Supplementary Information
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Supplementary Table S1.................................................................................................................................2
Supplementary Table S2.................................................................................................................................3
Supplementary Table S3.................................................................................................................................5
Supplementary Figure S1...............................................................................................................................6
Supplementary Figure S2...............................................................................................................................7
**Supplementary Table S1 List of the antibodies**

| Marker | Clone | Dilution | Company |
|--------|-------|----------|---------|
| CD3    | 2FGV6 | Ready to use | Roche (Basel, Switzerland) |
| CD4    | SP35  | 1:50 | Zytomed (Berlin, Germany) |
| CD5    | SP19  | 1:100 | Medac (Wedel, Germany) |
| CD8    | C8/144B | 1:300 | Dako (Santa Clara, CA, United States) |
| CD15   | MMA/LeuM1 | 1:100 | Biozol (Eching, Germany) |
| CD20   | L26   | 1:400 | Dako (Santa Clara, CA, United States) |
| CD30   | Ber-H2 | 1:30 | Dako (Santa Clara, CA, United States) |
| CD56   | MRQ-24 | 1:300 | Menarini (Florence, Italy) |
| CD68   | KP1   | 1:5000 | Dako (Santa Clara, CA, United States) |
| CD163  | MRQ-26 | 1:150 | Medac (Wedel, Germany) |
| cMaf   | BLR045F | 1:750 | Abcam (Cambridge, United Kingdom) |
| cMyc   | y69   | Ready to use | Roche (Basel, Switzerland) |
| EBNA2  | PE2   | 1:1000 | Abcam (Cambridge, United Kingdom) |
| FOXP1  | SP133 | 1:100 | Abcam (Cambridge, United Kingdom) |
| FOXP3  | Z36A/E7 | 1:50 | Abcam (Cambridge, United Kingdom) |
| Granzyme B | poly Rabbit | Ready to use | Roche (Basel, Switzerland) |
| Kappa  | poly Rabbit | 1:25000 | Dako (Santa Clara, CA, United States) |
| Lambda | poly Rabbit | 1:25000 | Dako (Santa Clara, CA, United States) |
| LMP    | CS 1-4 | 1:400 | Medac (Wedel, Germany) |
| Mannose | Polyclonal ab64693 | 1:2500 | Abcam (Cambridge, United Kingdom) |
| MUM1   | MUM1p | 1:400 | Dako (Santa Clara, CA, United States) |
| P53    | DO-7  | 1:400 | Novocastra (Wetzlar, Germany) |
| PAX5   | SP34  | Ready to use | Roche (Basel, Switzerland) |
| PD1    | NAT105 | Ready to use | Roche (Basel, Switzerland) |
| PD-L1  | 28-8  | 1:100 | Abcam (Cambridge, United Kingdom) |
| pSTAT1 | EPR 3146 | 1:1500 | Abcam (Cambridge, United Kingdom) |
| TIA1   | TIA-1 | 1:50 | Zytomed/Biocare (Berlin, Germany) |
### Supplementary Table S2 Detailed characteristics of the total collective

| Case # | Age (years) | Sex | Diagnosis | Subtype | EBV | Tx | Months Tx to PTLD | Follow-up |
|--------|-------------|-----|-----------|---------|-----|----|------------------|-----------|
| 1      | 9           | m   | Non-destructive PTLD | FFH     | +   | HCT | 22               | Alive     |
| 2      | 36          | m   | Polymorphic PTLD     | +       | HCT | 5   | n/a              | Alive     |
| 3      | 52          | m   | Polymorphic PTLD     | +       | HCT | 2   | Alive            |           |
| 4      | 28          | m   | Polymorphic PTLD     | +       | HCT | 2   | Dead             |           |
| 5      | 52          | m   | Polymorphic PTLD     | +       | HCT | 4   | Alive            |           |
| 6      | 17          | m   | Polymorphic PTLD     | +       | HCT | 2   | Dead             |           |
| 7      | 15          | m   | Polymorphic PTLD     | -       | HCT | 3   | Alive            |           |
| 8      | 52          | m   | Polymorphic PTLD     | +       | HCT | 19  | Alive            |           |
| 9      | 46          | m   | Monomorphoic PTLD    | DLBCL   | +   | HCT | 23               | Alive     |
| 10     | 28          | m   | Monomorphoic PTLD    | PBL     | -   | HCT | 75               | Alive     |
| 11     | 29          | m   | Monomorphoic PTLD    | PBL     | +   | HCT | 2               | Dead      |
| 12     | 19          | f   | Classic Hodgkin lymphoma PTLD | + | HCT | 228 | Alive            |           |
| 13     | 32          | m   | Non-destructive PTLD | PH      | +   | Liver| 201              | Alive     |
| 14     | 20          | m   | Non-destructive PTLD | FFH     | +   | Liver| 12               | Alive     |
| 15     | 66          | m   | Polymorphic PTLD     | +       | Liver| 6   | Alive            |           |
| 16     | 4           | f   | Monomorphoic PTLD    | DLBCL   | +   | Intestine| 8               | Alive     |
| 17     | 13          | m   | Monomorphoic PTLD    | BL      | +   | Liver| 36               | Alive     |
| 18     | 10          | m   | Monomorphoic PTLD    | DLBCL   | -   | Kidney| 115              | Alive     |
| 19     | 36          | m   | Monomorphoic PTLD    | DLBCL   | -   | Kidney| 86               | Alive     |
| 20     | 21          | m   | Monomorphoic PTLD    | DLBCL   | -   | Kidney| 217              | Alive     |
| 21     | 40          | f   | Monomorphoic PTLD    | PBL     | +   | Kidney| n/a              | n/a       |
| 22     | 11          | m   | Monomorphoic PTLD    | DLBCL   | -   | Liver| 84               | Alive     |
| 23     | 17          | f   | Non-destructive PTLD | IM      | +   | HCT  | 2               | Dead      |
| 24     | 74          | m   | Non-destructive PTLD | PH      | -   | HCT  | 23               | Dead      |
| 25     | 38          | m   | Polymorphic PTLD     | +       | HCT  | 11  | n/a              |           |
| 26     | 9           | f   | Polymorphic PTLD     | +       | HCT  | 13  | Alive            |           |
| 27     | 25          | f   | Polymorphic PTLD     | +       | HCT  | 2   | Alive            |           |
| 28     | 41          | m   | Polymorphic PTLD     | +       | HCT  | 1   | Dead             |           |
| 29     | 15          | f   | Polymorphic PTLD     | +       | HCT  | 3   | Alive            |           |
| 30     | 39          | f   | Polymorphic PTLD     | +       | HCT  | 1   | Alive            |           |
| 31     | 60          | f   | Polymorphic PTLD     | +       | HCT  | 5   | Dead             |           |
| 32     | 5           | m   | Polymorphic PTLD     | +       | HCT  | 4   | Dead             |           |
| 33     | 26          | f   | Monomorphoic PTLD    | DLBCL   | +   | HCT  | 3               | Dead      |
| 34     | 50          | f   | Monomorphoic PTLD    | Grey zone lymphoma* | - | HCT | 48               | Alive     |
| 35     | 41          | m   | Monomorphoic PTLD    | DLBCL   | -   | HCT  | 155              | Dead      |
| 36     | 42          | f   | Monomorphoic PTLD    | DLBCL   | +   | HCT  | 2               | Dead      |
| 37     | 5           | f   | Non-destructive PTLD | PH      | +   | Kidney| 28              | Alive     |
| 38     | 1           | m   | Polymorphic PTLD     | +       | Liver| 9   | Alive            |           |
| 39     | 60          | m   | Polymorphic PTLD     | +       | Multivisceral| 3 | Dead             |           |
| 40     | 13          | m   | Polymorphic PTLD     | +       | Heart| 116 | Alive            |           |
| 41     | 71          | m   | Polymorphic PTLD     | +       | Liver| n/a | n/a              |           |
| 42     | 12          | m   | Polymorphic PTLD     | +       | Intestine| 46 | Alive            |           |
| 43     | 60          | m   | Polymorphic PTLD     | +       | Liver| 9   | Dead             |           |
| 44     | 65          | m   | Polymorphic PTLD     | +       | Kidney| 435 | Dead             |           |
| 45     | 66          | m   | Monomorphoic PTLD    | DLBCL   | -   | Liver| 19              | Dead      |
| 46     | 9           | m   | Monomorphoic PTLD    | DLBCL   | -   | Heart| 105             | Alive     |
| 47     | 62          | m   | Monomorphoic PTLD    | ALC1    | -   | Lung | 148              | n/a       |
| 48     | 69          | m   | Monomorphoic PTLD    | HGBL with MYC- and BCL2-rearrangement | - | Liver | 48               | Alive     |
* B-cell lymphoma, unclassifiable, with features intermediate between DLBCL and Burkitt lymphoma (Jaffe ES, 2017 #95).

PTLD = Post-transplant lymphoproliferative disorder
Tx = Transplantation
HCT = Hematopoietic stem cell transplantation
EBV = Epstein-Barr virus
m = male
f = female
n/a = not available

PH = Plasmacytic hyperplasia
IM = Infectious mononucleosis
FFH = Florid follicular hyperplasia
DLBCL = Diffuse large B-cell lymphoma
PBL = Plasmablastic lymphoma
HGBL = High grade B-cell lymphoma
ALCL = Anaplastic large cell lymphoma
BL = Burkitt lymphoma
**Supplementary Table S3** Macrophages polarization of the 22 TMA cases

| Case # | Polarization |
|--------|--------------|
| 1      | M1           |
| 2      | Intermediate |
| 3      | Intermediate |
| 4      | M1           |
| 5      | M1           |
| 6      | M1           |
| 7      | M1           |
| 8      | M1           |
| 9      | M1           |
| 10     | M1           |
| 11     | M1           |
| 12     | M1           |
| 13     | M2           |
| 14     | M1           |
| 15     | M2           |
| 16     | M1           |
| 17     | M1           |
| 18     | M2           |
| 19     | M1           |
| 20     | M1           |
| 21     | M2           |
| 22     | M1           |

M1-polarization: ratio of CD163/pStat1-positive cells to CD163_cMaf-positive cells > 1.5.
M2-polarization: ratio of CD163/cMaf-positive to CD163/pStat1-positive cells > 1.5.
Intermediate: If neither ratio was > 1.5.
**Supplementary Fig S1 Basic data of the total collective**

Comparison of the total collective and the subgroup analyzed on TMA shows representative results regarding patient characteristics and PTLD-associated features of the TMA-subgroup.

| Case # | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|-------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| **Tx** |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| **PTLD** |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| **EBV** |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

**TMA**

**Non-TMA**

**Tx** = Transplantation  
**HCT** = Hematopoietic stem cell transplantation  
**SOT** = Solid organ transplantation  
**EBV** = Epstein-Barr virus  
**PTLD** = Post-transplant lymphoproliferative disorder  
**TMA** = Tissue microarray

- **HCT** n=26  
- **SOT** n=22  
- Non-destructive PTLD n=6  
- Polymorphic PTLD n=23  
- Monomorphic PTLD n=18  
- Classic Hodgkin lymphoma PTLD n=1  
- EBV-positive n=35  
- EBV-negative n=13  

- Tx = Transplantation  
- TMA = Tissue microarray
Supplementary Fig S2 Morphological and immunophenotypical features of a polymorphic EBV negative PTLD (case #7) Low power magnification highlights the effaced architecture (a, hematoxylin-eosin (H&E) stain, original magnification x50; insert EBER in-situ hybridization, x100). The polymorphic lymphoid proliferation comprises mature lymphocytes, blasts and plasma cells intermingled with scattered macrophages (b, H&E stain, x400). The immunophenotype of the lymphoid infiltrate shows a heterogenous staining for PAX5 (c) and positivity for CD79a (d). CD3 staining reveals a prominent reactive T cell population (e) (C-E, x200).