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Mosquitoes Harnessed to Vaccinate Humans Without Consent

New England Journal of Medicine Report of Malaria Vaccine Delivered by Mosquito Bites

By Dr. Peter McCullough
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Courageous Discourse

Theme: Biotechnology and GMO, Science and Medicine

It seems as if the world of vaccinology has ramped up to a feverish pitch with amplified research, massive funding, and no limit to the extent in which vaccines could be injected into humans. Dr. McCullough was a December 31, 2024, guest on the Grant Stinchfield Podcast to review research using mosquitoes to deliver vaccines to humans through their nasty bites in the skin.

Lamers et al described experiments where mosquitoes were laced with a malaria vaccine and then normal human volunteers went through three session of 50 bites each to get "vaccinated." It took only five bites to give the subjects a case of controlled malaria infection.

Stinchfield raised the ethical considerations of this line of development where mosquitoes released into nature essentially like flying syringes could vaccinate people without informed consent, no control over dose, prior immunity, and no ability to recognize or report side effects. Please enjoy this interview which also includes a review and clips from mosquito labs around the world demonstrating the massive resources poured into this line of development unfortunately with very poor biosecurity in some parts of the world.

Below is an excerpt from the NEJM article.

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Safety and Efficacy of Immunization with a Late-Liver-Stage Attenuated Malaria Parasite

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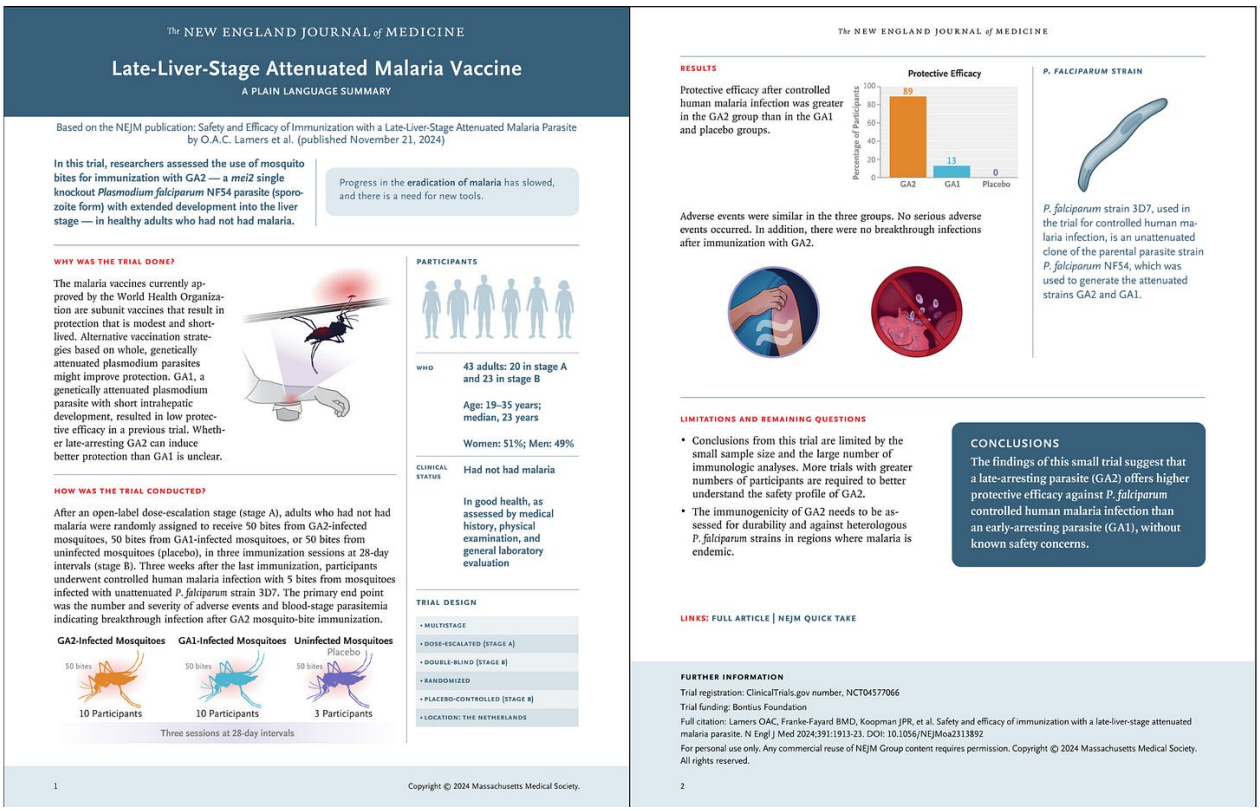

The NEW ENGLAND JOURNAL of MEDICINE

Late-Liver-Stage Attenuated Malaria Vaccine

A PLAIN LANGUAGE SUMMARY

Based on the NEJM publication: Safety and Efficacy of Immunization with a Late-Liver-Stage Attenuated Malaria Parasite by O.A.C. Lamers et al. (published November 21, 2024)

In this trial, researchers assessed the use of mosquito bites for immunization with GA2 — a *mei2* single knockout *Plasmodium falciparum* NF54 parasite (sporozoite form) with extended development into the liver stage — in healthy adults who had not had malaria.

Progress in the **eradication of malaria** has slowed, and there is a need for new tools.

WHY WAS THE TRIAL DONE?

The malaria vaccines currently approved by the World Health Organization are subunit vaccines that result in protection that is modest and short-lived. Alternative vaccination strategies based on whole, genetically attenuated plasmodium parasites might improve protection. GA1, a genetically attenuated plasmodium parasite with short intrahepatic development, resulted in low protective efficacy in a previous trial. Whether late-arresting GA2 can induce better protection than GA1 is unclear.

HOW WAS THE TRIAL CONDUCTED?

After an open-label dose-escalation stage (stage A), adults who had not had malaria were randomly assigned to receive 50 bites from GA2-infected mosquitoes, 50 bites from GA1-infected mosquitoes, or 50 bites from uninfected mosquitoes (placebo), in three immunization sessions at 28-day intervals (stage B). Three weeks after the last immunization, participants underwent controlled human malaria infection with 5 bites from mosquitoes infected with unattenuated *P. falciparum* strain 3D7. The primary end point was the number and severity of adverse events and blood-stage parasitemia indicating breakthrough infection after GA2 mosquito-bite immunization.

GA2-Infected Mosquitoes | GA1-Infected Mosquitoes | Uninfected Mosquitoes (Placebo)

50 bites | 50 bites | 50 bites

10 Participants | 10 Participants | 3 Participants

Three sessions at 28-day intervals

PARTICIPANTS

WHO: 43 adults: 20 in stage A and 23 in stage B

Age: 19–35 years; median, 23 years

Women: 51%; Men: 49%

CLINICAL STATUS: Had not had malaria

In good health, as assessed by medical history, physical examination, and general laboratory evaluation

TRIAL DESIGN

- MULTISTAGE
- DOSE-ESCALATED (STAGE A)
- DOUBLE-BLIND (STAGE B)
- RANDOMIZED
- PLACEBO-CONTROLLED (STAGE B)
- LOCATION: THE NETHERLANDS

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RESULTS

Protective efficacy after controlled human malaria infection was greater in the GA2 group than in the GA1 and placebo groups.

Protective Efficacy

Percentage of Participants: 100, 80, 60, 40, 20, 0

89 | 13 | 0

GA2 | GA1 | Placebo

Adverse events were similar in the three groups. No serious adverse events occurred. In addition, there were no breakthrough infections after immunization with GA2.

P. FALCIPARUM STRAIN

P. falciparum strain 3D7, used in the trial for controlled human malaria infection, is an unattenuated clone of the parental parasite strain *P. falciparum* NF54, which was used to generate the attenuated strains GA2 and GA1.

LIMITATIONS AND REMAINING QUESTIONS

- Conclusions from this trial are limited by the small sample size and the large number of immunologic analyses. More trials with greater numbers of participants are required to better understand the safety profile of GA2.
- The immunogenicity of GA2 needs to be assessed for durability and against heterologous *P. falciparum* strains in regions where malaria is endemic.

CONCLUSIONS

The findings of this small trial suggest that a late-arresting parasite (GA2) offers higher protective efficacy against *P. falciparum* controlled human malaria infection than an early-arresting parasite (GA1), without known safety concerns.

LINKS: FULL ARTICLE | NEJM QUICK TAKE

FURTHER INFORMATION

Trial registration: ClinicalTrials.gov number, NCT04577066

Trial funding: Bontius Foundation

Full citation: Lamers OAC, Franke-Fayard BMD, Koopman JPR, et al. Safety and efficacy of immunization with a late-liver-stage attenuated malaria parasite. N Engl J Med 2024;391:1913-23. DOI: 10.1056/NEJMoa2313892

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Download a PDF of the Plain Language Summary.

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Abstract

Background

Currently licensed and approved malaria subunit vaccines provide modest, short-lived protection against malaria. Immunization with live-attenuated *Plasmodium falciparum* malaria parasites is an alternative vaccination strategy that has potential to improve protection.

Methods

We conducted a double-blind, controlled clinical trial to evaluate the safety, side-effect profile, and efficacy of immunization, by means of mosquito bites, with a second-generation genetically attenuated parasite (GA2) — a *mei2* single knockout *P. falciparum* NF54 parasite (sporozoite form) with extended development into the liver stage. After an open-label dose-escalation safety phase in which participants were exposed to the bites of 15 or 50 infected mosquitoes (stage A), healthy adults who had not had malaria were randomly assigned to be exposed to 50 mosquito bites per immunization of GA2, an early-arresting parasite (GA1), or placebo (bites from uninfected mosquitoes) (stage B). After the completion of three immunization sessions with 50 mosquito bites per session, we compared the protective efficacy of GA2 against homologous *P. falciparum* controlled human malaria infection with that of GA1 and placebo. The primary end points were the number and severity of adverse events (in stages A and B) and blood-stage parasitemia greater than 100 *P. falciparum* parasites per milliliter after bites from GA2-infected mosquitoes (in stage A)

and after controlled human malaria infection (in stage B).

Results

Adverse events were similar across the trial groups. Protective efficacy against subsequent controlled human malaria infection was observed in 8 of 9 participants (89%) in the GA2 group, in 1 of 8 participants (13%) in the GA1 group, and in 0 of 3 participants in the placebo group. A significantly higher frequency of *P. falciparum*–specific polyfunctional CD4+ and Vδ2+ γδ T cells were observed among participants who received GA2 than among those who received GA1, whereas GA2 and GA1 induced similar antibody titers targeting the *P. falciparum* circumsporozoite protein.

Conclusions

In this small trial, GA2 was associated with a favorable immune induction profile and protective efficacy, findings that warrant further evaluation. (Funded by the Bontius Foundation; ClinicalTrials.gov number, NCT04577066.)

Click here to read the full NEJM article.

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