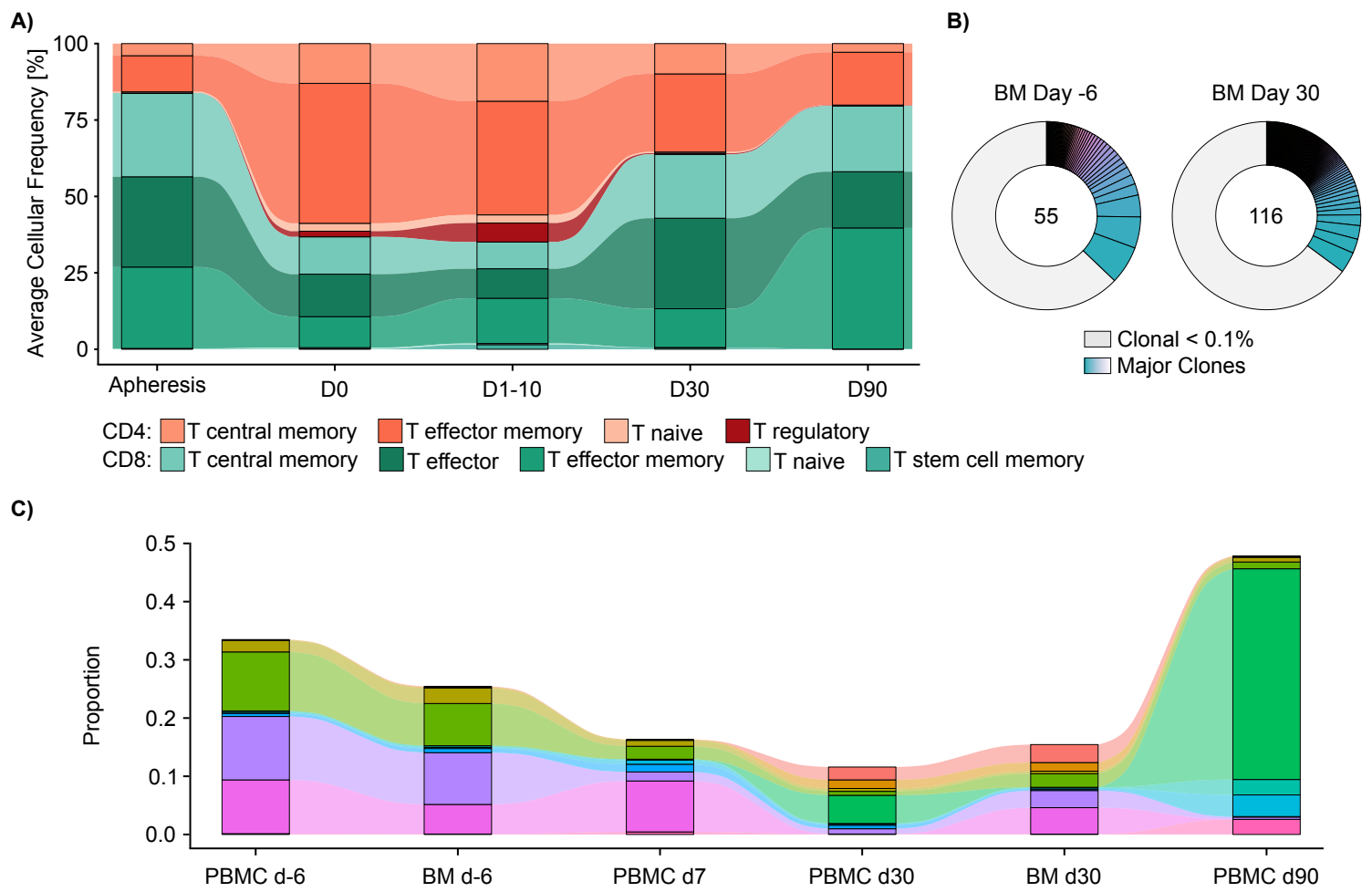


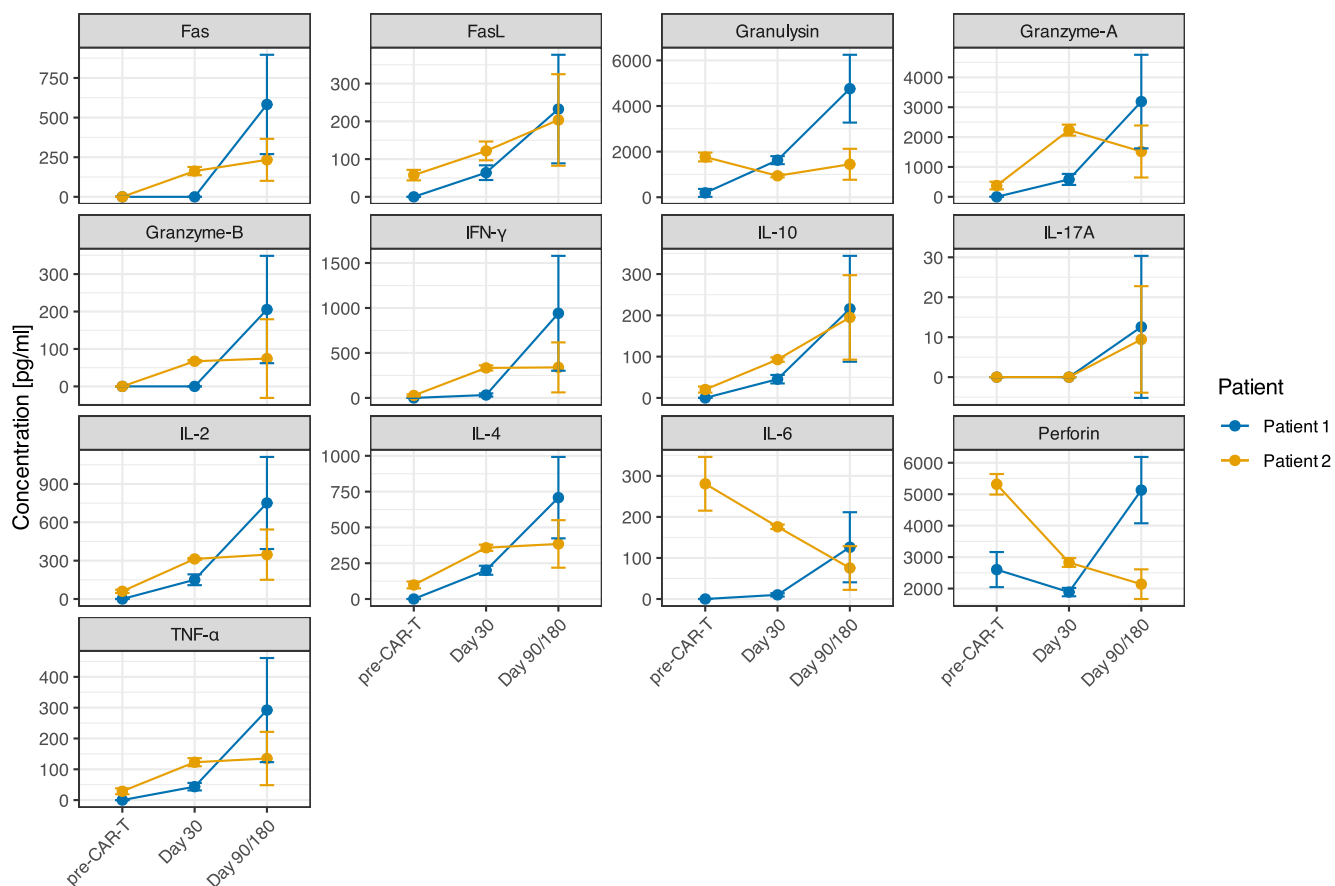
**Supplementary Figure 1.** T cell differentiation states and bone marrow T cell receptor analysis in patient 1.

**A)** Alluvial plot depicting the average distribution of CD4<sup>+</sup> and CD8<sup>+</sup> T cell differentiation states (as a proportion of all CD4<sup>+</sup> and CD8<sup>+</sup> T cells) across selected time points, based on spectral flow cytometry. **B)** T cell clonality assessed by TCR- $\beta$  sequencing of the bone marrow. Donut plots (right panel) show the proportion of dominant clones (>0.1% of all sequences), with each colored segment representing a distinct clone; bar width corresponds to clonal size. **C)** The lower panel presents an alluvial plot illustrating the temporal dynamics the largest T cell clones identified at each timepoint.



**Supplementary Figure 2.** T cell differentiation states and bone marrow T cell receptor analysis in patient 2

**A)** Alluvial plot depicting the average distribution of CD4+ and CD8+ T cell differentiation states (as a proportion of all CD4+ and CD8+ T cells) across selected time points, based on spectral flow cytometry. **B)** T cell clonality assessed by TCR- $\beta$  sequencing of the bone marrow. Donut plots (right panel) show the proportion of dominant clones (>0.1% of all sequences), with each colored segment representing a distinct clone; bar width corresponds to clonal size. **C)** The lower panel presents an alluvial plot illustrating the temporal dynamics the largest T cell clones identified at each timepoint.



**Supplementary Figure 3.** Cytokine dynamics

Cytokine concentrations of 13 analytes measured by LEGENDplex (BioLegend) in both patients at three time points. Values below the assay detection threshold were set to zero. Experiments were performed in duplicate, and the mean  $\pm$  standard deviation is shown.

**Supplementary Table 1.** Patient characteristics

<b>Diagnostics/Treatment</b>	<b>Patient 1</b>	<b>Patient 2</b>
Symptoms	Ataxia Grade 2-3 Peripheral motor neuropathy Grade 3-4 Peripheral sensory neuropathy Grade 3-4 Gait disturbance Grade 3	Ataxia Grade 2-3 Peripheral motor neuropathy Grade 3-4 Peripheral sensory neuropathy Grade 3-4 Gait disturbance Grade 3 Abducens nerve disorder Grade 3
Physical examination	Symmetrical sensorimotor neuropathy with ataxia of the lower limbs.	Symmetrical sensorimotor neuropathy with ataxia of the lower limbs and diplopia
Autoimmune laboratory	Negative for antineuronal antibodies	-
MRI	No pathological findings in cranial and spinal MRI	No pathological findings in cranial MRT Enhancement of L4-5 nerve roots
PET-CT	Marked regression of extramedullary lesion	No metabolically active extramedullary myeloma
EEG	No evidence of cerebral dysfunction or epileptiform activity	No evidence of cerebral dysfunction or epileptiform activity
Lumbar puncture	Cell count: 1 Protein and glucose levels normal No evidence of viral or bacterial infection Flow cytometry: No plasma cells, BCMA CAR-T+ cells detected Autoimmune antibody panel: Negative Oligoclonal bands: Negative	Cell Count: 4 Protein slightly elevated (567mg/l) glucose normal No evidence of viral or bacterial infection Flow cytometry: No plasma cells, BCMA CAR-T+ cells detected
Nerve conduction velocity	Sensorimotor axonal-demyelinating polyneuropathy	Sensorimotor axonal-demyelinating polyneuropathy
Treatment of neuropathy	Dexamethasone p.o. IVIg Cyclophosphamide 1g/m2 i.v. Cytarabine, MTX, Dexamethasone i.th.	Dexamethasone p.o. IVIg Cyclophosphamide 50mg p.o. Dexamethasone i.th.

Abbreviations: MRI - Magnetic resonance imaging, PET-CT - Positron emission tomography computed tomography, EEG - electroencephalography, BCMA - B cell maturation antigen, CAR – chimeric antigen receptor, IVIG - intravenous immunoglobulins, MTX - methotrexate, p.o. - per os, i.v. - intravenously, i.th. – intrathecal

**Supplementary Table 2.** CD4/CD8 ratios at different time points.

ID	Timepoint	CD4/CD8 Ratio
Patient 1	Apheresis	0,27
Patient 1	D0	3,31
Patient 1	D1-10	1,54
Patient 1	D30	0,29
Patient 1	D90	0,25
Patient 1	D180	0,13
Patient 2	Apheresis	0,19
Patient 2	D0	1,72
Patient 2	D1-10	1,85
Patient 2	D30	0,57
Patient 2	D90	0,26