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A study of a next generation mRNA-LNP vaccine against SARS-CoV-2

Submission date	Recruitment status	[X] Prospectively registered
28/11/2023	No longer recruiting	[_] Protocol
Registration date	**Overall study status**	[_] Statistical analysis plan
23/04/2024	Completed	[_] Results
Last Edited	**Condition category**	[_] Individual participant data
11/04/2025	Infections and Infestations	[X] Record updated in last year

Plain English summary of protocol

Background and study aims
This is a proof-of-platform trial of a new mRNA-Lipid Nanoparticle (LNP) vaccine against COVID-19. The test vaccine (NeomiVac) has been developed by NeoVac Ltd and is similar to other mRNA COVID-19 vaccines, but uses a new LNP formulation which has the potential to be stored at fridge temperature for longer than existing mRNA vaccines. This would make mRNA vaccines easier to use, ship, handle and store, especially for healthcare professionals in low- and middle-income countries. This first-in-human trial aims to test the safety and immune response of NeomiVac at three different doses. If shown to be safe and immunogenic, the mRNA molecule in the NeomiVac vaccine may be updated to tackle new COVID-19 variants of concern (as has been done for existing mRNA COVID-19 vaccines), whilst the same lipid nanoparticle formulation may also be used to develop new mRNA vaccines to protect against different infectious diseases.

Who can participate?
Healthy volunteers aged 18 to 64 years of age.

What does the study involve?
Participants will initially be screened for eligibility through an online questionnaire, followed by an in-person medical assessment by a trained clinician. Eligible participants will be assigned into three sequential cohorts.
1. Cohort 1 (6 participants): participants will receive a single low dose of NeomiVac (25 micrograms)
2. Cohort 2 (15 participants): participants will receive a single middle dose of NeomiVac (50 micrograms)
3. Cohort 3 (15 participants): participants will receive a single high dose of NeomiVac (100 micrograms)

All vaccinations will be administered via intramuscular injection. There will be safety reviews after the first and third participants in each cohort is vaccinated to confirm it is safe to vaccinate further participants at the tested dose. There will also be safety reviews once all participants in a cohort
have been vaccinated before proceeding to vaccinate the next cohort at a higher dose. Participants will be followed up for 6 months from vaccination. Blood samples will be taken at

D0 before vaccination and then at Day 3, Day 7, Day 14, Day 28, Day (3 months) and Day 180 (6 months). Blood samples will be tested for safety parameters at all timepoints and for immunogenicity at timepoints from Day 14 onwards.

What are the possible benefits and risks of participating?
By participating in this research, participants will help the research into the development of a novel platform vaccine against COVID-19 and potentially other diseases that the formulation is used to address. However, they will not directly receive any personal health benefit from the study or its procedures.
This is the first time that NeomiVac will be administered to humans and therefore the full risk profile of NeomiVac is not yet known. As with any vaccine, local adverse reactions are expected after intramuscular vaccination. These typically include pain, redness, swelling at the injection site, or underarm swelling or tenderness on the same side of the injection. Reactions are typically mild to moderate in severity, occurring within 24 hours of injection and resolving within 3 to 4 days of onset. Whilst NeomiVac has not previously been administered to humans, systemic adverse reactions have been observed for similar mRNA COVID-19 vaccines following vaccination, including headache, muscle pain, joint pain, fatigue, chills, nausea/vomiting and fatigue. These are usually mild to moderate in severity and in most cases they resolve spontaneously within several days. Participants will be able to reach the clinical team 24/7 in case of any concerns.
As with all injectable vaccines, immediate systemic allergic reactions to vaccination can occur. These reactions are very rare and are estimated to occur once per 450,000 vaccinations for vaccines that do not contain allergens such as gelatine or egg protein.

Where is the study run from?
NeoVac Ltd. (UK)

When is the study starting and how long is it expected to run for?
May 2024 to April 2025

Who is funding the study?
NeoVac Ltd. (UK)

Who is the main contact?
Vaccinetrials@ndm.ox.ac.uk

Contact information

Type(s)
Scientific

Contact name
Dr Hannah Emami

Contact details
Unit 1&2 West
127 Olympic Avenue
Milton Park
Milton
United Kingdom
OX14 4SA

+44 7500930091
clinicaltrials@neovac.co.uk

Type(s)
Principal Investigator

Contact name
Dr Paola Cicconi

Contact details
CCVTM, University of Oxford, Churchill Hospital, Old Road, Headington
Oxford
United Kingdom
OX3 7LE
+44 1865 611425
paola.cicconi@ndm.ox.ac.uk

Additional identifiers

EudraCT/CTIS number
Nil known

IRAS number
1006703

ClinicalTrials.gov number
Nil known

Secondary identifying numbers
NeomiVac001, IRAS 1006703

Study information

Scientific Title
A phase I monotherapy study to evaluate the safety, tolerability and immunogenicity of a candidate next generation lipid nanoparticle (LNP) mRNA vaccine against SARS-CoV-2 (NeomiVac) in UK healthy adult volunteers

Study objectives
Primary Objective of the trial is to determine the safety and tolerability of different doses of a single vaccination of NeomiVac in healthy participants.
The Secondary Objectives are to assess the immune response to the vaccine

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 19/04/2024, South Central – Oxford A Research Ethics Committee (Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6PN, United Kingdom; +44 207 104 8272; oxforda.rec@hra.nhs.uk), ref: 24/SC/0136

Study design
Interventional non randomized

Primary study design
Interventional

Secondary study design
Non randomised study

Study setting(s)
Pharmaceutical testing facility

Study type(s)
Safety

Participant information sheet

Health condition(s) or problem(s) studied
COVID-19

Interventions
A total of 36 participants will take part in this open-label study. Each participant will be allocated to one of 3 treatment Cohorts in a sequential manner. All participants will receive a dose of NeomiVac and there is no placebo cohort.

Cohort 1: The first 6 eligible participants will receive a single low dose of NeomiVac (25 micrograms).

Cohort 2: The next 15 eligible participants will receive a single medium dose of NeomiVac (50 micrograms)

Cohort 3: The final 15 eligible participants will receive a single high dose of NeomiVac (100 micrograms).

All vaccinations will be administered via intramuscular injection. There will be safety reviews after the first and third participant in each cohort is vaccinated to confirm it is safe to vaccinate the remainder of the cohort at the tested dose. There will also be safety reviews 7 days after the last participant from each cohort is vaccinated before proceeding to the next cohort with a higher dose.

Intervention Type
Biological/Vaccine

Pharmaceutical study type(s)
Others (Immunogenicity)

Phase
Phase I

Drug/device/biological/vaccine name(s)

NeomiVac [mRNA]

Primary outcome measure
Incidence of safety and reactogenicity events for approximately 6 months following the vaccination:
1. Adverse events and/or adverse events leading to study discontinuation
2. Serious adverse events
3. Grade ≥3 local and systemic reactions

Secondary outcome measures
Current secondary outcome measures as of 13/02/2025:

1. Binding IgG antibody levels to S protein to the Omicron variant and other relevant variants at baseline, D14, D28, D56 and D182
2. Neutralising antibody levels to Omicron and other relevant variants at baseline, peak antibody response as determined from IgG antibody levels and D182
3. Antigen-specific T cell responses to S antigen by IFN-gamma ELISPOT assays at baseline and at D14, D28, D56 and D182
4. Incidence of Grade ≥1 abnormalities in LFTs (ALT/AST/GGT) at baseline and at D3, D7, D14, D28, D56 and D182 timepoints

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Previous secondary outcome measures:

1. Binding IgG antibody levels to S protein to the Omicron variant and relevant subvariants and to Wuhan at baseline, D14, D28, D56 and D182
2. Neutralising antibody levels to Omicron and Wuhan live virus (variants and relevant subvariants) at baseline, D14,D28, D56 and D182
3. Antigen-specific T cell responses to S antigen by IFN-gamma ELISPOT assays at baseline and at D14, D28, D56 and D182
4. Incidence of Grade ≥1 abnormalities in LFTs (ALT/AST/GGT) at baseline and at D3, D7, D14, D28, D56 and D182 timepoints

Overall study start date
24/11/2023

Completion date
30/04/2025

Eligibility

Key inclusion criteria
1. Healthy adults aged 18 to 64 years.
2. Able and willing (in the Investigator’s opinion) to comply with all study requirements.
3. Willing to allow confirmation of their past medical history either through provision of a GP medical record summary, allowing investigators to obtain a copy of their medical history from their GP practice or by providing an alternative acceptable means of confirming their past medical history.
4. Agreement to refrain from blood donation during the course of the study.
5. Provide written informed consent.

6. For women of childbearing potential only: Willingness to practice continuous effective contraception for the duration of the trial.
7. For women of childbearing potential only: A negative pregnancy test on the day of both screening and vaccination.
8. Considered healthy with no current conditions that may significantly impair participant safety or influence study results, in the opinion of the Investigator.

Participant type(s)
Healthy volunteer

Age group
Adult

Lower age limit
18 Years

Upper age limit
64 Years

Sex
Both

Target number of participants
36

Total final enrolment
36

Key exclusion criteria
1. A history of COVID-19 infection (confirmed either by lateral flow test or PCR) within 30 days of the study vaccination.
2. Participation in another research study involving receipt of an investigational product in the 90 days preceding enrolment or during the trial follow up period.
3. Receipt of any COVID vaccine during the 3 months prior to screening and planned receipt of another COVID vaccine for 3 months after receiving the trial vaccine.
4. Planned or actual receipt of any non-COVID vaccines administered within 14 days (before or after) enrolment EXCEPT for live vaccines, which must not be given within 30 days of the trial vaccine.
5. Administration of immunoglobulins and/or any blood products within the three months preceding the planned administration of the vaccine candidate.
6. Any confirmed or suspected immunosuppressive or immunodeficient state, including HIV infection; asplenia; recurrent, severe infections and chronic (more than 14 days) systemically active immunosuppressant medication within the past 6 months.
7. History of allergic disease or reactions likely to be exacerbated by any component of the vaccine.
8. History of allergy to polyethylene glycol (PEG)
9. History of hereditary angioedema, acquired angioedema, or idiopathic angioedema.
10. History of anaphylaxis in relation to vaccination.
11. History of myocarditis, pericarditis, or any active known heart disease.
12. History of cancer (except basal cell carcinoma of the skin and cervical carcinoma in situ).
13. History of serious psychiatric condition likely to affect participation in the study.

14. Ongoing or planned pregnancy or breastfeeding during the trial follow up period.
15. Bleeding disorder (e.g. Factor deficiency, coagulopathy or platelet disorder), or prior history of significant bleeding or bruising following IM injections or venepuncture.
16. Detectable circulating hepatitis B surface antigen (HBsAg).
17. Seropositive for hepatitis C virus (antibodies to HCV).
18. Any clinically significant abnormal finding on screening biochemistry or haematology blood tests or urinalysis.
19. Participant has any medical, psychiatric, or occupational condition, including reported history of drug or alcohol abuse, that, in the opinion of the Investigator, might pose additional risk due to participation in the study or could interfere with the interpretation of study results

Date of first enrolment
15/05/2024

Date of final enrolment
24/10/2024

Locations

Countries of recruitment
England

United Kingdom

Study participating centre
Jenner Institute Centre for Clinical Vaccinology and Tropical Medicine (CCVTM)
Jenner Institute, Clinical Vaccine Trials CCVTM, Churchill Hospital Old Road, Headington
Oxford
United Kingdom
OX3 7LE

Sponsor information

Organisation
NeoVac Ltd.

Sponsor details
NeoVac Ltd.
Unit 1&2 West
127 Olympic Avenue
Milton Park
Milton
England
United Kingdom

OX14 4SA
+44 7500930091
clinicaltrials@neovac.co.uk

Sponsor type
Industry

Funder(s)

Funder type
Industry

Funder Name
NeoVac Ltd.

Results and Publications

Publication and dissemination plan
Peer reviewed scientific journals
Internal report
Conference presentation
Publication on website
Submission to regulatory authorities
The results of this study may be published or presented at scientific meetings. If this is foreseen, the Investigators may be involved in reviewing all manuscripts, abstracts, press release and any other publications arising from the study. Also, the Investigators agree to submit all manuscripts or abstracts to the Sponsor before submission. This allows the Sponsor to protect proprietary information and to provide comments.
The Sponsor will comply with the requirements for publication of study results. Authorship will be determined by mutual agreement. The results and data from this study belong to NeoVac.

Intention to publish date
31/07/2025

Individual participant data (IPD) sharing plan
Datasets generated during and/or analysed during this study are not expected to be made available due to the commercial sensitivity of the trial.

IPD sharing plan summary
Not expected to be made available