Medicines for Malaria Venture
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MMV Medicines for Malaria Venture

Global partnership network accelerates progress against malaria

The product-development partnership Medicines for Malaria Venture has evolved over the past 18 years into an organization with a strong network of partners and a track record of achievements.

Medicines for Malaria Venture (MMV) is a Switzerland-based not-for-profit foundation that works to discover, develop and deliver new, effective and affordable antimalarial drugs for vulnerable populations in disease-endemic countries. Launched in 1999 in response to the malaria burden and empty drug pipeline, MMV now manages the world's largest R&D portfolio of new and innovative antimalarial medicines.

Working with partners, MMV has brought forward seven new antimalarials since 2009, which have saved more than 1.5 million lives. These include child-friendly formulation Coartem Dispersible (artemether-lumefantrine; codeveloped with Novartis) for the treatment of uncomplicated malaria, and Artesun (injectable artesunate; from Guilin in China) for severe malaria. MMV also has ten clinical development projects targeting unmet needs, including medicines for children, pregnant women and people with relapsing or drug-resistant malaria.

The antimalarial drug market may be substantial in terms of those in need, but it is small in terms of profit, which makes it difficult for pharmaceutical companies to invest alone. MMV tackles this conundrum with its successful product-development partnership model, which enables the organization to share the costs and risks of drug development with partners and to make antimalarial drug research happen.

Pooling resources and expertise for malaria R&D

MMV has built an extensive network of over 400 partners in 55 countries since 1999, of which more than 160 are currently active. The network includes partners from industry, academia, NGOs and non-profit organizations, donors, and clinical trial sites in malaria-endemic countries.

MMV's R&D strategy relies on partnerships with industry and academia. It leverages the facilities, knowledge and expertise of the pharmaceutical and biotechnology industries, drawing on their valuable experience and resources at every stage of the drug development process. It also brings together world-class science and creativity from research and academic institutions, particularly during the discovery phase.

"MMV has been successful at bringing in new partners, and our portfolio has grown from 10 projects in 2000 to more than 65 today," said Timothy Wells, CSO at MMV. The portfolio has also matured and now extends from research and translational projects to product development and access.

Innovations in screening technology over the past decade have contributed to this growth. "Suddenly, we could offer to test a company's compounds and let them know which ones had antimalarial activity," said Wells. "Our industry partnerships today are based on this model, and we now have 27 pharmaceutical and academic partners involved in hit-to-lead and lead optimization projects around the world."

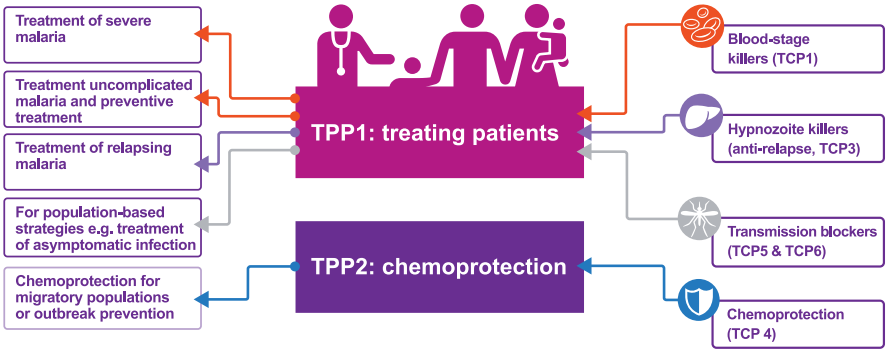

Fig. 1 | Connecting the target candidate profiles (TCPs), target product profiles (TPPs) and goals of the resultant medicines.

Clear vision for new medicines

Despite global progress, malaria remains a major cause of poverty affecting women and children, and the rise in multidrug-resistant malaria is also threatening the gains made so far[1]. Given this context, MMV's work is also to understand the key characteristics of next-generation medicines to control and ultimately eradicate malaria.

Informed by insight and analysis, MMV has defined the types of molecules (target candidate profiles (TCPs)) required for combination into medicines (target product profiles (TPPs)) that are needed to achieve these goals[2,3] (**Fig. 1**). MMV uses the TCPs to select individual compounds for early development; compounds are then combined into medicines at a later stage of clinical development.

"Our successful R&D strategy stems from our work to define what the product is," said Wells. "Part of our job is being able to communicate to our partners just what it is the medicine has to do, and to then bring all these elements together."

Since 2010, MMV and partners have brought 17 drug candidates into preclinical development, 13 of which are still active. Each active candidate has the potential to form part of a next-generation medicine.

Mutual benefit for MMV and partners

MMV and contracted partners develop products that will be accessible and affordable to populations at risk of malaria. Academic and pharma partners provide laboratory space, equipment, and in-kind contributions such as funding for staff costs and expertise. In return, MMV provides scientific and/or financial support for antimalarial drug discovery and development projects, from early research through to product development and access. Depending on the needs of a project, MMV may draw on in-house expertise, leverage its network for advice and resources or bring in donor money.

While industry partners work with MMV for many reasons, including the prospect of developing commercial footprints in malaria-endemic countries for nonmalaria products or access to the tropical disease priority review voucher from the US Food & Drug Administration, often the reason for industry engagement is internal. "Corporate social responsibility, and the excitement that gives to the whole company for a relatively small investment, is a key reason why our partners are keen to get involved," said Wells. "It has an amazing impact on staff morale, as people are genuinely proud to work for a company that is doing something to make an impact on a devastating disease like malaria."

1. Phillips, M. A. et al. *Nat. Rev. Dis. Primers* **3**, 17050 (2017).
2. Burrows, J. N. et al. *Malar. J.* **16**, 26 (2017).
3. Wells, T. N., Hooft van Huijsduijnen, R. & Van Voorhis, W. C. *Nat. Rev. Drug Discov.* **14**, 424–442 (2015).

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