Overview of CHKV candidate vaccines

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Vaccine and Therapeutic Options To Control Chikungunya Virus

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CURRENT VACCINE OPTIONS

- Virus-Like Particles
- Chimeric Vaccines
  - Measles virus-based chimeras
  - Alphavirus-based chimeras
  - Vaccinia virus-based chimeras
  - Adenovirus-based chimeras
  - Vesiculovirus-based chimeras
- Live Attenuated Vaccines
- Subunit Vaccines
- DNA Vaccines
PHASE II SAFETY AND IMMUNOGENICITY STUDY OF LIVE CHIKUNGUNYA VIRUS VACCINE TSI-GSD-218


Center for Vaccine Development, University Of Maryland School of Medicine, Baltimore, Maryland; University Health Center, University of Maryland, College Park, Maryland; Diagnostic Systems Division, United States Army Medical Research Institute of Infectious Diseases, Fort Detrick, Frederick, Maryland

• Ph1 n=15
• N=73 placebo controlled
• Attenuated vaccine
Immunologic interference from sequential administration of live attenuated alphavirus vaccines.

1) Persons previously vaccinated against Venezuelan equine encephalitis virus (VEEV) exhibited poor neutralizing antibody responses to a live attenuated chikungunya virus (CHIKV) vaccine (46% response rate).

2) CHIKV vaccine recipients' geometric mean titers (GMTs) to VEEV by 80% plaque-reduction neutralization titration never exceeded 10, compared with a peak GMT of 95 after VEEV vaccination for alphavirus-naive volunteers.

Preexisting alphavirus immunity in humans interferes with subsequent neutralizing antibody response to a live attenuated, heterologous vaccine.

A virus-like particle vaccine for epidemic Chikungunya virus protects nonhuman primates against infection

Wataru Akahata¹, Zhi-Yong Yang¹, Hanne Andersen², Siyang Sun³, Heather A Holdaway³, Wing-Pui Kong¹, Mark G Lewis², Stephen Higgs⁴, Michael G Rossmann³, Srinivas Rao¹ & Gary J Nabel¹

VLP vaccine protects against

• CHIK challenge in monkey

• Lethal challenge in mice
Safety and tolerability of chikungunya virus-like particle vaccine in healthy adults: a phase 1 dose-escalation trial


- VRC-CHKVLP059-00-VP; NIAID
- West-African genotype based strain
- Dose escalation
- Covalesent titers, 3 months after infection 4-7000
A Virus-Like Particle Vaccine Elicits Broad Neutralizing Antibody Responses in Humans to All Chikungunya Virus Genotypes

Leslie Goo,¹ Kimberly A. Dowd,¹ Tsai-Yu Lin,¹,a John R. Mascola,² Barney S. Graham,² Julie E. Ledgerwood,² and Theodore C. Pierson¹

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Trial for Safety and Immunogenicity of a Chikungunya Vaccine VRC-CHKVLP059-00-VP, in Healthy Adults

• Phase 2, multicenter, randomized, placebo-controlled, 2-injection vaccine regimen with Chikungunya virus (CHIKV)
• 2-injections of VRC-CHKVLP059-00-VP at 20 mcg compared to placebo (PBS) in CHIKV endemic areas.
• Approximately 72 weeks with vaccinations scheduled at Day 0 and Day 28
• N=400; 5 Caribbean countries; NIAID
Immunogenicity, safety, and tolerability of a recombinant measles-virus-based chikungunya vaccine: a randomised, double-blind, placebo-controlled, active-comparator, first-in-man trial

Immunogenicity, safety, and tolerability of the measles-vectored chikungunya virus vaccine MV-CHIK: a double-blind, randomised, placebo-controlled and active-controlled phase 2 trial

Emil C Reisinger, Roland Tschismarov, Eckhard Beubler, Ursula Wiedermann, Christa Firbas, Micha Loebermann, Andrea Pfeiffer, Matthias Mueller, Erich Tauber, Katrin Ramsauer
Study of a Live Attenuated Chikungunya Vaccine in a Previously Epidemic Area (Puerto Rico)

- Safety and immunogenicity of MV-CHIK in a previously epidemic area in 100 healthy volunteers
- MV-CHIK compared to the commercial MMR vaccine.
- Prospective, comparator controlled, randomized, double-blinded study
- 100 healthy volunteers, 50 of whom are seropositive to Chikungunya at baseline and 50 of whom are seronegative, will be randomized in a 4:1 ratio in a double blinded fashion
- Measles viremia will also be measured.
- Two intramuscular injections on day 0 and 28
- Themis & WRAIR
Safety, Tolerability, and Immunogenicity of VAL-181388 in Healthy Subjects

• Phase 1, Randomized, Placebo-Controlled, Dose-Ranging

• 60 participants, double blind dose escalation

• Performed in Maryland, Moderna Therapeutics, Collaborator: Defense Advanced Research Projects Agency
Randomized, observer-blinded, multicenter, dose-escalation Phase 1 clinical study investigating three dose levels of VLA1553

• Blind, randomized after sentinel cohorts
• Single immunization
• **120** participants
• Three different doses
• Re-vaccination after 6 or 12 months
• Follow up: 13 months after initial vaccination.
• US: 3 states
• Valneva
A Phase 2 Parallel-Group, Randomized, Double-Blind Study to Assess the Safety and Immunogenicity of PXVX0317 (Chikungunya Virus Virus-Like Particle Vaccine [CHIKV-VLP], Unadjuvanted or Alum-adjuvanted)

• Immune response & safety of various doses/ formulations/and schedules of PXVX0317 in healthy adults.
• 8 formulation/schedule combinations of CHIKV VLP vaccine with or without Alhydrogel adjuvant, 3 different dose schedules of Day 1 and 15 or Day 1 and 29 or Day 29 only.
• Actual Enrollment: 415 participants randomized
• 3 sites in US NCT03483961; PaxVax, Inc.
Safety and Immunogenicity of a Candidate CHIKV Vaccine (CHIK001)

- **ChAdOx1 Chik** in healthy volunteers
- Three different doses ($5 \times 10^9$ vp, $2.5 \times 10^{10}$ vp and $5 \times 10^{10}$vp).
- N=24
- Duration: 26 weeks
- University of Oxford
A Phase 1, Double Blinded, Placebo Controlled, Dose Comparison Trial to Evaluate the Safety, Immunogenicity and Schedule of Measles Vectored Chikungunya Virus Vaccine (MV-CHIK) in Healthy Adults

- Randomized, double-blinded, Phase 1, placebo-controlled, and dose comparison trial
- Two dosage levels ($5 \times 10^4$ or $5 \times 10^5$ TCID50) and
- 3 immunization schedules (days 1 and 29, days 1 and 85 or days 1 and 169). 6 cohorts, each with 30 subjects (5:1 randomised)
- N=180
- Duration of Subject participation is ~8-13 months.
- NIAID; VRC-CHKVLP059-00-VP ??
CuraChik: A Trial of the Efficacy and Safety of Chloroquine as Therapeutic Treatment of Chikungunya Disease

Recruitment Status: “Terminated (Terminated Chikungunya diseases has regressed and no more patients was suffering)”

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Further readings

Chikungunya vaccines in development

Michael Schwameis\textsuperscript{a}, Nina Buchtele\textsuperscript{a}, Patricia Pia Wadowski\textsuperscript{a}, Christian Schoergenhofer\textsuperscript{b}, and Bernd Jilma\textsuperscript{a}

\textsuperscript{a}Departments of Clinical Pharmacology and Internal Medicine I, Medical University of Vienna, Vienna, Austria; \textsuperscript{b}Internal Medicine I Medical University of Vienna, Vienna, Austria
Safety, Tolerability and Long-term Immunogenicity of Different Formulations of a Chikungunya Vaccine

- Observer-blinded, block-randomised, phase II trial, different dose levels of MV-CHIK in three different formulations (lyophilised, liquid frozen and liquid SPS)
- 60 healthy volunteers aged 18-55 years
- Placebo evaluating single shot versus double shot treatment.
- 1 year follow up