

Healthcare industry BW

MalVa GmbH – a protein cocktail that could potentially produce a high protection malaria vaccine

MalVa GmbH was founded as a spin-off company of Heidelberg University Hospital around five years ago and its aim is to develop an effective and safe inactivated vaccine against malaria. MalVa GmbH's innovative strategy to combat this infectious disease involves a cocktail of several parasite antigens.



Female Anopheles mosquito.
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Researchers around the world have been looking for an effective malaria vaccine for decades, without significant success. Although the number of malaria cases has slightly decreased over the past few years due to intensive prevention and control measures, hundreds of thousands of people still die from this disease that is particularly common in the tropics and subtropics. Children are the most vulnerable group, especially in Sub-Saharan Africa. In Germany, around 500 to 600 imported cases of malaria are registered every year. With such a high incidence rate, malaria remains one of the major imported parasitic diseases. An effective vaccine is considered an essential prerequisite for controlling the tropical disease.

Tedious search for an effective vaccine

Dr. Ann-Kristin Mueller, co-founder and scientific mentor of MalVa GmbH, explains why it is so difficult to develop an effective malaria vaccine: "Eradicating malaria is difficult as there are four species of human malaria, all of them caused by unicellular parasites of the genus Plasmodium. And these parasites have a far more complex structure than viruses. Moreover, the parasites have the ability to adapt quickly to changes in the environment and thus evade the human immune system," says Dr. Mueller.

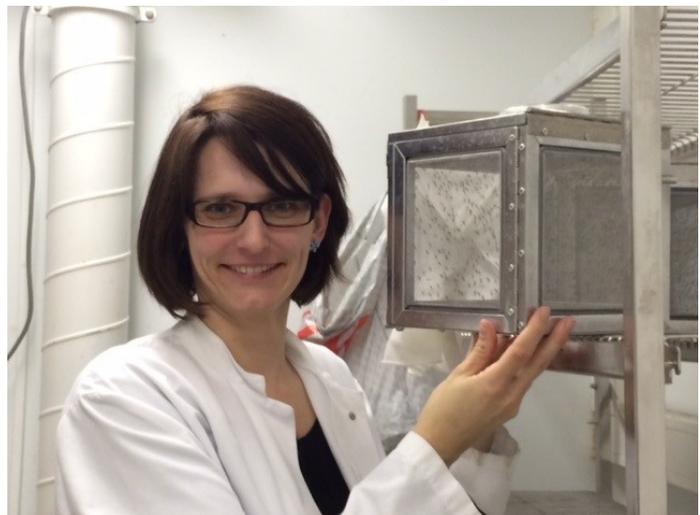
After around 30 years of painstaking research and development, the first malaria vaccine has recently received marketing authorisation for the active immunisation of infants against malaria caused by the *P. falciparum* parasite in geographically remote areas in Africa. However, in previous trials the vaccine has been shown to have only limited efficacy.

Dr. Mueller and her group of researchers at the Centre for Infectious Diseases at Heidelberg University Hospital are focused on a completely different, unprecedented strategy to combat the dangerous parasite. A few years ago, Mueller discovered a promising vaccine approach involving a handful of proteins expressed in the pathogen's pre-erythrocytic stages. With the objective of turning MalVaccine, as the company's vaccine cocktail is called, as soon as possible into a marketable product, the team successfully applied for funding under the German Federal Ministry of Economics and Technology's (BMWi) research transfer programme in 2008. The project was granted funding for the first phase which aimed at further developing the previous results. Following the successful completion of the first phase, the project was taken to the next step, which involved setting up a company called MalVa GmbH.

Promising preclinical results

MalVa was able to bring on board experts from the life sciences industry who helped the start-up tackle the many obstacles on the long road towards an effective vaccine. The vaccine has already been tested successfully in preclinical studies involving humanised mice* and suitable adjuvants for boosting adaptive immune responses have been identified. Dr. Kirsten Hei, managing director of MalVa GmbH, highlights the advantages of MalVaccine over conventional approaches: "We expect the chosen combination of antigens to provide superior protection, ideally against all relevant *Plasmodium* species."

*Humanised mice are mice carrying functioning human genes that can be used to model the human immune system.



Dr. Kirsten Hei, managing director of MalVa GmbH, in the *Anopheles* breeding room at Heidelberg University Hospital. The cage contains non-infected mosquitoes.
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Clinical trials to start soon an

MalVa GmbH's malaria vaccine has achieved good preclinical results and will now be taken to the next, crucial, step of vaccine development. This involves testing the vaccine in human volunteers. "We are looking for partners to help us finance the upcoming clinical trial," says Hei explaining the current situation. Investing in the development of the vaccine has a number of benefits. The vaccine will be useful for the prevention of the disease in endemic malaria countries, as well as protecting people from developed countries that travel to malarial areas for professional or tourist reasons.

Once they have further funding, the team, in cooperation with the Heidelberg University Hospital, will quickly commence clinical studies to assess the safety and immunogenicity of the vaccine.

MalVa and partners hope to be able to take the development of the vaccine through to clinical phase II studies. Mueller and Heiß are convinced that “once we have reached this stage of clinical development, in a few years’ time we will have an effective malaria vaccine.”

Malaria is an infectious disease caused by unicellular parasites of the genus Plasmodium and transmitted to humans through the bite of a bloodsucking female mosquito of the genus Anopheles. The sporozoites, as the infectious Plasmodium stages are called, travel in the bloodstream to the liver where they invade liver cells. This period, during which no disease symptoms are apparent, is referred to as the pre-erythrocytic phase. A few days after infection, however, so-called merozoites are released into the erythrocytes, resulting in typical malaria symptoms that are almost always associated with irregular bouts of fever and may lead to the death of the infected person.

Article

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Elke Matuschek

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Further information

Dr. Kirsten Heiß

Tel.: +49 (0)163 7855771

E-mail: k.heiss(at)malvacompany.de

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