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Reporting Summary

Nature Research wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Research policies, see our Editorial Policies and the Editorial Policy Checklist.

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a	Confirmed
☐	☒ The exact sample size (*n*) for each experimental group/condition, given as a discrete number and unit of measurement
☐	☒ A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
☐	☒ The statistical test(s) used AND whether they are one- or two-sided *Only common tests should be described solely by name; describe more complex techniques in the Methods section.*
☒	☐ A description of all covariates tested
☒	☐ A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons
☐	☒ A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
☐	☒ For null hypothesis testing, the test statistic (e.g. *F*, *t*, *r*) with confidence intervals, effect sizes, degrees of freedom and *P* value noted *Give P values as exact values whenever suitable.*
☒	☐ For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings
☐	☒ For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes
☐	☒ Estimates of effect sizes (e.g. Cohen's *d*, Pearson's *r*), indicating how they were calculated

Our web collection on statistics for biologists contains articles on many of the points above.

Software and code

Policy information about availability of computer code

Data collection	Inform (for data collected in the case report form) and electronic diary (Signant Health platform) for participant self reported reactogenicity Data collection for ELISA was performed using a SpectraMax M5 reader (Molecular Device, USA) at OD 450 nm using the SoftMax Pro GxP Software. Data collection for the IFNgamma ELIspot assay were performed an AID ELISPOT Reader (AID Autoimmun Diagnostika, Germany) and data exported using AID EliSpot software Version 7.0 No custom software codes have been developed.
Data analysis	SAS 9.4 was used to manage, analyze and export patient-level clinical trial data. All statistical analyses were performed using GraphPad Prism software version 8.4.2.

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Research guidelines for submitting code & software for further information.

Data

Policy information about availability of data

All manuscripts must include a data availability statement. This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A list of figures that have associated raw data
- A description of any restrictions on data availability

We support data sharing of individual participant data. The individual participant data that underlie the results reported in this article, after de-identification (text, tables, figures, and extended data) will be shared. The raw data will be available after the publish of this article till one year after publication. Researchers who

provide a scientifically sound proposal will be allowed access to the individual participant data. Proposals should be directed to jszfc@vip.sina.com or aimin.hui@fosunpharma.com.

Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☒ Life sciences ☐ Behavioural & social sciences ☐ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see nature.com/documents/nr-reporting-summary-flat.pdf

Life sciences study design

All studies must disclose on these points even when the disclosure is negative.

Sample size	The total sample size in this study was 144 participants, 24 participants of each age group was included in each treatment group. The probability to observe a particular adverse event with incidence of 8% at least once in 24 participants in each dose group was 86.5%.
Data exclusions	All safety and immunogenicity data were included in the report. No data were excluded from the analyses.
Replication	This is an interim report of an ongoing human clinical trial. There was no attempt at replication of study findings.
Randomization	This is an randomized controlled trial. We randomly assigned participants in each age group in a ratio of 1:1:1 to receive the low-dose BNT126b1 or high-dose BNT126b1 or placebo, stratified by gender, using a Web-based interactive response technology (IRT) system.
Blinding	Authorized unblinded pharmacists prepared the vaccines or placebo according to the allocation of participants through the IRT system, and nurses administrated the investigational products to participants. The unblinded staff had no further involvement in the trial, and were forbidden to disclosure allocation information to others. All other investigators, participants, laboratory staff and the sponsor remained blinded throughout the trial.

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

Materials & experimental systems

n/a	Involved in the study
☒	☐ Antibodies
☐	☒ Eukaryotic cell lines
☒	☐ Palaeontology and archaeology
☒	☐ Animals and other organisms
☐	☒ Human research participants
☐	☒ Clinical data
☒	☐ Dual use research of concern

Methods

n/a	Involved in the study
☒	☐ ChIP-seq
☒	☐ Flow cytometry
☒	☐ MRI-based neuroimaging

Eukaryotic cell lines

Policy information about cell lines

Cell line source(s)	Vero-E6 cells (National Collection of Authenticated Cell Cultures, National Academy of Science, China)
Authentication	The cell line was not authenticated
Mycoplasma contamination	The cell line was not tested
Commonly misidentified lines (See ICLAC register)	*Name any commonly misidentified cell lines used in the study and provide a rationale for their use.*

Human research participants

Policy information about studies involving human research participants

Population characteristics	144 eligible participants consented to participate in the trial and were randomized 1:1:1 to receive prime and boost doses of BNT162b1 at 10 μg or 30 μg, or two placebo doses 21 days apart (Figure 1), with an equal allocation for each age group.

	Following priming doses, two participants (one at 10 µg, one at 30 µg) between the ages of 65 and 85 years had withdrawn from boost dose administration
Recruitment	Participants were generally in good health as established by medical history, physical examination, and laboratory tests at the screening visit. Both male and female were included and agreed to have contraception during the trial. We excluded those who pregnant or breast-feeding or known infection with SARS-CoV-2. The eligibility of participants was confirmed by negative results from a commercial rapid diagnostic kit for IgM/IgG antibody to SARS-CoV-2 manufactured by Livzon diagnostics inc., Zhuhai, China), and pharyngeal swabs nucleic acid diagnostic test (manufactured by Fosun pharma, Shianghai, China), and no imaging features of COVID-19 in chest CT scan. Participants had serious cardiovascular disease, or some major chronic illnesses were also excluded.
Ethics oversight	The study was done in accordance with the Declaration of Helsinki and Good Clinical Practice. The trial protocol was reviewed and approved by the National Medical Products Administration, China, and the institutional review board of the Jiangsu Provincial Center of Disease Control and Prevention.

Note that full information on the approval of the study protocol must also be provided in the manuscript.

Clinical data

Policy information about clinical studies

All manuscripts should comply with the ICMJE guidelines for publication of clinical research and a completed CONSORT checklist must be included with all submissions.

Clinical trial registration	This trial was registered with the Chinese Clinical Trial Registry (ChiCTR2000034825) and with clinicaltrials.gov (NCT04523571).
Study protocol	The protocol has been submitted.
Data collection	Each participant was asked to remain at the study site for at least six hours post vaccine administration for safety observation. Vital signs including temperature, blood pressure, pulse, and respiratory rate were measured at baseline, one hour, three hours and six hours post-vaccination. Any adverse events following the vaccination were documented by participants using diaries until Day 28 post-administration of the boost dose. Serum were collected at baseline, days 8 and 22 after each dose.
Outcomes	The primary and secondary objectives of this trial were to evaluate safety and immunogenicity of the candidate vaccine BNT162b1 in healthy Chinese adults. The primary endpoints for safety evaluation were the incidence of solicited local reactions at the injection site or systemic adverse reactions within 14 days post-vaccination, and adverse events following the full immunization until 28 days after receiving the boost dose. Any clinical laboratory abnormalities from baseline to 24 hours or 7 days after vaccination, and any serious adverse event (SAE) that occurred were also recorded. The secondary endpoints for immunogenicity were geometric mean titer (GMT), seroconversion rates and fold increase of virus-neutralizing antibody, or ELISA IgG antibodies binding to S1 or RBD measured at days 8, 22 after each vaccination. Seroconversion is defined as an increase by a factor of four or more in antibody titer over the baseline, or the lower limit value if the baseline titer is below the limit of detection. The serum dilution for ELISA started at 1:100, while that for microneutralization assay started at 1:10. Cellular immune responses in terms of the number of positive cells with interferon gamma (IFN-γ) secretion among PBMCs at a concentration of 1×10^5/well at Day 8 and 22 after the boost dose were explored as an exploratory endpoint.