# Supplementary data

**Supplemental Methods** – Supplemental method section with increased detail regarding methods used in the manuscript.

**Supplemental Figures** – SFig 1: Assessment of the binding characteristics and cynomolgus monkey cross-reactivity of CD20-TCB. SFig 2: Tumor cell lysis mediated by different CD20-targeting TCB antibodies. SFig 3: T-cell and B-cell counts along with E:T ratio upon CD20-TCB treatment of primary bone marrow aspirates from patients with lymphoma and leukemia. SFig 4: Quantification of interactions between T-cells and tumor cells from live imaging experiments and kinetic analysis of T-cell activation and exhaustion marker expression. SFig 5: Secretion of cytokines, cytotoxic granules and T-cell proliferation upon tumor lysis. SFig 6: Assessment of the cytokine-mediatedendothelial cell activation.

**Supplemental Tables** – STab 1: Overview of CD20-targeting T-cell bispecific molecules evaluated in the current study. STab 2: Tumor cell lines and EC50 values of tumor cell lysis. STab 3: Assessment of the activity in *ex vivo* primary tumor samples derived from aggressive lymphoma and leukemia patients. STab 4: Absolute values of cytokines measured by multiplex analysis of blood samples reported as heatmap in Figure 3e, 4b, 5d, and 6b. STab 5: Average score of perivascular CD3 positive T-cells in the lung (assessed by blinded pathologist analysis) referring to T-cell staining of lungs from tumor-bearing, HSC NSG mice 7 days after the first treatment and 24 h after the second treatment (treatment groups are indicated on Figure 6D panels).

**Supplemental Video 1.** *In vitro* visualization of the dynamics of untargeted TCB (white) during the interaction between CD8+ T-cells (green) and tumor cells (blue).

**Supplemental Video 2.** *In vitro* visualization of the dynamics of CD20-TCB (white) during the interaction between CD8+ T-cells (green) and tumor cells (blue).

**Supplemental Video 3.** *In vitro* visualization of the dynamics of CD20-TCB (white) during interaction between CD8+ T-cells (green) and tumor cells (blue). The video focuses on an example of CD20-TCB-mediated CD8+ T-cell cytotoxicity of tumor cells. T-cells surround the tumor cells and create stable synapses where CD20-TCB is localized (white). Tumor cells are killed upon certain time of T-cell/tumor cell interaction as evidenced by the formation of tumor blebs.