



Novartis Social Business

Malaria Initiative: Research & Development

Leading the path to malaria elimination

At Novartis, we leverage both the expertise of our large research organization and our unique network of external partners to research and develop best-in-class compounds against malaria. We are working with clinical experts across the world to continuously study the efficacy and safety of our existing treatments, and are developing formulations which target unmet medical needs.



Researching and developing the next generation of malaria drugs

Partnerships are essential in researching and developing new treatments for malaria as they can help bring compounds to market faster. The Novartis Malaria Initiative has forged collaborations with more than a dozen research organizations to assemble a broad portfolio of projects.

Working with partners in China, Novartis pioneered a new class of antimalarial medicines known as artemisinin-based combination therapies (ACTs). In 1999, we launched Coartem[®], the first fixed dose ACT, today approved in more than 60 countries. With a cure rate of over 95%^{*1-4} and a demonstrated safety profile¹⁻⁷, Coartem[®] has become the standard of care for millions of people around the world.

In the past nine years, a team of scientists at the Novartis Institute for Tropical Diseases (NITD), the Genomics Institute of the Novartis Research Foundation and the Swiss Tropical and Public Health Institute (Swiss TPH) have discovered new classes of antimalarials. If successfully developed, they would be the first new antimalarials in many years not belonging to the artemisinin class, and provide a completely new option to treat the disease.

The first compound, known as KAE609 (cipargamin), is currently in Phase 2 clinical testing. It is a so-called spiroindolone molecule that rapidly kills malaria parasites⁸.

The second compound, KAF156, now in Phase 2 clinical trials, belongs to a new class of dual-acting compounds known as imidazolepiperazines (IZPs) that target the parasite at both the liver and blood stage of its reproductive cycle. If it can be confirmed in clinical trials, the dual antimalarial activity of the IZP compounds gives this class promise as a first-line therapy for the prevention and treatment of malaria^{9,10}. Early drug discovery efforts were funded by a collaboration between the NITD, MMV, the Wellcome Trust and the Singapore Economic Development Board.

In an effort to respond to the unmet medical needs of infants and children, together with MMV, Novartis developed the first sweet-tasting dispersible ACT, Coartem[®] *Dispersible*^{**}. The treatment was launched

in 2009. Other partners, including the Swiss TPH and clinical academic centers in sub-Saharan Africa, helped to develop the pediatric formulation, now approved in more than 40 countries.

Coartem[®] *Dispersible* meets the calls from UNICEF and the WHO to “make medicines childsize” by developing age-appropriate dispersible formulations to ensure children receive correct and effective doses¹¹.

“Thanks to initiatives like the Novartis Malaria Initiative, people can have hope. We will be able to really tackle this disease and one day maybe, for the next generation, there will be a malaria-free world.”

Professor Awa Marie Coll-Seck,
Former Executive Director, Roll Back
Malaria Partnership

Continuously monitoring efficacy and safety of existing treatment

Since Coartem[®] was first approved in 1999, the Novartis Malaria Initiative has conducted a clinical development program spanning over 18 years.

We have sponsored and published over twenty clinical studies related to Coartem[®]¹⁻⁶. In addition, over 50 independent trials have produced data supporting its efficacy and safety^{12,13} across different populations and regions.

We have been the first healthcare company to develop an observational study to evaluate the safety of Coartem[®] in pregnant women in Zambia in partnership with the World Health Organization (WHO)¹⁴.

As part of the three-year ALIVE study (Artemether-Lumefantrine In Vulnerable patients: Exploring health impact) covering approximately 95,000 individuals in two rural districts of Tanzania, we documented the adherence to and acceptance of Coartem[®] among patients in rural Tanzania. Approximately 90% of patients adhered to the dosing regimen and found the treatment pictograms on the packaging helpful¹⁵. No special guidance was given to patients other than that routinely offered by local healthcare personnel.

* 28-day PCR-corrected cure rates in evaluable population.

** Infants and children weighing 5 kg to less than 35 kg and 12 years of age or less.

“In my village there are lots of mosquitoes because of stagnant water. The mosquitoes are breeding everywhere because of the rice fields. If there were no mosquitoes and malaria was not there, then our children could grow well. We continue to lose many children because of malaria. Not every person can afford to take their child to hospital. If there was no malaria, we would have many children.”

Rosemary Omolo, rice farmer, Kenya

In the United States where Coartem® is the only approved ACT, results from a five-year US patient surveillance study on the use of the treatment in non-immune travelers have been recently published. Data from the study, conducted in collaboration with the US Centers for Disease Control and Prevention, confirmed that Coartem® was effective and well tolerated to treat likely non-immune patients in the US with *P. falciparum*.¹⁷

The Novartis Malaria Initiative also supports independent clinical and non-clinical studies by malaria investigators around the world. In some instances, we provide expert input into protocol development or procure treatments or drug substance to carry out the investigation.

Addressing unmet medical needs in adults and infants

We are constantly looking for ways to reduce treatment burden and deliver care to vulnerable patient populations.

Coartem® 80/480: Reduced pill burden for adults.

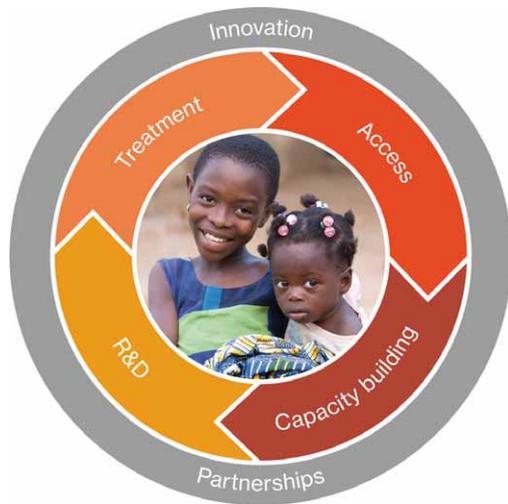
We have developed a new dosage strength of Coartem® for adult patients which reduces the number of tablets to be taken from 24 to 6 tablets, i.e. one single tablet to be taken twice daily for three days. This could potentially improve treatment adherence and clinical outcomes.

The new dosage strength, which received Swissmedic approval in November 2013, was launched in the private sector in Nigeria in late 2013 and has since been launched in more than fifteen African countries.

In 2015, Coartem® 80/480 received WHO prequalification, making it the first artemether-lumefantrine (AL) with a reduced pill burden available for public sector procurement. This prequalification is a key milestone to provide access to the treatment to many malaria sufferers across Africa.

Coartem® Dispersible: innovating for children

Infants and children are most affected by malaria. In 2009, Novartis and MMV launched Coartem® *Dispersible*, the first dispersible ACT designed specifically for infants and children*. Today, more than 300 million Coartem® *Dispersible* treatments have been delivered without profit to malaria-endemic countries. The development of Coartem® *Dispersible* consisted of four studies. Two studies were pharmacokinetic studies performed in healthy volunteers in Europe. The other two studies were performed in sub-Saharan Africa, one in healthy schoolchildren¹⁶, one in infants and children with malaria⁶. In the first study of its kind to be performed in Tanzania, schoolchildren evaluated the palatability of Coartem® *Dispersible*, a key factor in aiding compliance in children's medicines¹⁶.



The Novartis Malaria Initiative

For over a decade, the Novartis Malaria Initiative has been a pioneer in the fight against malaria. Focused on treatment, access, capacity building and R&D, the initiative is the largest access-to-medicine program within Novartis measured by the number of patients reached annually. Together with our partners, and with our continued patient-centric approach, we are committed to the common goal of malaria elimination.

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