

Table S1. FDA-approved cellular and gene therapy products

No.	Product and Trade Name	Manufacturer	Disease	Therapeutic/Therapy
1	ABECMA (idecabtagene vicleucel)	Celgene Corporation, a Bristol-Myers Squibb Company	Multiple myeloma	Immunomodulatory agent (proteasome inhibitor and anti-CD38 monoclonal antibody)
2	ADSTILADRIN (nadofaragene firadenovec-vcng)	Ferring Pharmaceuticals A/S	Bacillus Calmette-Guérin (BCG)-unresponsive non-muscle invasive bladder cancer (NMIBC) with carcinoma in situ	Non-replicating adenovirus vector encoding human IFN alpha2b
3	ALLOCORD (HPC, Cord Blood)	SSM Cardinal Glennon Children's Medical Center	Disorders of the hematopoietic system that are inherited, acquired, or result from myeloablative treatment	Allogeneic cord blood hematopoietic progenitor cell therapy
4	AMTAGVI (lifileucel)	Iovance Biotherapeutics, Inc.	Unresectable or metastatic melanoma previously treated with a PD-1 blocking antibody.	Autologous T cell immunotherapy
5	AUCATZYL (obecabtagene autoleucel)	Autolus Limited	Refractory B-cell precursor acute lymphoblastic leukemia (ALL)	CAR T-cell therapy

6	BEQVEZ (fidanacogene elaparvovec-dzkt)	Pfizer, Inc.	Hemophilia B	AAV-based gene therapy (human clotting factor IX)
7	BREYANZI (lisocabtagene maraleucel)	Juno Therapeutics, Inc., a Bristol-Myers Squibb Company	Large B-cell lymphoma (LBCL)	CD19-directed genetically modified autologous T cell immunotherapy
8	CARVYKTI (ciltacabtagene autoleucel)	Janssen Biotech, Inc	Multiple myeloma	CAR T-cell therapy
9	CASGEVY (exagamglogene autotemcel [exa-cel])	Vertex Pharmaceuticals Incorporated	Sickle cell disease	Autologous genome edited hematopoietic stem cell therapy
10	CLEVECORD (HPC Cord Blood)	Cleveland Cord Blood Center	Disorders of the hematopoietic system that are inherited, acquired, or result from myeloablative treatment.	Allogeneic cord blood hematopoietic progenitor cell therapy
11	Ducord, HPC Cord Blood	Duke University School of Medicine	disorders affecting the hematopoietic system that are inherited, acquired, or result from myeloablative treatment.	Allogeneic cord blood hematopoietic progenitor cell therapy
12	ELEVIDYS (delandistrogene moxeparvovec-rokl)	Sarapeta Therapeutics, Inc.	Duchenne muscular dystrophy	AAV-based gene therapy (micro-dystrophins)

13	ENCELTO (revakinagene taroretcel-lwey)	Neurotech Pharmaceuticals, Inc.	Idiopathic macular telangiectasia type 2	Allogeneic encapsulated cell-based gene therapy
14	GINTUIT (Allogeneic Cultured Keratinocytes and Fibroblasts in Bovine Collagen)	Organogenesis Incorporated	Mucogingival conditions	Allogeneic cellularized scaffold product
15	HEMACORD (HPC, cord blood)	New York Blood Center	Hematopoietic and immunologic reconstitution of inherited or acquired disorders affecting the hematopoietic system	Allogeneic cord blood hematopoietic progenitor cell therapy
16	HEMGENIX (etranacogene dezaparvovec-drlb)	CSL Behring LLC	Hemophilia B	AAV-based gene therapy (Padua variant (R338L) of human coagulation Factor IX)
17	HPC, Cord Blood	Clinimmune Labs, University of Colorado Cord Blood Bank	Hematopoietic and immunologic reconstitution of inherited or acquired disorders affecting the hematopoietic system	Allogeneic cord blood hematopoietic progenitor cell therapy

18	HPC, Cord Blood - MD Anderson Cord Blood Bank	MD Anderson Cord Blood Bank	Hematopoietic and immunologic reconstitution of inherited or acquired disorders affecting the hematopoietic system	Allogeneic cord blood hematopoietic progenitor cell therapy
19	HPC, Cord Blood - LifeSouth	LifeSouth Community Blood Centers, Inc.	Hematopoietic and immunologic reconstitution of inherited or acquired disorders affecting the hematopoietic system	Allogeneic cord blood hematopoietic progenitor cell therapy
20	HPC, Cord Blood - Bloodworks Bloodworks	Bloodworks	Hematopoietic and immunologic reconstitution of inherited or acquired disorders affecting the hematopoietic system	Allogeneic cord blood hematopoietic progenitor cell therapy
21	IMLYGIC (talimogene laherparepvec)	BioVex, Inc., a subsidiary of Amgen Inc.	Melanoma	Oncolytic viral therapy with a weakened form of HSV-1
22	KEBILIDI (eladocogene exuparvovec-tneq)	PTC Therapeutics	Aromatic L amino acid decarboxylase (AADC) deficiency	AAV-based gene therapy
23	KYMRIAH (tisagenlecleucel)	Novartis Pharmaceuticals Corporation	B-cell lymphoblastic leukemia (ALL)	CD19-directed genetically modified autologous T-cell immunotherapy

24	LANTIDRA (donislecel)	CellTrans Inc.	Type 1 diabetes	Allogenic cellular therapy
25	LAVIV (Azficel-T)	Fibrocell Technologies	Nasolabial fold wrinkles	Autologous cellular product
26	LENMELDY (atidarsagene autotemcel)	Orchard Therapeutics (Europe) Limited	Pre-symptomatic late infantile (PSLI), pre-symptomatic early juvenile (PSEJ) or early symptomatic early juvenile (ESEJ) metachromatic leukodystrophy (MLD)	Autologous hematopoietic stem cell-based gene therapy
27	LUXTURNA (voretigene neparvovec-rzyl)	Spark Therapeutics, Inc.	RPE65 mutation-associated retinal dystrophy	AAV-based gene therapy
28	LYFGENIA (lovotibeglogene autotemcel [lovo-cel])	bluebird bio, Inc.	Sickle cell disease	Autologous hematopoietic stem cell-based gene therapy
29	MACI (Autologous Cultured Chondrocytes on a Porcine Collagen Membrane)	Vericel Corp.	Full-thickness cartilage defects of the knee	Autologous cellularized scaffold product
30	OMISIRGE (omidubicel-only)	Gamida Cell Ltd.	Blood cancers	Nicotinamide-modified allogeneic hematopoietic progenitor cell therapy derived from cord blood

31	PROVENGE (sipuleucel-T)	Dendreon Corp.	Hormone refractory prostate cancer	Autologous cellular immunotherapy
32	REGENECYTE (HPC, Cord Blood)	StemCyte, Inc.	Hematopoietic and immunologic reconstitution of inherited or acquired disorders affecting the hematopoietic system	Allogeneic cord blood hematopoietic progenitor cell therapy
33	RETHYMIC (allogeneic processed thymus tissue – agdc)	Enzyvant Therapeutics GmbH	Congenital athymia	Allogeneic processed thymus tissue
34	ROCTAVIAN (valoctocogene roxaparvovec-rvox)	BioMarin Pharmaceutical IncH	Hemophilia A	AAV-based gene therapy
35	RYONCIL (remestemcel-L-rknd)	Mesoblast, Inc.	Steroid-refractory acute graft versus host disease	Allogeneic bone marrow-derived mesenchymal stromal cell (MSC) therapy
36	SYMVESS (acellular tissue engineered vessel-tyod)	Humacyte Global, Inc.	Arterial injury	Acellular tissue engineered vessels

37	SKYSONA (elivaldogene autotemcel)	bluebird bio, Inc.	Neurologic dysfunction	Autologous hematopoietic stem cell-based gene therapy
38	STRATAGRAFT (allogeneic cultured keratinocytes and dermal fibroblasts in murine collagen-dsat)	Stratatech Corporation	Thermal burns	Allogeneic cellularized scaffold product
39	TECARTUS (brexucabtagene autoleucel)	Kite Pharma, Inc.	Mantle cell lymphoma	CD19-directed genetically modified autologous T cell immunotherapy
40	TECELRA (afamitresgene autoleucel)	Adaptimmune LLC	Synovial sarcoma	Melanoma-associated antigen A4 (MAGE-A4)-directed genetically modified autologous T cell immunotherapy
41	VYJUVEK (beremagene geperpavec)	Krystal Biotech, Inc.	Wound treatment in dystrophic epidermolysis bullosa with COL7A1 mutation(s)	HSV-1 vector-based gene therapy
42	YESCARTA (axicabtagene ciloleucel)	Kite Pharma, Incorporated	B-cell lymphoma	CD19-directed genetically modified autologous T cell immunotherapy

43	ZEVASKYN (prademagene zamikeracel)	Abeona Therapeutics, Inc.	Wounds in recessive dystrophic epidermolysis bullosa	Autologous cell sheet-based gene therapy
44	ZYNTGLO (betibeglogene autotemcel)	bluebird bio, Inc.	β -thalassemia	Autologous hematopoietic stem cell-based gene therapy
45	ZOLGENSMA (onasemnogene abeparvovec-xioi)	Novartis Gene Therapies, Inc.	Spinal muscular atrophy (SMA) with bi-allelic mutations in the survival motor neuron 1 (SMN1) gene	AAV-based gene therapy

Data was taken from [25]. AAV: adeno-associated virus; HSV-1: herpes simplex virus-1