Supplementary table 1. TREC results for the neonatal SCID screening. Triplicate dried blood spots were used for TREC and ß-actin detection.

	TREC (copies μL^{-1})	ß-actin (copies μL^{-1})	Result
Controls*			
No TREC control	0	600	NA
Low control	120	20	NA
High control	670	600	NA
SCID patient			
Test 1	0	123	TREC negative
Test 2	0	184	TREC negative
Test 4	12	127	TREC negative

TREC <40 copies μL^{-1} was defined as TREC negative[23].

NA indicates not available.

*The values for controls were provided from the manufacturer (Perkin Elmer).

Supplementary table 2. Laboratory findings after hematopoietic cell transplantation

Age		238D	269D	308D	338D	353D	16M
Lab	Day after HCT / Normal	Day 40	Day 71	Day 110	Day 140	D153	D364
WBC	6000-14,000, μL^{-1}	5310	6400	4950	2490	4940	5580
ALC	1500-3000, μL^{-1}	3650	4520	4010	1230	2260	3260
Hb	10.5-14.0, g dL^{-1}	9.6	11.2	13.7	7.0	9.6	12.6
PLT	150-400, $\times 10^3$ μL^{-1}	288	396	405	61	364	274
CRP	0-8, mg dL^{-1}	<0.3	<0.3	<0.3	<0.3	0.5	-
TB	0.2-0.8, mg dL^{-1}	0.1	0.1	0.2	1.5	0.4	0.3
AST	13-34, IU L^{-1}	118	65	114	501	57	35
ALT	5-46, IU L^{-1}	114	56	103	475	37	35
$CD3^+$	2284-4776, μL^{-1}	3500	4571	4014	1784	-	1417
$CD4^+$	1523-3472, μL^{-1}	7	32	269	585	-	585
$CD8^+$	524-1583, μL^{-1}	1536	2115	2414	832	-	832
$CD19^+$	776-2238, μL^{-1}	1886	2267	-	242	-	228
$CD56^+$	230-801, μL^{-1}	28	64	76	21	-	22
IgG	176-601, mg dL^{-1}	843 (on IGRT)		1137 (on IGRT)			254 (without IGRT)
IgA	4.4-84, mg dL^{-1}	Not detected		Not detected			Not detected
IgM	17-105, mg dL^{-1}	8.5		17.5			42.7
CMV	<500, copies mL^{-1}	3055	1375	Not detected	Not detected	Not detected	Not detected

WBC indicates white blood cell; ALC, absolute lymphocyte count; Hb, hemoglobin; PLT, platelet count; CRP, C-reactive protein; TB, total bilirubin; AST, aspartate aminotransferase; ALT, alanine aminotransferase; LDH, lactate dehydrogenase; Ig, immunoglobulin; D, day; M, month; IGRT; immunoglobulin G replacement therapy..

Supplementary table 3. Main clinical features associated with the patient

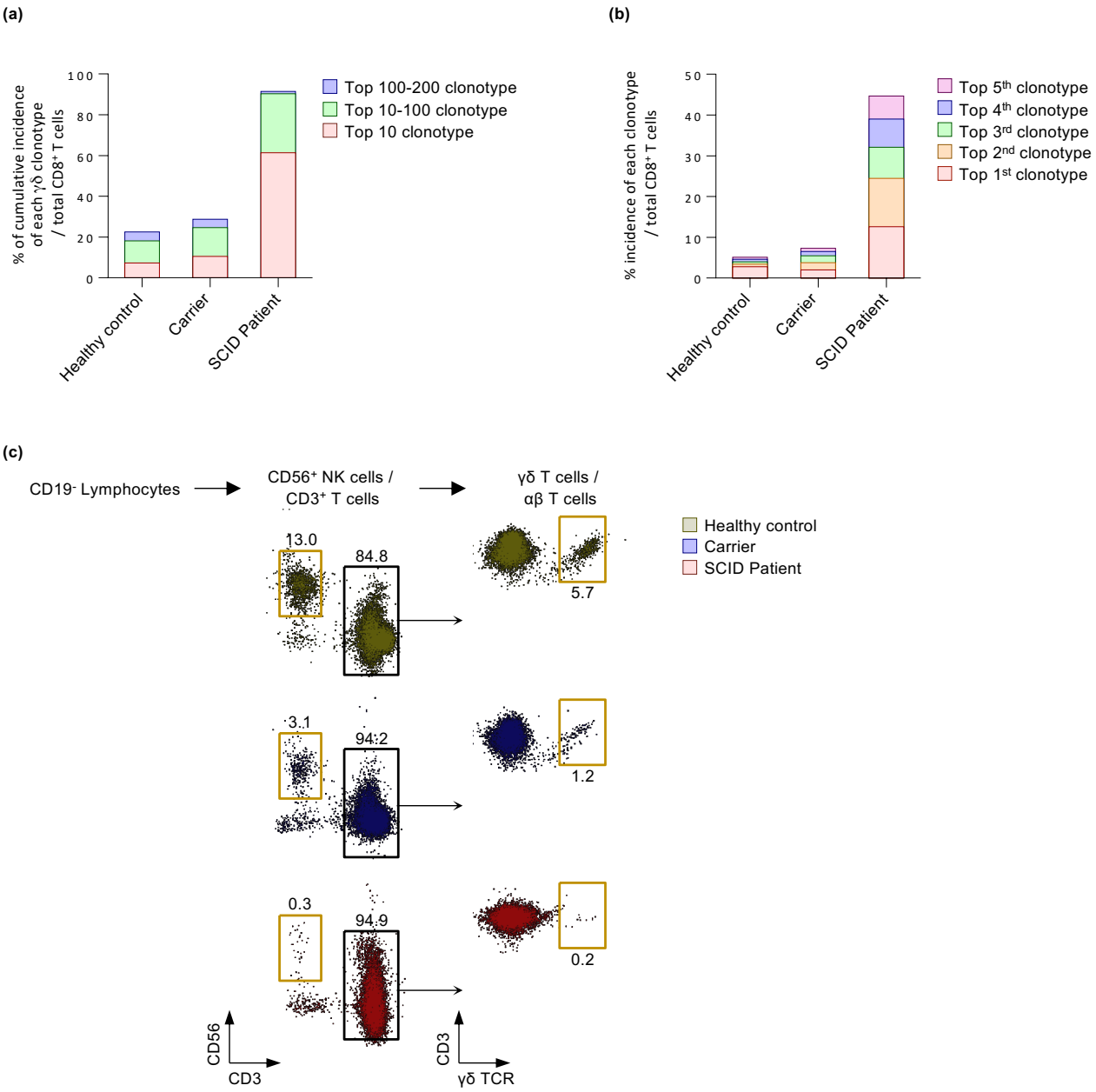
Clinical features		**Age at onset**
Fever of unknown origin	No	-
Skin rash	No	-
Lymphadenopathy (mesenteric)	**Yes**	**4.5 months**
Hepatomegaly	No	-
Splenomegaly	**Yes**	**4.5 months**
Neuropathy	No	-
Bronchiectasis	No	-
Enteropathy	No	-
Autoimmune cytopenia	No	-
Vasculitis	No	-
Malignancy	No	-
Developmental delay	No	-
Failure to thrive	No	-
Diarrhea	**Yes**	**6 months**
Sentinel infections		
CMV	**CMV hepatitis**	**3 months (1st), 5.5 months (2nd), 7 months (3rd), 8 months (4th)**
VZV	No	-
HSV	No	-
PJP	No	-
Rotavirus	No	-
BCG infection	**Probable**	**4.5 months**
Fungus	No	-
Other infections 1	***E. coli* urinary tract infection**	**1.5 months**
Other infections 2	**Noroviral enteritis**	**6 months**
Other infections 3	**Lt, 1st toe cellulitis**	**5 months**

CMV indicates cytomegalovirus; VZV, varicella zoster virus; HSV, herpes simplex virus; PJP, *Pneumocystis jirovecii*; BCG, Bacillus Calmette–Guérin.

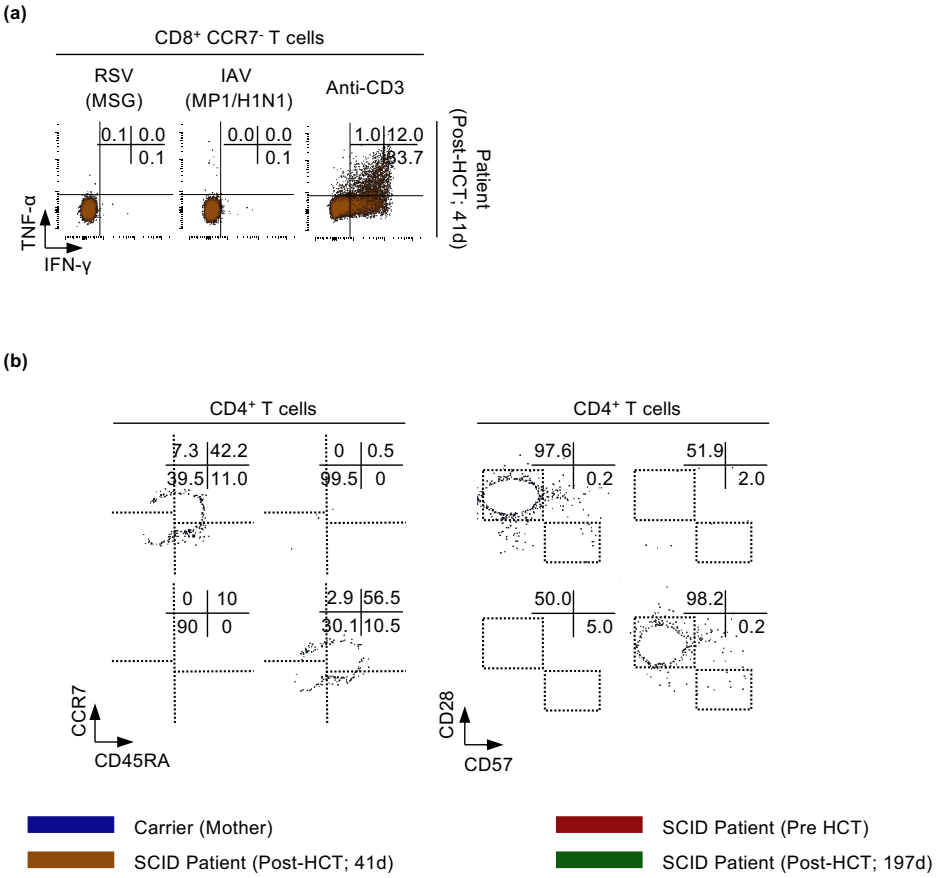
Supplementary table 4. Key resources table

REAGENT or RESOURCE	SOURCE	IDENTIFIER
Antibodies		
BV421 anti-human CD132 (clone AG184)	BD Biosciences	Cat# 566222
PE anti-human CD132 (clone AG184)	BD Biosciences	Cat# 555900
BV711 anti-human CD8 (clone RPA-T8)	BD Biosciences	Cat# 563677
BV786 anti-human CD56 (clone NCAM16.2)	BD Biosciences	Cat# 564058
AlexaFluor® 647 anti-human CD16 (clone 3G8)	BD Biosciences	Cat# 557710
PerCP-Cy™5.5 anti-human CD4 (clone RPA-T4)	BD Biosciences	Cat# 560650
APC anti-human CD3 (clone UCHT1)	Biolegend	Cat# 300412
Alexa Fluor® 700 anti-human CD19 (clone HIB19)	BD Biosciences	Cat# 557921
APC/Cyanine7 anti-human HLA-DR (clone L243)	Biolegend	Cat# 307618
BV421 anti-human CD4 (clone RPA-T4)	BD Biosciences	Cat# 562424
BV510 anti-human CD3 (clone UCHT1)	BD Biosciences	Cat# 563109
VioBright515 anti-human CD56 (clone REA196)	Miltenyi Biotec	Cat# 130-108-990
AlexaFluor® 647 anti-human Stat5 (clone pY694)	BD Biosciences	Cat# 612599
PE-eFluor610 anti-human CD14 (clone 61D3)	eBioscience	Cat# 61-0149-42
PE-eFluor610 anti-human CD19 (clone HIB19)	eBioscience	Cat# 61-0199-42
PE-Cy™7 anti-human CD8 (clone RPA-T8)	BD Biosciences	Cat# 557746
PerCP-Cy™5.5 anti-human CD197 (clone 150503)	BD Biosciences	Cat# 561144
APC-H7 anti-human CD3 (clone SK7)	BD Biosciences	Cat# 560176
BV421 anti-human CD28 (clone CD28.2)	BD Biosciences	Cat# 562613
BV510 anti-human CD3 (clone HIT3α)	BD Biosciences	Cat# 564713
FITC anti-human CD4 (clone RPA-T4)	BD Biosciences	Cat# 561842
PE anti-human CD57 (clone NK-1)	BD Biosciences	Cat# 560844
APC/Cyanine7 anti-human CD45RA (clone HI100)	Biolegend	Cat# 304128
PE anti-human IFN-γ (clone B27)	BD Biosciences	Cat# 554701
APC anti-human TNF-α (clone Mab11)	Invitrogen	Cat# 17-7349-82
CD3 pure-functional grade, human (clone OKT3)	Miltenyi Biotec	Cat# 130-093-387
Chemicals, peptides, and recombinant proteins		
PepMix™ EBV (BARF1)	JPT	Cat# PM-EBV-BARF1
PepMix™ Influenza A (MP1 /California (H1N1))	JPT	Cat# PM-INFA-MP1-

		H1N1
PepMix™ HRSVA (major surface glycoprotein G)	JPT	Cat# PM-HRSVA-MSG
PepMix™ HCMVA (pp65) (>90%)	JPT	Cat# PM-PP65-2
PepMix™ HCMVA (IE-1)	JPT	Cat# PM-IE1
Purified protein derivative (PPD)	Dr. Brennan at Aeras (Rockville, MD).	
Recombinant human IL-2	Peprotech	200-2
Brilliant stain buffer	BD Biosciences	Cat# 563794
Dimethyl sulfoxide	Sigma-Aldrich	Car# 276855
Ficoll-paque PREMIUM	GE Healthcare Life Science	Cat# 17-5442-02
Critical commercial assays		
Brefeldin A protein transport inhibitor	BD Biosciences	Cat# 555029
Monensin protein transport inhibitor	BD Biosciences	Cat# 554724
eBioscience™ IC fixation buffer	Invitrogen	Cat# 00-8222-49
eBioscience™ Foxp3/transcription factor staining buffer set	Invitrogen	Cat# 00-5523-00
LIVE/DEAD fixable red dead cell stain kit	Invitrogen	Cat# L23102
LIVE/DEAD fixable aqua dead cell stain kit	Invitrogen	Cat# L34957
Methanol	Biosesang	Cat# M1066



Supplementary figure 1. (a, b) γδ-TCR repertoire analysis of $CD8^+$ T cells from a healthy donor, carrier, and the SCID patient showed vigorous expansion of the oligoclonotypes of engrafted $CD8^+$ T cells from the patient. **(c)** Proportion of γδ -T cells among $CD3^+$ T cells from a healthy donor, carrier, and the patient.



Supplementary figure 2. (a) Engrafted $CD8^+$ T cells did not respond to viral antigen after HCT. **(b)** Immunophenotyping analysis revealed an increased frequency of effector/effector memory ($CD45RA^-CCR7^-$) and replicative senescent ($CD28^-CD57^+$) $CD4^+$ T cells from the patient pre-HCT. The percentage of naïve $CD4^+$ T cells was increased after HCT.