop than traditional vaccines. BioNTech aimsto assess multiple vaccine candidates that target the circumsporozoite protein (CSP) similar to that in R21/Matrix-M, as well as new antigens discovered in pre-clinical research and select the most promising for a clinical trial, which is due to start by the end of 2022.

Are you travelling to a malaria-endemic country? Take precautions and consult Wanda, our digital travel health expert.