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The Society of Hematologic Oncology (SOHO): Continuing to Move Forward in the Battle against Hematologic Malignancies

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The Society of Hematologic Oncology (SOHO) is an international society designed specifically for clinicians, research scientists and related health care professionals who specialize in the research and treatment of patients with hematologic malignancies. SOHO's mission is to promote worldwide research and education through the exchange of scientific information. Organized by its founders and world class committees, SOHO is the only international society specific to this field. SOHO's membership grew by 111% over the past year to its 2016 mid-year total of 2,286 members. 1,037 attended the third annual meeting of the society held September 16-19, 2015 at the Hilton Americas in Houston, Texas. There were 119 faculty speakers, 139 presentations, 12 meet-the-professor sessions, 3 plenary sessions, 10 general sessions, 1 poster session, 3 expert breakfast sessions, and a number of independent industry expert sessions. Additionally, 154 abstracts were approved for publication, poster presentation and/or oral presentation. A post meeting journal supplement is scheduled for publication in SOHO's official journal, "Clinical Lymphoma, Myeloma and Leukemia."The annual meeting of the society provides a venue for hematologic oncologists and related specialists to learn and collaborate in a more intimate setting. SOHO places special emphasis on the development and mentoring of young investigators through its extensive worldwide Young Investigator program. Each year, SOHO sponsors more than 100 young investigators with a focus on hematologic oncology to attend the annual meeting. Young investigators are encouraged to submit research to SOHO which provides a forum for active exchange of ideas and new research in an international setting. In the near future, the society will further its role in this capacity by facilitating fellowships between institutions for its young investigators. Finally, the SOHO Ambassador program brings the latest developments in the field to all corners of the globe. Rapid advances in molecular technology have led to an explosion of new drugs approvals over the last two decades. In the U.S. alone, there have been 39 new drugs approved to treat hematologic malignancies since 1997 (Table 1) FDA Approved Drugs for Oncology [1]. In the 15 years from 1997-2011 there were 17 new drugs approved to treat hematologic malignancies. By contrast, in the last five years (2012-2016) there have been 20 new drugs approved at a rate of four to five per year.

Drug	Indication	Mechanism of Action	Approval
Opdivo (nivolumab)	Hodgkin lymphoma	PD-1 receptor inhibitor	2016
Venclexta (venetoclax)	CLL	BCL-2 inhibitor	2016
Darzalex (daratumumab)	multiple myeloma	anti-CD38 monoclonal antibody	2015
Empliciti (elotuzumab)	multiple myeloma	anti-SLAMF7 monoclonal antibody	2015
Farydak (panobinostat)	multiple myeloma	histone deacetylase inhibitor	2015
Ninlaro (ixazomib)	multiple myeloma	proteasome inhibitor	2015
Beleodaq (belinostat)	PTCL	histone deacetylase inhibitor	2014
Blincyto (blinatumomab)	Ph-ALL	bispecific CD19-directed CD3 T-cell engager	2014
Imbruvica (ibrutinib)	CLL	Bruton's tyrosine kinase inhibitor	2014
Zydelig (idelalisib)	CLL, follicular B-cell NHL, SLL	phosphoinositide-3 kinase delta inhibitor	2014
Gazyva (obinutuzumab)	CLL	anti-CD20 monoclonal antibody	2013
Imbruvica (ibrutinib)	mantle cell lymphoma	Bruton's tyrosine kinase inhibitor	2013
Pomalyst (pomalidomide)	multiple myeloma	immunomodulatory agent	2013
Revlimid (lenalidomide)	mantle cell lymphoma	immunomodulatory agent	2013

Valchlor (mechlorethamine) gel	mycosis fungoides-type CTCL	alkylating agent	2013
Bosulif (bosutinib)	Ph^+ CML	tyrosine kinase inhibitor	2012
Iclusig (ponatinib)	CML, Ph^+ ALL	tyrosine kinase inhibitor	2012
Kyprolis (carfilzomib)	multiple myeloma	proteasome inhibitor	2012
Marqibo (vinCRIStine sulfate LIPOSOME injection)	Ph-ALL	inhibition of microtubule formation	2012
Synribo (omacetaxine mepesuccinate)	CML	protein translation inhibitor	2012
Erwinaze (asparaginase Erwinia chrysanthemi)	ALL	thought to interfere with protein metabolism in leukemic cells	2011
Arzerra (ofatumumab)	CLL	anti-CD20 monoclonal antibody	2009
Folotyn (pralatrexate injection)	peripheral T-cell lymphoma	dihydrofolate reductase inhibitor	2009
Istodax (romidepsin)	cutaneous T-cell lymphoma	histone deacetylase inhibitor	2009
Treanda (bendamustine hydrochloride)	CLL, B-cell NHL	alkylating agent	2008
Tasigna (nilotinib)	CML	tyrosine kinase inhibitor	2007
Sprycel (dasatinib)	CML	tyrosine kinase inhibitor	2006
Arranon (nelarabine)	T-cell ALL and T-cell lymphoblastic lymphoma	disrupts DNA synthesis and induces apoptosis	2005
Clolar (clofarabine)	ALL	disrupts DNA synthesis	2004
Bexxar (I-131Tositumomab)	NHL	Radioimmunotherapy (anti CD20 monoclonal antibody)	2003
Velcade (bortezomib)	multiple myeloma	Proteasome inhibitor	2003
Zevalin (ibritumomab tiuxetan)	NHL	Radioimmunotherapy (anti CD20 monoclonal antibody)	2002
Zometa (zoledronic acid)	multiple myeloma	inhibitor of bone resorption	2002
Campath (alemtuzumab)	B-cell CLL	Anti CD52 monoclonal antibody	2001
Gleevec (imatinib mesylate)	CML	tyrosine kinase inhibitor	2001
Trisenox (arsenic trioxide)	APL	Morphological changes and DNA fragmentation characteristic of apoptosis. Also causes damage or degradation of the fusion protein PML-RAR alpha.	2000
Busulflex (busulfan)	CML	bifunctional alkylating agent	1999
Intron A (interferon alfa-2b, recombinant)	NHL	exerts immunomodulatory, and antiproliferative effects	1997
Rituxan (rituximab)	B-cell NHL	Anti CD20 monoclonal antibody	1997

Table 1: The rapid increase in drug approvals has been accompanied by an expansion in clinical studies focused on hematologic malignancies. According to ClinicalTrials.gov [2] there are nearly 4,000 active, interventional clinical trials currently ongoing. Table 2 provides a breakdown of these clinical trials by type of malignancy.

Hematologic Malignancy	**Ongoing Clinical Trials***
Acute myelogenous leukemia	578
Acute lymphocytic leukemia	356
Chronic myelogenous leukemia	275
Chronic lymphocytic leukemia	332
Hodgkin lymphoma	251
Non-Hodgkin lymphoma	752
Multiple myeloma	503

Myelodysplastic syndrome	391
Myeloproliferative neoplasms	352
Total	3,790

Table 2: Number of Clinical Trials Ongoing by Type of Malignancy (*Interventional, recruiting trials according to ClinicalTrials.gov[2]).

These advances have brought greater understanding of the specific pathways and upstream regulating molecules responsible for the malignant process. In parallel, there has been an expansion of national and international research collaborations and an increase in data sharing among researchers and clinicians. Consequently, researchers are now able to accurately profile patient tumors and design tailored therapy clinical trial models with a high degree of sophistication.

For example, immunotherapy in hematologic oncology is evolving quickly and bringing new opportunities to patient treatment with monoclonal antibodies targeting tumor-specific antigens, cancer vaccines aimed at stimulating a patient's immune response, checkpoint inhibitors to prevent cancer cells from evading the immune system and cellular immunotherapy aimed at instructing the immune system to recognize and attack tumor cells.

SOHO remains at the forefront of these efforts by providing resources to young investigators and improving collaboration amongst key investigators in the field. The society stands firm in its mission "to expedite the discovery and application of knowledge of the Biology, Therapy, Etiology and Prevention of the Hematologic Malignancies." These findings should provide a platform for the progress needed for controlling and ultimately curing hematologic cancers.

References

1. CenterWatch (2016) FDA Approved Drugs for Oncology.
2. Clinical Trials.gov. A service of the U.S. National Institutes of Health.