Hematology Drugs in the Pipeline

HEMONC TODAY presents the most recent information about hematology drugs in the pipeline. Drugs listed here are in phase 2 or phase 3 development for a variety of indications. Clinicians can use this chart as a quick reference to learn about the status of those drugs that may be clinically significant to their practice. To view the entire chart online, go to www.Healio.com/HematologyPipeline.

Generic name (Brand name, Manufacturer)	Indication(s)	Development status
A6 peptide (Angstrom Pharmaceuticals)	chronic lymphocytic leukemia, small lymphocytic lymphoma	phase 2
AAV5-hFIX (UniQure Biopharma)	hemophilia	phase 2
ABC294640 (RedHill Biopharma)	diffuse large B-cell lymphoma	phase 2
abemaciclib (Eli Lilly)	mantle cell lymphoma	phase 2
abexinostat (Pharmacyclics)	follicular lymphoma, mantle cell lymphoma	phase 2
ABP 798 (Allergan/Amgen)	non-Hodgkin's lymphoma	phase 3
ACP-196 (Acerta Pharma) **READ PERSPECTIVE** on this drug from Richard R. Furman, MD, on page 108.	B-cell malignancies (combination therapy), mantle cell lymphoma chronic lymphocytic leukemia	phase 2 phase 3
ACP-319 (Acerta Pharma)	B-cell lymphoma (combination therapy), chronic lymphocytic leukemia (combination therapy)	phase 2
adeno-associated virus serotype 8 Factor IX gene therapy (AskBio009, Baxalta)	hemophilia B	phase 2
AEB071 (Novartis)	diffuse large B-cell lymphoma (combination therapy for CD79-mutant or ABC-subtype disease)	phase 2
AFM 13 (Affimed Therapeutics)	Hodgkin's lymphoma	phase 2
alisertib (Millennium)	peripheral T-cell lymphoma (relapsed or refractory)	phase 3
ALT-803 (Altor BioScience)	hematologic malignancies, multiple myeloma	phase 2
alvocidib (Tolero Pharmaceuticals)	acute myelogenous leukemia (relapsed or refractory) acute myelogenous leukemia (first-line)	phase 2 phase 3
andexanet alfa (Portola Pharmaceuticals)	Factor Xa inhibitor antidote	phase 3
antihemophilic factor [recombinant], porcine sequence (Obizur, Baxalta)	hemophilia A, hemophilia B	phase 3
AR-42 (Arno Therapeutics)	hematologic malignancies	phase 2
ASP2215 (Astellas)	acute myelogenous leukemia	phase 3
AST-VAC1 (Asterias Biotherapeutics)	acute myelogenous leukemia	phase 2
AT7519 (Astex Pharmaceuticals)	multiple myeloma	phase 2
azacitidine for injection (Vidaza, Celgene)	acute myelogenous leukemia (post-induction maintenance)	phase 3
BAX 111 (Baxalta)	von Willebrand's disease	phase 3
BAX 335 (Baxalta)	Factor IX gene therapy in adults with hemophilia B	phase 2
BAX 555 (Baxalta)	sickle cell disease	phase 2
BAX 855 (Baxalta)	hemophilia A	phase 3
BB305 (Lentiglobin, Bluebird Bio)	beta-thalassemia, sickle cell disease	phase 2
BC8-I-131 construct (Iomab-B, Actinium Pharmaceuticals)	hematopoietic stem cell transplantation in acute lymphoblastic leukemia	phase 2
bendamustine (Treanda, Teva Oncology)	mantle cell lymphoma	phase 2
betrixaban (Portola Pharmaceuticals)	Factor Xa inhibitor	phase 3
BI 695500 (Boehringer Ingelheim)	follicular lymphoma (first-line)	phase 3
BI 836858 (Boehringer Ingelheim)	myelodysplastic syndrome	phase 2
birinapant (TetraLogic Pharmaceuticals)	cutaneous T-cell lymphoma, myelodysplastic syndrome	phase 2
Bismab-A (Actinium Pharmaceuticals)	acute myelogenous leukemia	phase 2
BL-8040 (BioLineRx)	acute myelogenous leukemia (combination therapy)	phase 2

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blinatumomab (Blincyto, Amgen)	acute lymphoblastic leukemia (relapsed or refractory Philadelphia chromosome-positive disease), diffuse large B-cell lymphoma	phase 2
	acute lymphoblastic leukemia (relapsed or refractory disease)	phase 3
bortezomib (Velcade, Millennium)	diffuse large B-cell lymphoma	phase 2
	mantle cell lymphoma (first-line)	phase 3
bosutinib (Bosulif, Pfizer)	chronic myeloid leukemia (first-line)	phase 3
BP-100-1-01 (Bio-Path Holdings)	acute myelogenous leukemia	phase 2
BPX-501 (Bellicum Pharmaceuticals)	acute lymphoblastic leukemia, acute myelogenous leukemia, chronic lymphocytic leukemia, chronic myeloid leukemia, non-Hodgkin's lymphoma	phase 2
brentuximab vedotin (Adcetris, Seattle Genetics)	diffuse large B-cell lymphoma (CD30-positive disease), Hodgkin's lymphoma (first-line therapy for elderly patients)	phase 2
	cutaneous T-cell lymphoma (relapsed CD30-positive disease), Hodgkin's lymphoma (first-line), Hodgkin's lymphoma (post-transplant relapse prevention), T-cell lymphoma (CD30-positive mature disease)	phase 3
BVD-523 (BioMed Valley Discoveries)	acute myelogenous leukemia, myelodysplastic syndrome	phase 2
calaspargase pegol (Baxalta)	acute lymphoblastic leukemia	phase 3
carfilzomib (Kyprolis, Onyx Pharmaceuticals)	multiple myeloma (first-line therapy)	phase 3
carlecortemcel-L (StemEx; Gamida Cell and Teva)	hematologic malignancies	phase 3
CC-486 (Celgene)	myelodysplastic syndrome (post hypomethylating agent failure)	phase 2
	acute myelogenous leukemia (post-induction maintenance), myelodysplastic syndrome (lower-risk disease)	phase 3
CDX-301 (Celldex Therapeutics)	B-cell lymphoma, stem cell transplantation in hematologic malignancies	phase 2
cerdulatinib (Portola Pharmaceuticals)	chronic lymphocytic leukemia, non-Hodgkin's lymphoma	phase 2
CMD-003 (Cell Medica)	EBV-positive, extranodal natural killer T-cell lymphoma	phase 2
CNDO-109 (Fortress Biotech)	acute myelogenous leukemia	phase 2
coagulation Factor VIIa recombinant (LR769, rEVO Biologics)	hemophilia A, hemophilia B	phase 3
coltuximab ravtansine (Immunogen)	diffuse large B-cell lymphoma	phase 2
copanlisib (Bayer)	diffuse large B-cell lymphoma	phase 2
	non-Hodgkin's lymphoma	phase 3
cord blood stem cell therapy (NiCord, Gamida Cell)	hematologic malignancies	phase 2
crenolanib (Arog Pharmaceuticals)	acute myelogenous leukemia (newly diagnosed disease, maintenance therapy after bone marrow transplantation)	phase 2
	acute myelogenous leukemia (relapsed or refractory disease)	phase 3
CTL019 (Novartis)	acute lymphoblastic leukemia	phase 2
CX-01 (Cantex Pharmaceuticals)	acute myelogenous leukemia	phase 2
cytarabine:daunorubicin (CPX-351, Celator Pharmaceuticals)	acute myelogenous leukemia, myelodysplastic syndrome (high-risk disease), pre-conditioning before hematopoietic stem cell transplantation	phase 2
dabigatran etexilate (Pradaxa, Boehringer Ingelheim)	stroke prevention in patients with nonvalvular oral anticoagulation	phase 3
damoctocog alfa pegol (Bayer)	hemophilia	phase 3
daratumumab (Janssen)	multiple myeloma (first-line therapy; first-line combination therapy; combination therapy for recurrent or relapsed disease)	phase 3
darbepoetin alfa (Aranesp, Amgen)	myelodysplastic syndrome (low-risk disease)	phase 3
darinaparsin (SP-02, Solasia Pharma)	peripheral T-cell lymphoma	phase 2
dasatinib (Sprycel, Bristol-Myers Squibb)	leukemia (pediatric patients)	phase 2
denosumab (Xgeva, Amgen)	prevention of skeletal-related events in multiple myeloma	phase 3

READ PERSPECTIVE on this drug from Paul G. Richardson, MD, on page 108, and Ruben Niesvizky, MD, on page 108.

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Generic name (Brand name, Manufacturer)	Indication(s)	Development status
DFP-10917 (Delta-Fly Pharma)	acute lymphoblastic leukemia, acute myelogenous leukemia	phase 2
DI-Leu16-IL2 (Alopexx Oncology)	non-Hodgkin's lymphoma	phase 2
DKN-01 (HealthCare Pharmaceuticals)	multiple myeloma	phase 2
duvelisib (AbbVie and Infinity Pharmaceuticals)	non-Hodgkin's lymphoma (refractory indolent disease) chronic lymphocytic leukemia (relapsed or refractory disease), follicular lymphoma (previously treated disease)	phase 2 phase 3
E6201 (Strategia Therapeutics)	hematologic malignancies	phase 2
elotuzumab (AbbVie and Bristol-Myers Squibb) **READ PERSPECTIVE** on this drug from Ruben Niesvizky, MD, on page 108.	multiple myeloma (combination therapy, second-line) multiple myeloma (combination therapy, first-line; combination therapy for relapsed or refractory disease)	phase 2 phase 3
eltrombopag (Promacta, Novartis)	myelodysplastic syndrome	phase 2
entospletinib (Gilead Sciences)	hematologic malignancies	phase 2
epratuzumab (Immunomedics)	leukemia, lymphoma	phase 2
EPZ-6438 (Epizyme)	non-Hodgkin's lymphoma	phase 2
ERY-ASP (Erytech Pharma)	acute lymphoblastic leukemia (adults)	phase 2
everolimus (Afinitor, Novartis)	diffuse large B-cell lymphoma	phase 3
FF-10501 (Strategia Therapeutics and Fujifilm Pharmaceuticals USA)	hematologic malignancies	phase 2
filanesib (Array BioPharma)	multiple myeloma	phase 2
ganetespib (Synta Pharmaceuticals)	acute myelogenous leukemia	phase 2
GC1101C (Green Cross)	hemophilia A	phase 3
glasdegib (PF-04449913, Pfizer)	acute myelogenous leukemia, myelodysplastic syndrome	phase 2
GO-203-2c (Genus Oncology)	acute myelogenous leukemia (relapsed or refractory disease)	phase 2
GP2013 (Novartis)	chronic lymphocytic leukemia, non-Hodgkin's lymphoma	
guadecitabine (SGI-110, Astex Pharmaceuticals)	hematologic malignancies	phase 3
HSC835 (Novartis)	hematologic malignancies in single umbilical cord blood transplantation	phase 2
HSV-Tk (MolMed)	acute leukemia (high-risk disease)	phase 3
human-cl rhFVIII (Octapharma)	hemophilia A	phase 3
ibrutinib (Imbruvica; Pharmacyclics and Janssen)	chronic lymphocytic leukemia (single-agent therapy for treatment-naive patients; combination therapy for relapsed or refractory disease), diffuse large B-cell lymphoma (combination therapy for newly diagnosed non-germinal center B-cell subtype), mantle cell lymphoma (single-agent therapy for relapsed or refractory disease; combination therapy for treatment-naive patients), non-Hodgkin's lymphoma (combination therapy for relapsed or refractory disease), Waldenstrom's macroglobulinemia (combination therapy for previously treated adults)	phase 3
idelalisib (Gilead Sciences)	non-Hodgkin's lymphoma (first-line therapy for indolent disease) chronic lymphocytic leukemia (first-line treatment; relapsed or refractory disease), non-Hodgkin's lymphoma (relapsed or refractory indolent disease)	phase 2 phase 3
imetelstat (Janssen)	myelofibrosis	phase 2
IMO-8400 (Idera Pharmaceuticals)	diffuse large B-cell lymphoma, Waldenstrom's macroglobulinemia	phase 2
Imprime PGG (Biothera)	chronic lymphocytic leukemia (combination therapy for first-line treatment of high-risk disease), non-Hodgkin's lymphoma (combination therapy for second- and third-line treatment of advanced indolent disease)	phase 2
INCB39110 (Incyte)	B-lymphoid malignancies	phase 2
INCB40093 (Incyte)	B-cell malignancies	phase 2

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INCB52793 (Incyte)	hematologic malignancies	phase 2
indatuximab ravtansine (Biotest Pharmaceuticals)	multiple myeloma	phase 2
inotuzumab ozogamicin (Pfizer)	acute lymphoblastic leukemia	phase 3
intravenous immunostimulant (Imprime PGG, Biothera)	chronic lymphocytic leukemia (first-line treatment of high-risk disease)	phase 2
isatuximab (Sanofi)	multiple myeloma	phase 2
ixazomib (Millennium/Takeda Oncology)	follicular lymphoma (relapsed or refractory) amyloidosis, myeloma (treatment-naive disease; relapsed or refractory disease)	phase 2 phase 3
JCAR014 (Juno Therapeutics)	acute lymphoblastic leukemia, chronic lymphocytic leukemia (refractory disease), non-Hodgkin's lymphoma	phase 2
JCAR015 (Juno Therapeutics)	acute lymphoblastic leukemia	phase 2
JCAR017 (Juno Therapeutics)	leukemia	phase 2
JTCR016 (Juno Therapeutics)	acute lymphoblastic leukemia, chronic myeloid leukemia, myelodysplastic syndrome	phase 2
KB004 (KaloBios Pharmaceuticals)	hematologic malignancies (EphA3-positive disease)	phase 2
KTE-C19 CAR (Kite Pharma)	diffuse large B-cell lymphoma B-cell lymphoma	phase 2 phase 3
lenalidomide (Revlimid, Celgene)	chronic lymphocytic leukemia (maintenance therapy, second-line), diffuse large B-cell lymphoma (maintenance therapy), diffuse large B-cell lymphoma (first-line therapy for ABC subtype), follicular lymphoma (first-line), indolent lymphoma (relapsed or refractory disease), multiple myeloma (maintenance therapy), myelodysplastic syndrome (non-deletion 5q)	phase 3
lintuzumab Ac-225 (Actinium Pharmaceuticals)	acute myelogenous leukemia (first-line)	phase 2
long-acting fusion protein linking recombinant coagulation Factor IX with recombinant albumin (rIX-FP, CSL Behring)	hemophilia B	phase 3
luspatercept (ACE-536; Acceleron Pharma and Celgene)	beta-thalassemia, myelodysplastic syndrome	phase 3
LY2928057 (Eli Lilly)	anemia	phase 2
marizomib (Triphase Accelerator)	multiple myeloma (relapsed or refractory disease)	phase 2
MEDI-551 (MedImmune)	chronic lymphocytic leukemia, diffuse large B-cell lymphoma	phase 2
milatuzumab-doxorubicin conjugate (Immunomedics)	acute lymphoblastic leukemia, non-Hodgkin's lymphoma	phase 2
MK-8628 (Merck)	hematologic malignancies	phase 2
mocetinostat (Mirati Therapeutics)	diffuse large B-cell lymphoma, myelodysplastic syndrome	phase 2
MOD-5014 (Opko Biologics)	hemophilia A, hemophilia B	phase 2
mogamulizumab (Kyowa Hakko Kirin)	T-cell leukemia and lymphoma (adults) cutaneous T-cell lymphoma	phase 2 phase 3
molidustat (Bayer)	anemia	phase 2
momelotinib (Gilead Sciences)	myelofibrosis	phase 3
MOR208 (MorphoSys)	acute lymphoblastic leukemia, chronic lymphocytic leukemia, non-Hodgkin's lymphoma	phase 2
moxetumomab pasudotox (MedImmune)	acute lymphoblastic leukemia (pediatric patients) hairy cell leukemia	phase 2 phase 3
N8-GP (NN7088, Novo Nordisk)	hemophilia A	phase 3
N9-GP (NN7999, Novo Nordisk)	hemophilia B	phase 3
nilotinib (Tasigna, Novartis)	acute lymphoblastic leukemia (pediatric patients), chronic myeloid leukemia (pediatric patients) chronic myeloid leukemia (treatment-free remission)	phase 2 phase 3

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Generic name (Brand name, Manufacturer)	Indication(s)	Development status
nivolumab (Opdivo, Bristol-Myers Squibb) **READ PERSPECTIVE** on this drug from Stephen M. Ansell, MD, PhD, on page 109.	diffuse large B-cell lymphoma, follicular lymphoma, Hodgkin's lymphoma	phase 2
NNC 0129-0000-1003 (Novo Nordisk)	hemophilia A	phase 3
NY-ESO-1/LAGE-1–specific T cells (Adaptimmune)	multiple myeloma (advanced disease)	phase 2
obinutuzumab (Gazyva, Genentech/Roche)	chronic lymphocytic leukemia (combination therapy for first-line treatment; combination therapy for relapsed or refractory disease), diffuse large B-cell lymphoma, non-Hodgkin's lymphoma (first-line therapy for indolent disease; refractory indolent disease)	phase 3
ofatumumab (Arzerra, Novartis)	chronic lymphocytic leukemia (maintenance therapy and relapsed disease), non-Hodgkin's lymphoma (relapsed or refractory disease)	phase 3
Oncoquest-L (XEME Biopharma)	follicular lymphoma	phase 2
oprozomib (Onyx Pharmaceuticals)	multiple myeloma (monotherapy), Waldenstrom's macroglobulinemia (monotherapy)	phase 2
otlertuzumab (TRU-116, Emergent BioSolutions)	chronic lymphocytic leukemia	phase 2
OVI-123 (OncoVista Innovative Therapies)	TdT-positive leukemia	phase 2
pacritinib (Baxalta and CTI Biopharma)	acute myelogenous leukemia (relapsed disease) myelofibrosis	phase 2 phase 3
pegaspargase (Oncaspar, Baxalta)	acute myelogenous leukemia acute lymphoblastic leukemia	phase 2 phase 3
pembrolizumab (Keytruda, Merck) **READ PERSPECTIVE** on this drug from Stephen M. Ansell, MD, PhD, on page 109.	Hodgkin's lymphoma	phase 2
PF-05280586 (Pfizer)	follicular lymphoma (first-line therapy)	phase 3
pidilizumab (Medivation)	diffuse large B-cell lymphoma	phase 2
PIM447 (Novartis)	multiple myeloma	phase 2
pixantrone (Pixuvri, CTI BioPharma)	non-Hodgkin's lymphoma (combination therapy for second-line treatment of aggressive disease)	phase 3
PKC412 (Novartis)	acute myelogenous leukemia	phase 3
plitidepsin (PharmaMar)	multiple myeloma (combination therapy), T-cell lymphoma multiple myeloma (relapsed or refractory disease)	phase 2 phase 3
PM01183 (PharmaMar)	acute leukemia	phase 2
PNT2258 (ProNAi Therapeutics)	diffuse large B-cell lymphoma (relapsed or refractory disease), non-Hodgkin's lymphoma (relapsed or refractory disease)	phase 2
polatuzumab vedotin (RG7596, Genentech/Roche)	diffuse large B-cell lymphoma, non-Hodgkin's lymphoma	phase 2
ponatinib (Iclusig, Ariad Pharmaceuticals)	acute lymphoblastic leukemia (Philadelphia chromosome-positive disease)	phase 2
pracinostat (MEI Pharma)	acute myelogenous leukemia (first-line), myelodysplastic syndrome (first-line treatment and refractory disease)	phase 2
PRI-724 (PRISM Pharma)	acute myelogenous leukemia, chronic myeloid leukemia	phase 2
PRM-151 (Promedior)	myelofibrosis	phase 2
PVX-410 (OncoPep)	multiple myeloma (smoldering)	phase 2
quizartinib (Ambit Biosciences)	acute myelogenous leukemia (relapsed or refractory disease)	phase 3
recombinant Factor VIIa fusion protein (CSL689, CSL Behring)	hemophilia A hemophilia B	phase 2 phase 3
recombinant Factor VIII (Bay81-8973, Bayer)	hemophilia A	phase 3
recombinant Factor VIII-single chain (CSL Behring)	hemophilia A	phase 3
recombinant Factor IX (Bax 326, Baxalta)	hemophilia B	phase 3

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Generic name (Brand name, Manufacturer)	Indication(s)	Development status
recombinant von Willebrand Factor (Baxalta)	von Willebrand disease	phase 3
regadenoson (Lexiscan, Astellas)	sickle cell anemia	phase 2
rexlemestrocel-L (Mesoblast)	hematologic malignancies (bone marrow regeneration in patients undergoing bone marrow transplantation)	phase 3
ricolinostat (Acetylon Pharmaceuticals)	lymphoma, multiple myeloma (relapsed or refractory disease)	phase 2
rigosertib (Onconova Therapeutics) READ PERSPECTIVE on this drug from Azra Raza, MD, on page 109.	myelofibrosis (combination therapy for first-line treatment of high-risk disease) acute myelogenous leukemia (first-line treatment of high-risk disease), myelodysplastic syndrome (post-HMR, high-risk disease)	phase 2 phase 3
rivaroxaban (Xarelto, Bayer)	venous thromboembolism prevention	phase 3
rivipansel (GMI-1070, GlycoMimetics)	vaso-occlusive crisis associated with sickle cell disease	phase 3
romidepsin (Istodax, Celgene)	peripheral T-cell lymphoma (first-line)	phase 3
RP-323 (Rich Pharmaceuticals)	acute myelogenous leukemia, myelodysplastic syndrome	phase 2
Sanguinate (Prolong Pharmaceuticals)	sickle cell anemia	phase 2
sapacitabine (Cyclacel Pharmaceuticals)	myelodysplastic syndrome acute myelogenous leukemia	phase 2 phase 3
SD-101 (Dynavax Technologies)	B-cell lymphoma	phase 2
selinexor (Karyopharm Therapeutics) READ PERSPECTIVE on this drug from John P. Leonard, MD, on page 109.	multiple myeloma (combination therapy) acute myelogenous leukemia, diffuse large B-cell lymphoma, multiple myeloma (monotherapy), Richter's transformation	phase 2 phase 3
SG2000 (Spirogen)	acute myelogenous leukemia, chronic lymphocytic leukemia	phase 2
SGI-110 (Astex Pharmaceuticals)	myelodysplastic syndrome acute myelogenous leukemia	phase 2 phase 3
SGN-CD19A (Seattle Genetics)	diffuse large B-cell lymphoma	phase 2
SGX301 (Soligenix)	cutaneous T-cell lymphoma	phase 2
SHAPE (TetraLogic Pharmaceuticals)	cutaneous T-cell lymphoma	phase 2
siltuximab (Sylvant, Janssen)	multiple myeloma (smoldering)	phase 2
simvastatin (Zocor, Merck)	sickle cell disease	phase 2
SL-401 (Stemline Therapeutics)	acute myelogenous leukemia (relapsed or refractory disease), blastic plasmacytoid dendritic cell neoplasm, myeloproliferative neoplasms (advanced high-risk disease)	phase 2
sonidegib (Odomzo, Novartis)	acute leukemia	phase 2
sotatercept (Acceleron and Celgene)	anemia, multiple myeloma, myelofibrosis	phase 2
TAS-120 (Taiho Oncology)	multiple myeloma (advanced disease)	phase 2
TG-1101 (TG Therapeutics)	chronic lymphocytic leukemia (monotherapy), non-Hodgkin's lymphoma chronic lymphocytic leukemia (combination therapy), mantle cell lymphoma (combination therapy)	phase 2 phase 3
tosedostat (CTI BioPharma)	acute myelogenous leukemia, myelodysplastic syndrome	phase 2
TSR-011 (TESARO Inc.)	lymphoma	phase 2
TZ101 (Targazyme)	cord blood stem cell transplantation in hematologic malignancies	phase 2
veltuzumab (Immunomedics)	non-Hodgkin's lymphoma	phase 2
venetoclax (AbbVie and Genentech)	acute myelogenous leukemia, chronic lymphocytic leukemia (refractory disease with 17p-deletion), diffuse large B-cell lymphoma, non-Hodgkin's lymphoma chronic lymphocytic leukemia (first-line treatment; combination treatment for relapsed, refractory disease)	phase 2 phase 3
vepoloxamer (MST-188, MAST Therapeutics)	sickle cell disease	phase 3

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Generic name (Brand name, Manufacturer)	Indication(s)	Development status
vincristine sulfate liposome injection (Marqibo, Spectrum Pharmaceuticals)	acute lymphoblastic leukemia (first-line treatment of elderly patients with Philadelphia chromosome-negative disease), non-Hodgkin's lymphoma (first-line therapy for aggressive disease)	phase 3
VLX1570 (Vivolux)	multiple myeloma	phase 2
volasertib (Boehringer Ingelheim)	acute myelogenous leukemia	phase 3
vosaroxin (Qinprezo, Sunesis)	acute myelogenous leukemia, myelodysplastic syndrome	phase 2
WT-1 cancer vaccine (STELLAS Life Sciences)	hematologic malignancies	phase 2

Information in this chart was compiled from the Pharmaceutical Research and Manufacturers of America, NIH (www.clinicaltrials.gov), corporate websites and the databases of HEMONC TODAY. The publisher or editors do not assume responsibility for any errors or omissions.

PERSPECTIVE: DARATUMUMAB

Paul G. Richardson

If I had to pick the most exciting new drug to emerge in this extraordinarily productive year for multiple myeloma, I would suggest daratumumab (Janssen and Genmab) as one of the most promising and arguably transformative in the long term, when added to the ongoing impact of proteasome inhibition — such as with bortezomib (Velcade; Millennium/Takeda) and carfilzomib (Kyprolis, Onyx) — and immunomodulatory drugs, such as thalidomide (Thalomid, Celgene), lenalidomide (Revlimid, Celgene) and pomalidomide (Pomalyst, Celgene).

Daratumumab is a very potent monoclonal antibody, with a completely new mechanism of action, and we have been privileged to be on the forefront of its clinical development from phase 1 through phase 3 as part of an international team.

Targeting CD38 with this very well-engineered antibody has proven highly successful and has been validated in subsequent studies by other antibodies in the same class. Most importantly, not only has daratumumab proven feasible to administer and active as a single agent — as we very recently published in *The New England Journal of Medicine* — but, when combined with other drugs, its efficacy is particularly impressive.

Daratumumab as a single agent generates major clinical responses in about a third of otherwise highly refractory patients. When combined with lenalidomide, the response rates jump dramatically. In fact, close to 80% to 90% of patients with relapsed/refractory disease appear to respond, and I think this promises enormous benefit for patients in various settings in the future, such as part of upfront treatment as well as maintenance.

It is important to recognize that elotuzumab (AbbVie and Bristol-Myers Squibb) is another very promising advance in the monoclonal antibody space that has been validated in the phase 3 setting and — in my opinion — will be approved by the regulatory authorities hopefully this year, with great potential to meaningfully and further improve patient outcome.

I think the fact that daratumumab not only has single-agent activity but — just like elotuzumab — is highly active in combination with a different target, and has multiple effects that are beyond the immuno-oncologic spectrum alone, is especially compelling.

Two other new agents warrant mention. The approval of panobinostat (Farydak, Novartis) this year as a first-in-class molecule in the area of histone deacetylase inhibition is a milestone. In my view, next-generation inhibitors show great promise. Second, the results of ixazomib (Takeda) in combination with lenalidomide and dexamethasone in relapsed, refractory myeloma in the TOURMALINE study are very exciting for an all-oral approach, with excellent efficacy and favorable tolerability. For the first orally bioavailable proteasome inhibitor to enter phase 3 studies, these results — which will be fully shared as an oral presentation at the ASH Annual Meeting and Exposition in December — are especially provocative.

With all of the above in mind, and a true plethora of important and very good options emerging for our patients in a record-breaking year, I would propose daratumumab as the most promising single agent. Its unique mechanism of action and striking activity as monotherapy, its efficacy in combination and its manageable safety profile provide a vital new therapeutic approach for this otherwise very challenging disease.

— Paul G. Richardson, MD

HEMONC TODAY Editorial Board member

Dana-Farber Cancer Institute

Harvard Medical School

Disclosure: Richardson reports advisory roles with Bristol-Myers Squibb, Celgene, Genmab, Janssen and Millennium/Takeda.

PERSPECTIVE: ACP-196

Richard R. Furman

One of the new agents that I'm most excited about is ACP-196 (Acerta Pharma), which is a second-generation inhibitor of Bruton's tyrosine kinase (BTK). ACP-196 binds to BTK at the same amino acid residue as ibrutinib (Imbruvica; Pharmacyclics, Janssen) does, but it is more selective in its binding. Although ibrutinib targets BTK, it also binds to eight other enzymes. The most common side effects seen with ibrutinib — namely diarrhea, bruising and atrial fibrillation — are the results of these off-target effects. ACP-196, given its better selectivity, has not been associated with diarrhea, bruising or atrial fibrillation.

My hope is that we not only have an agent that works incredibly well in CLL, but now have an excellent agent that works incredibly well with no toxicities. That is really the Holy Grail of what we would hope to achieve in terms of treatment for our patients.

— Richard R. Furman, MD

Weill Cornell Medicine

NewYork-Presbyterian Hospital

Disclosure: Furman reports consultant and speakers bureau roles with Pharmacyclics.

PERSPECTIVE: ELOTUZUMAB, DARATUMUMAB

Ruben Niesvizky

The most exciting findings in the pipeline for myeloma appear to be related to immune-regulation drugs. The most recent published manuscripts emphasize elotuzumab (AbbVie, Bristol-Myers Squibb), a SLAMF7 antibody, and daratumumab (Janssen), an anti-CD38 antibody.

A recent randomized trial compared elotuzumab, lenalidomide (Revlimid, Celgene) and dexamethasone with a control regimen of lenalidomide and dexamethasone in patients with relapsed/refractory myeloma. It was very encouraging to find the infusion therapy was not toxic and that elderly patients can receive this therapy without any major infusion reactions.

Further, although single-agent activity has not been demonstrated, prolongation of PFS has been shown for the elotuzumab group, particularly in patients who are naive to lenalidomide. I can foresee using elotuzumab in combination with lenalidomide and dexamethasone earlier in the disease — particularly in those patients who have not received lenalidomide — and that we will achieve long-term results, especially among the elderly or the infirm, for whom multiple comorbidities would preclude other types of therapy.

Randomized trials of daratumumab are ongoing. *The New England Journal of Medicine* published results from a frontline phase 2 regimen of daratumumab that showed staggering responses, particularly in patients who have gone through several lines of therapy, including proteasome inhibitors and immunomodulators. This is the first monoclonal antibody that has shown high single-agent activity, even in relapsed/refractory patients.

I can foresee seeing this agent move forward in the frontline and, more importantly, in combinations.

— Ruben Niesvizky, MD

Weill Cornell Medicine

NewYork-Presbyterian Hospital

Disclosure: Niesvizky reports research support from Bristol-Myers Squibb and Johnson & Johnson.

Hematology Drugs in the Pipeline

HEMONC TODAY asked key opinion leaders to offer perspective about hematology drugs in the pipeline they believe have the potential to change practice.

PERSPECTIVE: PEMBROLIZUMAB, NIVOLUMAB

Stephen M. Ansell

The treatment approach that I believe holds the greatest promise to fill an unmet need and make a very significant impact on patients in general is PD-1 blockade with either pembrolizumab (Keytruda, Merck) or nivolumab (Opdivo, Bristol-Myers Squibb), in patients with Hodgkin's lymphoma. This treatment has already demonstrated high response rates in previously treated patients. Looking to the future, using these agents in combination with earlier-phase approaches is likely to make a substantial impact on how we treat patients.

— Stephen M. Ansell, MD, PhD

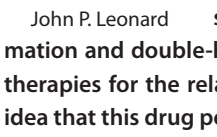
HEMONC TODAY Editorial Board member

Mayo Clinic

Rochester, Minnesota

Disclosure: Mayo Clinic receives research funding from Bristol-Myers Squibb and Merck for clinical trials that involve pembrolizumab and nivolumab.

PERSPECTIVE: SELINEXOR



John P. Leonard

One of the new agents in clinical trials that I think is very interesting is a drug called selinexor (Karyopharm Therapeutics), a selective inhibitor of nuclear export. It interferes with trafficking of molecules in and out of the nucleus. The net effect of this drug is that it affects growth signals and results in antiproliferative effects in a variety of different lymphomas.

This is exciting, in part, because it is an oral agent that seems — at least at this point — to have activity in highly aggressive lymphomas, such as large-cell lymphoma, Richter's transformation and double-hit lymphoma. These subtypes have very little in the way of good therapies for the relapsed setting. Most novel agents have limited efficacy there. The idea that this drug potentially has activity in these aggressive relapsed lymphoma subtypes is quite exciting. It may offer a new option, and we — along with others — are now looking at it in combination with rituximab (Rituxan; Genentech, Biogen Idec) and in combination with chemotherapy to see if we can really make an impact in what are among the highest unmet need areas of lymphoma.

— John P. Leonard, MD

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Disclosure: Leonard reports no relevant financial disclosures.

PERSPECTIVE: RIGOSERTIB

Azra Raza

Myelodysplastic syndrome (MDS) is a heterogeneous group of bone marrow disorders characterized by ineffective hematopoiesis and increased risk for developing into acute myeloid leukemia. Patients with MDS who receive repeated blood transfusions also are at risk for chronic iron overload.

The last drug to be approved for MDS was 10 years ago. I am particularly encouraged by the responses to a small molecule inhibitor of cellular signaling called rigosertib (Onconova Therapeutics) in both lower-risk and higher-risk MDS patients.

Rigosertib acts as a RAS mimetic. The main activity is mediated through the RAS-binding domain (RBD) found in many effector proteins, exemplifying a novel approach to block the interactions between RAS and its RBD-containing targets, such as PI3 kinase, pathways implicated in the pathogenesis of MDS.

Rigosertib is available as an IV infusion and as oral capsules. More than 1,200 patients have been treated in clinical trials worldwide. Published results have shown that rigosertib has the potential to provide survival benefit to patients with high-risk MDS and to improve hematological function in patients with low-risk MDS.

The global phase 3 INSPIRE trial — currently enrolling patients — will evaluate IV rigosertib in patients with high-risk MDS who progressed on or failed to respond to a hypomethylating agent. Oral rigosertib is being developed as a single agent for the treatment of low-risk MDS, and in combination with azacitidine (Vidaza, Celgene) for the treatment of high-risk MDS and AML.

— Azra Raza, MD

Columbia University

Disclosure: Raza reports no relevant financial disclosures.

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