Supplementary appendix

Supplementary Table S1: Study Participant Characteristics

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Participants with Lymphoma (n=126)** | **Control Participants****(n = 20)** |
|   |   | **Median/****Number** | **Range/****Percent** | **Median/****Number** | **Range/****Percent** |
| **Age** (years) |   | 68 | 27-92 | 65.5 | 29-84 |
| **Sex** | Male | 73 | 58% | 4 | 20% |
|  | Female | 53 | 42% | 16 | 80% |
| **Vaccine Type** | mRNA-1273 | 74 | 59% | 8 | 40% |
| BNT162b2 | 48 | 38% | 12 | 60% |
| J&J | 4 | 3% | 0 | 0% |
| **Time Interval** (days) | Last vaccine to 1st sample | 27.5 | 10-96 | 32 | 15-78 |
| 1st sample to 2nd sample | 97 | 23-196 | 100 | 52-152 |
| **Lymphoma Histology** | FL | 52 | 41% |  |  |
| DLBCL | 37 | 29% |  |  |
| MZL | 19 | 15% |  |  |
| MCL | 8 | 6% |  |  |
| LPL/WM | 4 | 3% |  |  |
| HGBCL/Burkitt | 4 | 3% |  |  |
| Other | 2 | 2% |  |  |
| **Treatment Status** | Previously untreated | 17 | 13% |  |  |
| Not treated in past 6m | 65 | 52% |  |  |
| Anti-CD20 within 6m prior | 31 | 25% |  |  |
| Currently on a BTKi | 11 | 9% |  |  |
| Other | 2 | 2% |  |  |
| FL, follicular lymphoma. DLBCL, diffuse large B-cell lymphoma. MZL, marginal zone lymphoma. MCL, mantle cell lymphoma. LPL/WM, lymphoplasmacytic lymphoma/Waldenstrom macroglobulinemia. HGBCL/Burkitt, high-grade B-cell lymphoma/Burkitt lymphoma. 6m, six months. BTKi, BTK inhibitor |

**Supplementary Table S2: Blocking Antibody Results 1 month after final vaccine dose**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **RBD-ACE2 Binding Inhibition** | **Anti-Spike IgG** |
| **Cohort** | **Blocking Positive** | **Blocking Negative** | **% Blocking Positive** | **p-value(vs controls)** | **IgG Positive** | **IgG Negative** | **% IgG Positive** | **p-value(vs controls)** |
| Healthy Donor Controls | 20 | 0 | 100% | -- | 20 | 0 | 100% | -- |
| Patients with Lymphoma (all) | 69 | 56 | 55% | <0.001 | 84 | 42 | 67% | <0.001 |
| Lymphoma subgroups | Previously untreated | 14 | 3 | 82% | ns | 17 | 0 | 100% | ns |
| No treatment in the past 6 months\* | 50 | 16 | 76% | 0.017 | 54 | 12 | 82% | ns |
| Currently on BTKi\* | 5 | 7 | 42% | <0.001 | 8 | 4 | 67% | 0.014 |
| Received aCD20 within the past 6 months\* | 0 | 31 | 0% | <0.001 | 5 | 26 | 16% | <0.001 |
| \* Timing relative to first vaccine dose |
| Blocking activity and anti-spike antibody responses scored as positive or negative based on validated cutoffs (see Materials and Methods). RBD, receptor-binding domain. ACE2, angiotensin converting enzyme 2. BTKi, Bruton tyrosine kinase inhibitor. aCD20, anti-CD20 antibody. |

**Supplementary Table S3: Characteristics of pre-therapy vaccination cohort in Figure 3A**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Patient** | **Age** | **Sex** | **Diagnosis** | **Vaccine** | **Timing of Last Treatment** | **Treatment received** **after vaccination** | **Time from last vaccine to treatment start (days)** |
| Pt01 | 75 | M | DLBCL | mRNA1273 | > 6m ago | RCHOP | 22 |
| Pt02 | 70 | M | FL | mRNA1273 | > 6m ago | RB | 2 wks after 1st dose |
| Pt03 | 57 | F | FL | mRNA1273 | > 6m ago | R | 39 |
| Pt04 | 67 | M | DLBCL | mRNA1273 | > 6m ago | RCHOP | 28 |
| Pt05 | 67 | M | MZL | mRNA1273 | Untreated | RZ | 36 |
| Pt06 | 40 | F | MZL | BNT162b2 | Untreated | R | 20 |
| Pt07 | 92 | F | DLBCL | mRNA1273 | Untreated | RCEP | 32 |
| Pt08 | 56 | M | MCL | mRNA1273 | Untreated | RB | 39 |
| Pt09 | 50 | M | DLBCL | mRNA1273 | Untreated | REPOCH, MTX | 58 |
| Pt10 | 52 | M | DLBCL | BNT162b2 | Untreated | RCHOP | 50 |

Characteristics of 10 patients who demonstrated positive antibody responses after vaccination and who shortly thereafter received anti-CD20-containing treatment were followed for persistence of response after 4 cycles or 4 months of treatment had passed. R, rituximab (an anti-CD20 antibody). C, cyclophosphamide. H, hydrodaunorubicin/doxorubicin. O, vincristine. P, prednisone or equivalent corticosteroid. B, bendamustine. Z, zanubrutinib (a BTK inhibitor). E, etoposide. MTX, intravenous methotrexate.