Background BNT116 is an intravenously administered RNA-lipoplex therapeutic cancer vaccine comprising six RNAs each encoding a tumor-associated antigen (TAA) frequently expressed in non-small cell lung cancer (NSCLC). Here, we report preliminary results from patients with advanced unresectable or metastatic NSCLC (ECOG 0–2) receiving BNT116 monotherapy with optional addition of cemiplimab.

Methods LuCa-MERIT-1 is a first-in-human, open label, Phase I trial with cohorts to confirm the dose of BNT116 alone or as combination therapy with cemiplimab, docetaxel, and/or carboplatin/paclitaxel (21-day cycles). The first six BNT116 doses are administered once weekly during Cycles 1 and 2 and three-weekly from Cycle 3 onwards.

The cohort reported here will confirm the dose of BNT116 as monotherapy. Cemiplimab may be added from Cycle 1 if tumor samples exhibit PD-L1 expression (tumor proportion score $\geq 15\%$) and from Cycle 2 if tumor samples exhibit PD-L1 expression $\geq 5\%$. Patients’ prior therapies must have included a PD-1/PD-L1 inhibitor, a platinum-based chemotherapy regimen as well as one other systemic therapy. The objectives are to determine safety (dose limiting toxicities [DLTs] in Cycle 1; treatment-emergent adverse events [TEAEs]), and clinical activity (RECIST v1.1). Tumor and blood samples will be used for biomarker analysis.

Results As of 01 March 2023, 18 patients (median age 65 years) have received BNT116 in the reported cohort ($n=13$ monotherapy only; $n=5$ cemiplimab added after Cycle 3). Most ($16/18$ [89%]) had received $\geq 3$ prior therapy lines. All patients experienced $\geq 1$ TEAE, and most TEAEs were grade 1–2 (table 1). TEAEs (incidence rate $\geq 5\%$) include pyrexia ($n=12$ [67%], grade 1–3), chills ($n=9$ [50%], grade 1–2), and vomiting ($n=5$ [28%], grade 1–2). Pyrexia and chills were considered treatment-related TEAEs for BNT116. Serious TEAEs were observed in 5/18 (28%) patients (grade 2 pneumonia [n=1], grade 3 fatigue [n=1] or pneumonia [n=1], and grade 4 acute kidney injury [n=1]). The latter grade 4 TEAE occurred during safety follow-up after trial treatment termination and was considered as unrelated to treatment with IMP. No DLTs or deaths under treatment were observed. Ten of 18 patients were evaluable for clinical activity ($n=5$ monotherapy only; $n=5$ cemiplimab added after Cycle 3). Of these, 6/10 had stable disease and 4/10 had progressive disease. The median duration of disease control was 1.5 months.

Conclusions In this trial, BNT116 was generally well tolerated with an expected safety profile as monotherapy and in combination with cemiplimab. Updated safety and clinical activity data will be presented along with additional biomarker data (TAA expression, PD-L1 expression, cytokines, tumor markers).

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Ethics Approval This study was reviewed and approved by the institutional review boards of the participating institutions.

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