Switzerland - A Phase I, double-blind, randomized, vehicle-controlled, dose-finding, safety study of a synthetic nanoparticle-based, T cell priming peptide vaccine against Dengue virus in healthy adults in Switzerland

GENTON, Blaise, HARTLEY, Mary-Anne

Report generated on: December 13, 2023

Visit our data catalog at: https://data.unisante.ch/index.php

Overview

Identification

ID NUMBER
10.16909-DATASET-43

Overview

ABSTRACT
Background

Vaccines that minimize the risk of vaccine-induced antibody-dependent enhancement and severe dengue are needed to address the global health threat posed by dengue. This study assessed the safety and immunogenicity of a gold nanoparticle (GNP)-based, multi-valent, synthetic peptide dengue vaccine candidate (PepGNP-Dengue), designed to provide protective CD8+ T cell immunity, without inducing antibodies.

Methods

In this randomized, double-blind, vehicle-controlled, phase 1 trial (NCT04935801), healthy naïve individuals aged 18-45 years recruited at the Centre for primary care and public health, Lausanne, Switzerland, were randomly assigned to receive PepGNP-Dengue or comparator (GNP without peptides [vehicle-GNP]). Randomization was stratified into four groups (low dose [LD] and high dose [HD]), allocation was double-blind from participants and investigators. Two doses were administered by intradermal microneedle injection 21 days apart. Primary outcome was safety, secondary outcome immunogenicity. Analysis was by intention-to-treat for safety, intention-to-treat and per protocol for immunogenicity.

Findings

26 participants were enrolled (Aug-Sep 2021) to receive PepGNP-Dengue (LD or HD, n=10 each) or vehicle-GNP (LD or HD, n=3 each). No vaccine-related serious adverse events occurred. Most (90%) related adverse events were mild; injection site pain and transient discoloration were most frequently reported. Injection site erythema occurred in 58% of participants. As expected, PepGNP-Dengue did not elicit anti-DENV antibodies of significance. Significant increases were observed in specific CD8+ T cells and dengue dextramer+ memory cell subsets in the LD PepGNP-Dengue but not in the HD PepGNP-Dengue or Vehicle-GNP groups, specifically PepGNP-activated CD137+CD69+CD8+ T cells (day 90, +0·0318%, 95% CI: 0·0088-0·1723, p= 0·046), differentiated effector memory (TemRA) and central memory (Tcm) CD8+ T cells (day 35, +0·8 /105 CD8+, 95% CI: 0·19-5·13, p= 0·014 and +1·34 /105 CD8+, 95% CI: 0·1-7·34, p= 0·024, respectively).

Interpretation

Results provide proof of concept that a synthetic nanoparticle-based peptide vaccine can successfully induce virus-specific CD8+ T cells. The favourable safety profile and cellular responses observed support further development of PepGNP-Dengue.

Funding

Emergex Vaccines Holding Limited.

KIND OF DATA
Clinical data and laboratory data (safety)

UNITS OF ANALYSIS
Individuals. 26 participants were enrolled.

KEYWORDS
Dengue vaccine, Dengue virus, T cell immunity, Nanoparticle-based vaccine

Coverage

GEOGRAPHIC COVERAGE
Switzerland

Producers and Sponsors

PRIMARY INVESTIGATOR(S)

Name	Affiliation
GENTON, Blaise	Unisanté, University Center for Primary Care and Public Health
HARTLEY, Mary-Anne	Unisanté, University Center for Primary Care and Public Health

OTHER PRODUCER(S)

Name	Affiliation	Role
MIAUTON, Alix	Unisanté, University Center for Primary Care and Public Health	Project coordinator
FAOUZI, Mohamed	Unisanté, University Center for Primary Care and Public Health	Statistician
SPERTINI, François	Lausanne University Hospital (CHUV)	Lead for immunological analyses
AUDRAN, Régine	Lausanne University Hospital (CHUV)	Immunological analyses

FUNDING

Name	Abbreviation	Role
Emergex Vaccines Holding Limited		

OTHER ACKNOWLEDGEMENTS

Name	Affiliation	Role
BESSON, Juliette	Unisanté, University Center for Primary Care and Public Health	Research physician
MABY EL HAJJAMI, Hélène	Lausanne University Hospital (CHUV)	Regulatory support
KARLEN, Maxime	Unisanté, University Center for Primary Care and Public Health	Research physician
WARPELIN DECRAUSAZ, Loane	Unisanté, University Center for Primary Care and Public Health & Lausanne University Hospital (CHUV)	Regulatory support
SENE, Loredana	Lausanne University Hospital (CHUV)	Study nurse
SCHAUFELBERGER, Sylvain	Unisanté, University Center for Primary Care and Public Health	Data management
FAIVRE, Vincent	Unisanté, University Center for Primary Care and Public Health	Data management

Metadata Production

METADATA PRODUCED BY

Name	Abbreviation	Affiliation	Role
RACINE, Céline		Unisanté, University Center for Primary Care and Public Health	Metadata editor

DATE OF METADATA PRODUCTION
2023-12-13

Sampling

No content available

Questionnaires

No content available

Data Collection

Data Collection Dates

Start	End	Cycle
2021-07-26	2022-03-11	N/A

Data Collection Mode

Data Processing

No content available

Data Appraisal

No content available