SPORE

THE UNIVERSITY OF IOWA / MAYO CLINIC SPECIALIZED PROGRAMS OF RESEARCH EXCELLENCE

IN THIS ISSUE 2022

Collaboration is at the core of the Iowa/Mayo lymphoma Specialized Program of Research Excellence (SPORE). This collaboration takes place between lymphoma researchers at Iowa and Mayo, with colleagues across the country and around the world, among laboratory, clinical and population researchers, and most importantly, between researchers and patients who agree to participate in SPORE research studies.

For the past 20 years, the SPORE has been at the forefront of translational lymphoma research. This type of research takes scientific concepts and uses them to develop new approaches that can help patients. It also involves research in the laboratory designed around unexplained challenges faced by patients such as the need to understand why a given treatment might work better in some patients but not others.

Our team of researchers from the University of Iowa and Mayo Clinic, with different backgrounds and areas of expertise, work together and with other researchers from around the world on a broad range of research projects. Patient volunteers and advocates partner with us and are central to this success.

SPORE research is exploring how the genetics of various types of lymphoma can impact on response to therapy and outcomes for patients. This information is proving helpful in determining the right therapy for the right patient at the right time. We are determining how various molecules that interact on the outside and inside of lymphoma cells (through a complex process called "cell signaling") can provide targets for new and improved lymphoma medicines. We are also developing new approaches to using the immune system to treat lymphoma more effectively and safely than ever before. We provide funding for researchers to explore new high-risk/high payoff lymphoma research ideas.

Finally, the SPORE supports up-and-coming new lymphoma researchers, many of whom have used this support to become outstanding lymphoma researchers themselves and have joined our team. SPORE research over the years has contributed to a major reduction in the pain and suffering caused by lymphoma. While we have made outstanding progress, we know we still have a long way to go. With our culture of collaboration, support from the National Cancer Institute, and the partnership of our patients, we are poised to make progress faster than ever before. In this newsletter, we provide additional information on who we are, what we do, and why it is so important as we work together to improve the lives of all patients with lymphoma.

UNIVERSITY OF IOWA HOLDEN COMPREHENSIVE CANCER CENTER
University of Iowa Health Care

MAYO CLINIC Cancer Center

NCI CCC A Comprehensive Cancer Center Designated by the National Cancer Institute

PATIENT STORY: Jodi Hagar (Dubuque, Iowa)

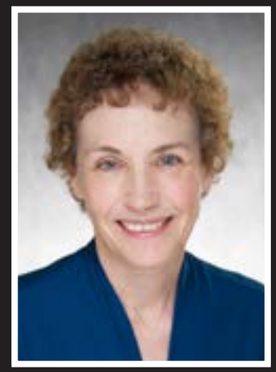
Jodi Hagar was diagnosed at the age of 44 with aggressive Non-Hodgkin Follicular Triple Hit Lymphoma – something that was rare for someone at her age. The diagnosis came from her care team at Mercy One/Medical Associates in Dubuque, IA. They referred her to Brian Link, MD at Holden Comprehensive Cancer Center. After he was in agreement with the diagnosis, she began rCHOP treatment that lasted for several months in Dubuque. The treatment consisted of a combination of five drugs targeting this aggressive cancer. Five months after diagnosis, she was in complete remission. But just 20 months later, the cancer was back. This was a harrowing time for Jodi and her family. In coordination with her team of oncologists in Dubuque and the team at Holden, it was determined that Jodi should undergo an autologous stem cell transplant. This course of action was decided on mostly because of her young age. She began receiving chemotherapy that put her back in remission and then harvested her own stem cells before receiving them back into her body in a transplant. She had almost five years being cancer-free. When the cancer came back again, Jodi let her team know that her preferred course of action was participating in a clinical trial. She didn't want to go through chemotherapy again if she could help it. She was enrolled in a clinical trial supported by the SPORE grant testing the drug CMP-001 in conjunction with Keytruda immunotherapy. In her own words she says that it was like "being vaccinated against my own cancer." She had 100% success with that clinical trial. It has now been six months and Jodi feels great!

PATIENT ADVOCATE SPOTLIGHT: Ben Haines

Ben Haines is our lymphoma SPORE patient advocate with perspective from the caregiver side. His wife, Janice, was diagnosed with lymphoma 25 years ago. He attends monthly SPORE meetings and advances. He has a passion to help the lymphoma community by helping the best minds in lymphoma, who work tirelessly behind the scenes. Ben and Janice are grateful for their daughter, Lyudmila, whom they were able to adopt, even with a lot of medical uncertainty, 18 years ago in Odesa, Ukraine (after the approval of Dr. Tom Witzig). Ben likes fishing, walking, welding, cooking, and living "cabin life." He is grateful for the Iowa/Mayo Lymphoma SPORE and the legacy it has built for the lymphoma community under the expert guidance of Tom Witzig, MD and George Weiner, MD.

THANK YOU, BEN, FOR ALL YOU DO IN YOUR ROLE AS A PATIENT ADVOCATE!

MEET OUR INVESTIGATORS



GAIL BISHOP, PhD
Holden Comprehensive Cancer Center

A native Midwesterner, Gail Bishop (Abendroth) grew up in Milwaukee and completed a BA in Biology at St. Olaf College in Northfield, MN. Immediately after graduation she married Warren Bishop, a third-year medical student at the University of Wisconsin-Madison. She took a lab position at the university in the McArdle Cancer Research Labs studying the genetics of tumor rejection in a mouse teratocarcinoma model. When her spouse matched for a residency at the University of Michigan, she moved to Ann Arbor to complete a PhD in Cellular & Molecular Biology, studying the natural killer cell response to cells infected with Herpes Simplex virus. Dr. Bishop then traveled to the University of North Carolina in Chapel Hill for postdoctoral research, where she developed a career-long interest in how B and T lymphocytes interact and respond to signals from each other and their environment. She brought that interest to the University of Iowa Department of Microbiology in 1989, joining the faculty in the same year as SPORE co-leader George Weiner. Her research on the B cell-T cell interaction molecule CD40 stimulated her to study in parallel the oncogenic EBV-encoded CD40 mimic, LMP1, which sparked an interest in lymphoma, a cancer linked to LMP1. This, in turn, stimulated her participation in the Lymphoma SPORE group and resulted in her lab's pursuit of a SPORE Developmental Research Project, followed by a full SPORE project in collaboration with the lab of Mayo academic physician Thomas Witzig. Dr. Bishop's CD40 studies also led her to investigate the family of TRAF signaling molecules, resulting in her lab's discovery that TRAF3 is a critical inhibitor of B cell homeostatic survival and activation, reflected by both genetic and post-translational loss of TRAF3 in human B cell malignancies. Her lab is continuing these studies, investigating how earlier autoimmunity associated with B cell TRAF3 loss can predispose to B cell lymphoma, as well as the mechanisms and consequences of B cell TRAF3 loss in aging. She continues to enjoy interacting with the SPORE group on a regular basis, as they are the source of many interesting new ideas and collaborations. Dr. Bishop and her spouse Warren have been married for 44 years, and have two grown sons, Eric and Ian. She enjoys cooking, travel, hiking, reading (especially mysteries), and making wire and beaded jewelry.

PROJECT OVERVIEW

PROJECT 1
Activating Phagocytic Macrophages in Non-Hodgkin Lymphoma

STEPHEN ANSELL, MD, PhD
Mayo Clinic

ANDREW FELDMAN, MD
Mayo Clinic

Co-investigators: Grzegorz Nowakowski, MD (Mayo), Zhi Zhang Yang, MD (Mayo), Umar Farooq, MD (Iowa)

Macrophages are a type of white blood cells with specialized immune function to fight infections as well as cancer. These cells are really the "trash collectors" of the immune system and work by ingesting infected or malignant cells, in a process called phagocytosis. The goal of our project is to improve the ability of macrophages to fight cancer by increasing their phagocytosis of lymphoma cells. The ability of macrophages to phagocytose target cells is controlled by a receptor on their surface called SIRP*α*. Activation of this receptor by a protein called CD47 shuts down phagocytosis. We have specific interest in sub-types of macrophages, particularly based on their expression of SIRP*α* (SIRP*α*-high versus SIRP*α*-low macrophages), as lymphoma cells have high expression on their surface of CD47 which protects lymphoma cells from macrophages. We are working to improve the phagocytic function of macrophages by blocking the interaction of CD47 on surface of lymphoma cells with SIRP*α* on the surface of macrophages. However, the amount of SIRP*α* on the surface of the macrophage affects the response to CD47 blockade. We are testing a drug called TTI-621 that blocks the CD47 signal on lymphoma cells but also activates macrophages to increase their phagocytosis and antitumor activity. So far, we have found that TTI-621 has anti-lymphoma activity in approximately one third of patients treated. We are now studying whether a predominance of SIRP*α*-high compared to SIRP*α*-low macrophages at site involved by lymphoma determines whether treatment will be beneficial or not.

PROJECT OVERVIEW (continued)

PROJECT 2
Microenvironment Modification and Anti-PD1 Immunotherapy of Lymphoma

GEORGE WEINER, MD
UNIVERSITY OF IOWA

YI LIN, MD, PhD
MAYO CLINIC

The underlying premise behind Project #2 is that it is possible to modify a lymphoma node in a manner that allows the immune system to recognize the lymphoma as being foreign and to reject it. This is known as "in situ immunization" because it involves turning the lymphoma node itself into its own vaccine without taking it out of the patient. This is being done using two different approaches. The first strategy, being led by Dr. Lin at Mayo, involves taking blood cells from the patient and treating them in a way that converts them into highly specialized cells of the immune system known as dendritic cells. Once this is done, a lymphoma node in the patient is killed by freezing and the patient's own dendritic cells injected into that node to kick off the immune response. The second strategy, being led by Drs. Weiner and Farooq at Iowa, involves injecting the lymphoma node with a "virus-like particle" or VLP which was designed to stimulate the immune system in a manner similar to one that would be generated by a local, severe viral infection. Importantly, the VLP is not a real virus. It contains no true genetic material and so can not cause an infection. With support from the SPORE, clinical trials are being pursued for both approaches (NCT03035331 for the first approach and NCT03983668 for the second approach). To date, 18 patients have been enrolled on these trials with encouraging evidence for regression of lymphoma using both strategies. Samples are being obtained during therapy which is allowing the SPORE team to understand how these treatment strategies are altering the immune system within the lymphoma node. This information will be used to determine the best way to combine these approaches with other approaches to lymphoma therapy in the future.

PROJECT 3
Targeting Tumor Metabolism in Aggressive Lymphoma

THOMAS WITZIG, MD
MAYO CLINIC

GAIL BISHOP, PhD
UNIVERSITY OF IOWA

This project is focused on targeting the increased growth rate of lymphoma cells. Lymphomas utilize glucose as their fuel and tumors that use more glucoses do worse. The cells that lack a normal regulator called TRAF3 live better and are associate with a kinase enzyme called glucose-6-kinase (GSK). We are part of a national trial that is now testing whether inhibiting GSK3 can produce tumor responses. That trial has now accrued 11 patients at Mayo. Project 3 is also studying the relationship between an important "pump" that is located on the membrane that separates the nucleus from the cytoplasm of the cell. This pump, CRM1 moves proteins and nutrients in and out of the nucleus. Selinexor is the first drug to be approved by the FDA to inhibit CRM1. Project 3 investigators are launching a trial in September to test Selinexor with other drugs to improve the tumor responses with less toxicity. The results of these studies in the lab suggest that this can be accomplished. P3 investigators are also studying a cell line made from a patient with resistant mantle cell lymphoma to learn why it is resistant. These studies are informing us how to potentially overcome the resistance.

PROJECT 4
Genomic Predictors of Early Relapse in Immunochemotherapy-treated Follicular Lymphoma

JAMES CERHAN, MD, PhD
MAYO CLINIC

ANNE NOVAK, PhD
MAYO CLINIC

BRIAN LINK, MD
UNIVERSITY OF IOWA

The goal of SPORE Project 4 is to identify patients with follicular lymphoma who are more likely to have short remissions after initial treatment that includes rituximab and chemotherapy, also known as immunochemotherapy. Early relapse after frontline therapy has been shown to be associated with disease that is more difficult to treat and worse outcomes in general. Identifying patients with high risk of early relapse at the time of diagnosis (prior to starting therapy) will help clinicians in treatment management as well as identify tumor biology that could be targeted with new treatment approaches. One part of the research project is to understand clinical factors that might predict early aggressive disease. Since last year's newsletter, we have brought together data from 11 international cohorts on over 9000 patients with follicular lymphoma diagnosed from 2002-2018, including over 6000 treated with front-line immunochemotherapy. This is now the largest collection of such patients in the world and gives us even more power to identify subtle patterns on the best strategies for treating patients with follicular lymphoma. After aligning all of these datasets, including the pertinent data on patients who receive this newsletter, we made the first report of the results at the 2021 American Society of Hematology (ASH) meeting in Atlanta, Georgia. We reported that outcomes from this large, pooled analysis were very similar to long-term follow-up of large randomized clinical trials and support the use of our data for developing clinical models. We also documented changing patterns for front-line chemotherapy, such as the increased use of bendamustine and rituximab maintenance therapy over the study period. About half of patients were without disease progression or new treatment at 10 years from the start of therapy; this improved over time with more recently treated patients (during 2010-2018) doing better than those treated prior to 2010. About 70% of patients were alive 10 years after their initial treatment; this estimate remained about the same during the study period. Patients who were still in remission two years after treatment were more likely to be alive 10 years later. Our next step is to develop and validate a clinical model to predict at the time of diagnosis which patients are at highest risk of relapsing early. We then plan to incorporate it with tumor and host genomic data being generated as part of Project 4 so we can better understand and predict early events in order to improve the initial treatments and outcomes of patients with follicular lymphoma.

CORES

ADMINISTRATIVE CORE

GEORGE WEINER, MD
UNIVERSITY OF IOWA

THOMAS WITZIG, PhD
MAYO CLINIC

The Administrative Core is the organizational hub of the SPORE. Drs. George Weiner and Thomas Witzig lead the Administrative Core. They are Co-Principal Investigators of the SPORE and cooperate to coordinate and provide direction for all SPORE activities. The Administrative Core supplies the organizational structure to coordinate the activities of the research projects, scientific cores and developmental programs at both institutions. The framework for collaboration, financial management, review of research projects, project growth and effective communication between Iowa and Mayo, patient advocates and the NCI is maintained through this Core. The Administrative Core also coordinates the publicity and the selection process for the Developmental Research and Career Enhancement programs. The Administrative Core has maintained its efforts throughout the COVID-19 pandemic including supporting virtual monthly meetings of SPORE researchers.

BIOSPECIMENS CORE

ANDREW FELDMAN, MD
MAYO CLINIC

ANNE NOVAK, PhD
MAYO CLINIC

LISA RIMSZA, MD
MAYO CLINIC

The Biospecimens Core coordinates all specimen-related research for projects in the Lymphoma SPORE. Most recently, this Core has developed new innovations in Biospecimens Core sampling through gut microbiome analysis (stool microbiome) and novel techniques (CyTOF) that will enable investigators to expand lymphoma research. The SPORE is studying the stool microbiome in over 400 patients with new lymphoma. The results should be finalized by the end of 2020. We anticipate that these results will further inform our diets.

The Core offers specialized expertise in working with lymphoma biospecimens and is closely aligned with institutional research cores and shared resources. They also provide biospecimens expertise and biobank resources for innovative Developmental Research.

The Biospecimen Core is unique in that it has directors at the University of Iowa, Mayo Clinic Rochester and Mayo Clinic Arizona. This leadership structure allows for the Core to share best practices between all institutions and assure uniformity in sample collection.

NAME	INSTITUTION	ROLE
ANDREW FELDMAN, MD	Mayo Clinic - Rochester	Core Director
SERGEI SYRBU, MD	University of Iowa	Core Co-Director
LISA RIMSZA, MD	Mayo Clinic - Arizona	Core Co-Director
SARAH GIBSON, MD	Mayo Clinic - Arizona	Core Co-Director
ANNE NOVAK, PhD	Mayo Clinic - Rochester	Core Co-Director
MILES DELBUSSO	Mayo Clinic - Rochester	Lab Technician
JANICE COOK-GRANROTH	University of Iowa	Lab Technician
SARA BORGSCHATZ	Mayo Clinic Rochester	Lead Pathology Coordinator
ANGELA MERRISS	University of Iowa	Lead Pathology Coordinator
JULIANNE LUNDE	Mayo Clinic Rochester	Program Manager

BIOSTATISTICS/BIOINFORMATICS CORE

YAN ASMAN, PhD
MAYO CLINIC

MATTHEW MAURER, MS, DMSc
UNIVERSITY OF IOWA

BRIAN SMITH, PhD
UNIVERSITY OF IOWA

The Biostatistics and Bioinformatics Core (BBC) works closely with SPORE investigators on their research. The BBC helps with the design of studies, such as determining how many patients are needed for the study and what the endpoint of the study should be. The BBC develops and maintains the infrastructure needed to capture and store the data on studies. Finally, members of the BBC analyze the study data and work with the investigators to develop reports and prepare results for abstracts and manuscripts. The BBC works with many investigators across the SPORE research group and on many types of studies and data, ranging from small projects to large genomic sequencing projects with massive datasets. To meet the needs of the SPORE, members of the BBC have a wide range of expertise, including database design, data management, and a broad skillset in analytical techniques.

BBC members typically have backgrounds in statistics, mathematics, computer science, and biology; many have interdisciplinary training or experience across these varied fields.

CLINICAL RESEARCH CORE

THOMAS HABERMAN, MD
MAYO CLINIC

BRIAN LINK, MD
UNIVERSITY OF IOWA

The Clinical Research Core (CRC), co-chaired by Drs. Thomas Habermann and Brian Link, coordinates the clinical trials conducted through the SPORE. It also has the critical task of supporting the Molecular Epidemiology Research (MER) which follows patients for outcomes. There are now 7,605 patients enrolled and in follow-up in the MER. Collaborations through the CRC continue building on previous collaborations with the Dana Farber Cancer Institute and The Broad Institute. International collaborations continue with researchers in France, Sweden, and Italy.

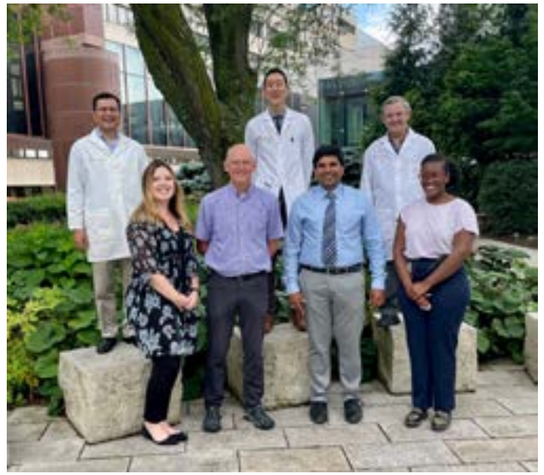
The MER continues to define outcomes of patients with different lymphoma subtypes such as late relapses in diffuse large B-cell lymphoma and the long-term survival rates and cause of death in patients with follicular lymphoma in the immunochemotherapy era because of the opportunity to continually follow patients. The MER has contributed to other international efforts such as genome wide association studies through other study groups such as InterLymph which include institutions world-wide. A unique aspect of the MER is that patients are followed after their initial clinical evaluation and consent to provide a peripheral blood sample, to allow researchers to utilize tissue for research and provide responses to multiple questions related to their health, quality of life, risk factors, and physical activity. The combination of genetic information obtained from the blood and tissue, as well as clinical and outcomes information on a large number of patients collected over many years is extremely valuable for lymphoma research. Multiple genetic studies have helped advance the science of lymphoma in Hodgkin lymphoma, diffuse large B-cell lymphoma (DLBCL), chronic lymphocytic leukemia, and other lymphoproliferative disorders. Variations in genes in several pathways in lymphoma have been identified and are under further evaluation. The CRC's extensive patient data base has allowed for new and unique clinical observations and a number of studies not otherwise possible, which directly helps patients. The CRC continues to innovate. It has expanded the MER to six additional centers by obtaining NCI Cancer Epidemiology Cohort infrastructure funding for the Lymphoma Epidemiology of Outcomes (LEO) cohort study. The MER collaborated with the Biospecimens Core to collect and store repeat blood samples for some patients so we can evaluate changes over time. Electronic consent and electronic data collection with the participants has been incorporated. New clinical trials in relapsed lymphoma have included a high dose vitamin C trial in relapsed refractory lymphoma and a nanoparticle clinical trial.

SPORE REGISTRY (MER) UPDATE

WHAT IS MER?

MER stands for Molecular Epidemiology Resource and is the registry that collects all information on participants who consent to the SPORE. Data collected in the MER is used to describe lymphomas and answer questions about outcomes and new treatments.

IOWA MER/LEO TEAM



TOP ROW L-R: Umar Farooq, MD; Eric Mou, MD; Sergei Syrbu, MD, PhD

BOTTOM ROW L-R: Angela Merriss; Brian Link, MD; Sabarish Ayyappan, MD; Alia Burks

UNIVERSITY OF IOWA
HOLDEN
COMPREHENSIVE
CANCER CENTER
University of Iowa Health Care

THE RESEARCH TEAM

The lymphoma SPORE/MER research team consists of investigators, study coordinators, lab technicians, pathologists, statisticians, clinicians, patient advocates and students who all work together to collect, store, and analyze data and specimens. The University of Iowa and Mayo Clinic research teams work closely together to assure the continued success of the MER.

MAYO MER/LEO TEAM

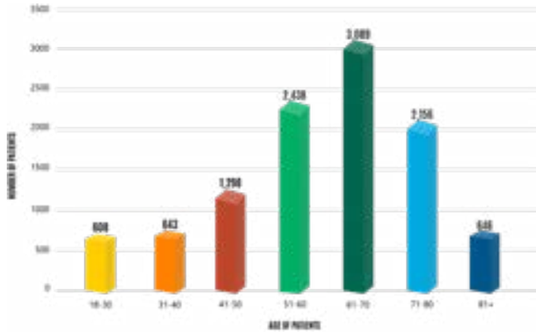
FRONT ROW L-R: Dr. James Cerhan, Dr. Thomas Habermann, Shaun Riska, Dr. Carrie Thompson, Devin Copley

SECOND ROW L-R: Melissa Larson, Tanner Reicks, Julianne Lunde, Sara Borgschatz, Rachel Benson, Matthew Holets

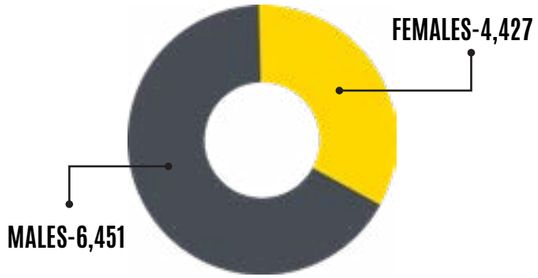
THIRD ROW L-R: Lindsey En, McKenzie Kline, Aymen Murdos, Christina Stenzel, Emma Chadbourn

MAYO CLINIC
Cancer Center

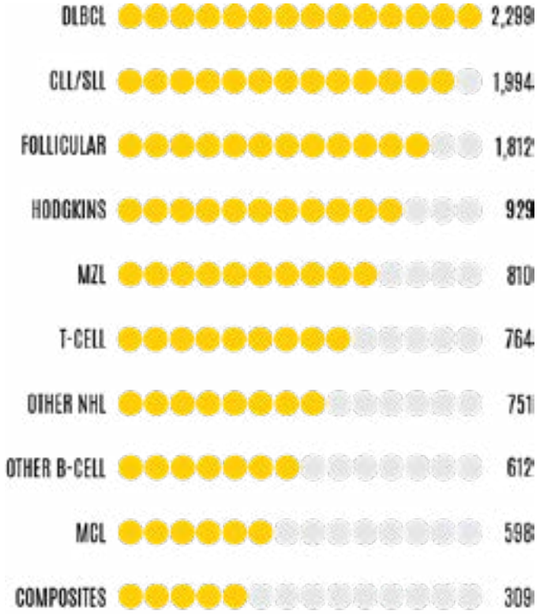
MER BY AGE



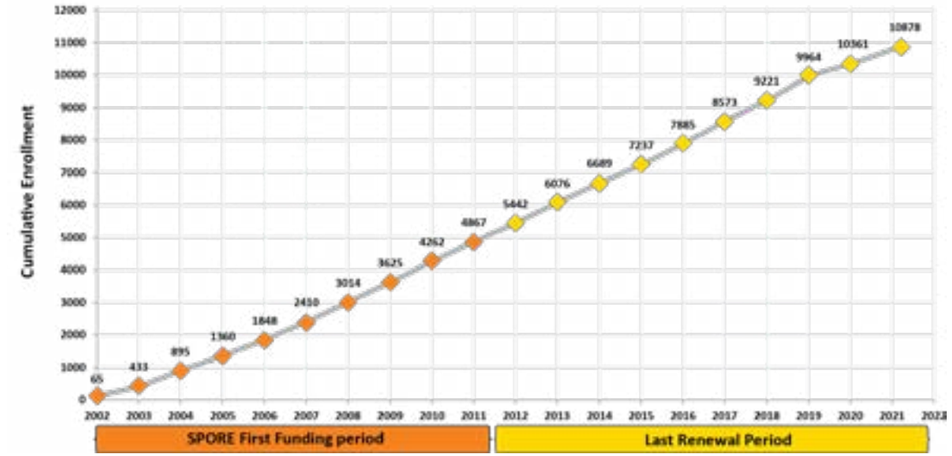
MER BY GENDER



TYPE OF LYMPHOMA



CUMULATIVE PATIENT ENROLLMENT



RECENT PUBLICATIONS

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In this study SPORE investigators studied the drug Selinexor (approved for relapsed lymphoma) and enhanced its activity by combining it with an aspirin-like compound called choline salicylate. The combination works in an unusual way by interfering with the way cancer cells repair their DNA. The result is a new way of treating lymphoma that is now being tested in the SPORE.

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Higgins A, Kim H, Harper L, Habermann TM, Nowakowski GS, Thompson CA, Johnston P, Witzig TE, Allmer C, Maurer MJ, Cerhan JR, Young JR, Thanarajasingam G. Testicular FDG-PET/CT uptake threshold in aggressive lymphomas Am J Hematol 2021

Hu G, Phillips JL, Dasari S, Jacobs HK, Luchtel RA, Oishi N, Hundal T, Ahmed NH, Satou A, Epstein AL, Bennani NN, Nowakowski GS, Murray JA, Feldman AL. Targetability of STAT3-JAK2 fusions: implications for T-cell lymphoproliferative disorders of the gastrointestinal tract Leukemia 2020

Hwang SR, Higgins A, Castillo Almeida NE, LaPlant B, Maurer MJ, Ansell SM, Witzig TE, Thanarajasingam G, Bennani NN. Effect of antibiotic use on outcomes in patients with Hodgkin lymphoma treated with immune checkpoint inhibitors Leuk Lymphoma 2021

Jakobsen LH, Ellin F, Smeland KB, Wästerlid T, Christensen JH, Jørgensen JM, Josefsson PL, Øvlisen AK, Holte H, Blaker YN, Grauslund JH, Bjørn J, Molin D, Lagerlöf I, Smedby KE, Colvin K, Thanarajasingam G, Maurer MJ, Habermann TM, Song KW, Zhu KY, Gerrie AS, Cheah CY, El-Galaly TC. Minimal relapse risk and early normalization of survival for patients with Burkitt lymphoma treated with intensive immunochemotherapy: an international study of 264 real-world patients Br J Haematol 2020

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Khurana A, Maurer MJ. Reversing the restrictive trend in diffuse large B-cell lymphoma trial eligibility: it's time to open the gates! Br J Haematol 2021

Khurana A, Mwangi R, Nowakowski GS, Habermann TM, Ansell SM, LaPlant BR, Link BK, Cerhan JR, Maurer MJ, Witzig TE. Impact of Organ Function-Based Clinical Trial Eligibility Criteria in Patients With Diffuse Large B-Cell Lymphoma: Who Gets Left Behind? J Clin Oncol 2021

Clinical trials are important in proving new treatments for lymphoma. There have been concerns that sometimes the eligibility criteria are too strict leaving some patients out of the trial. In this joint study of the Iowa/Mayo investigators we demonstrated that indeed the key recent trials had eligibility criteria that excluded 10-20% of the patients. These "left behind" patients had more deaths due to lymphoma. This report provides valuable recommendations to those designing trials so that this problem can be rectified.

Kleinstern G, Camp NJ, Berndt SI, Birmann BM, Nieters A, Bracci PM, McKay JD, Ghesquières H, Lan Q, Hjalgrim H, Benavente Y, Monnereau A, Wang SS, Zhang Y, Purdue MP, Zeleniuch-Jacquotte A, Giles GG, Vermeulen R, Cocco P, Albanes D, Teras LR, Brooks-Wilson AR, Vajdic CM, Kane E, Caporaso NE, Smedby KE, Salles G, Vijai J, Chanock SJ, Skibola CF, Rothman N, Slager SL, Cerhan JR.

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Lipid Trait Variants and the Risk of Non-Hodgkin Lymphoma Subtypes: A Mendelian Randomization Study Cancer Epidemiol Biomarkers Prev 2020

Kleinster G, O'Brien DR, Li X, Tian S, Kabat BF, Rabe KG, Norman AD, Yan H, Vachon CM, Boddicker NJ, Call TG, Parikh SA, Bruins L, Bonolo de Campos C, Leis JF, Shanafelt TD, Ding W, Cerhan JR, Kay NE, Slager SL, Braggio E. Tumor mutational load predicts time to first treatment in chronic lymphocytic leukemia (CLL) and monoclonal B-cell lymphocytosis beyond the CLL international prognostic index Am J Hematol 2020

Kleinstern G, Rishi A, Achenbach SJ, Rabe KG, Kay NE, Shanafelt TD, Ding W, Leis JF, Norman AD, Call TG, Cerhan JR, Parikh SA, Baum CL, Slager SL. Delineation of clinical and biological factors associated with cutaneous squamous cell carcinoma among patients with chronic lymphocytic leukemia J Am Acad Dermatol 2020

Krull JE, Wenzl K, Hartert KT, Manske MK, Sarangi V, Maurer MJ, Larson MC, Nowakowski GS, Ansell SM, McPhail E, Habermann TM, Link BK, King RL, Cerhan JR, Novak AJ. Somatic copy number gains in MYC, BCL2, and BCL6 identifies a subset of aggressive alternative-DH/TH DLBCL patients Blood Cancer J 2020

Le K, Wellik LE, Maurer MJ, McPhail ED, Witzig TE, Gupta M. JAK2 activation promotes tumorigenesis in ALK-negative anaplastic large cell lymphoma via regulating oncogenic STAT1-PVT1 lncRNA axis Blood Cancer J 2021

Liebow M, Larson MC, Thompson CA, Nowakowski GS, Call TG, Macon WR, Kay NE, Habermann TM, Slager SL, Cerhan JR. Aspirin and other nonsteroidal anti-inflammatory drugs, statins and risk of non-Hodgkin lymphoma Int J Cancer 2021

Maurer MJ, Jakobsen LH, Mwangi R, Schmitz N, Farooq U, Flowers CR, de Nully Brown P, Thompson CA, Frederiksen H, Cunningham D, Jørgensen J, Poeschel V, Nowakowski G, Seymour JF, Merli F, Haioun C, Ghesquieres H, Ziepert M, Tilly H, Salles G, Shi Q, El-Galaly TC, Habermann TM. Relapsed/Refractory International Prognostic Index (R/R-IPI): An international prognostic calculator for relapsed/refractory diffuse large B-cell lymphoma Am J Hematol 2021

Many patients with Diffuse Large B Cell lymphoma that has relapsed or is refractory to standard therapy have poor outcomes. SPORE researchers, in collaboration with colleagues from across the country and Europe, used data from the Lymphoma Molecular Epidemiology Resource to develop a prognostic model for use by lymphoma physicians to inform treatment decisions for individual lymphoma patients and be used to improve the design of new research studies. The model is available in smartphone-based formats for health care professionals.

Mondello P, Fama A, Larson MC, Feldman AL, Villasboas JC, Yang ZZ, Galkin I, Svelolkin V, Postovalova E, Bagaev A, Ovcharov P, Varlamova A, Huet S, Tesson B, McGrath KR, Slager S, Link BK, Syrbu S, Novak AJ, Habermann TM, Witzig TE, Nowakowski GS, Salles G, Cerhan JR, Ansell SM. Lack of intrafollicular memory CD4 + T cells is predictive of early clinical failure in newly diagnosed follicular lymphoma Blood Cancer J 2021

Nowakowski GS, Hong F, Scott DW, Macon WR, King RL, Habermann TM, Wagner-Johnston N, Casulo C, Wade JL, Nagargoje GG, Reynolds CM, Cohen JB, Khan N, Amengual JE, Richards KL, Little RF, Leonard JP, Friedberg JW, Kostakoglu L, Kahl BS, Witzig TE. Addition of Lenalidomide to R-CHOP Improves Outcomes in Newly Diagnosed Diffuse Large B-Cell Lymphoma in a Randomized Phase II US Intergroup Study ECOG-ACRIN E1412 J Clin Oncol 2021

Oishi N, Hundal T, Phillips JL, Dasari S, Hu G, Viswanatha DS, He R, Mai M, Jacobs HK, Ahmed NH, Syrbu SI, Salama Y, Chapman JR, Vega F, Sidhu J, Bennani NN, Epstein AL, Medeiros LJ, Clemens MW, Miranda RN, Feldman AL. Molecular profiling reveals a hypoxia signature in breast implant-associated anaplastic large cell lymphoma Haematologica 2020

Pophali PA, Larson MC, Allmer C, Farooq U, Link BK, Maurer MJ, Cerhan JR, Thompson CA. Compliance with cancer screening and influenza vaccination guidelines in non-Hodgkin lymphoma survivors J Cancer Surviv 2020

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Risueño A, Hagner PR, Towfic F, Fontanillo C, Djebbari A, Parker JS, Drew CP, Nowakowski GS, Maurer MJ, Cerhan JR, Wei X, Ren Y, Lee CW, Couto S, Wang M, Pourdehnad M, Gandhi AK, Trotter MWB. Leveraging gene expression subgroups to classify DLBCL patients and select for clinical benefit from a novel agent Blood 2020

Rogers LM, Wang Z, Mott SL, Dupuy AJ, Weiner GJ. A Genetic Screen to Identify Gain- and Loss-of-Function Modifications that Enhance T-cell Infiltration into Tumors Cancer Immunol Res 2020

Ruan GJ, Gandhi S, Abeykoon JP, Schram S, Habermann TM, Sandefur BJ, Witzig TE. Elevated Serum Lactate in Patients With Lymphoma: It Is Not Always Infection Mayo Clin Proc Innov Qual Outcomes 2021

Ruan GJ, Hazim A, Abeykoon JP, Scheckel C, Vassallo R, Ryu JH, Tobin WO, Koster MJ, Bennani NN, Rech KL, Young JR, Shah MV, Goyal G, Go RS. Low-dose vemurafenib monotherapy in BRAF(V600E) -mutated Erdheim-Chester disease Leuk Lymphoma 2020

Sabree SA, Voigt AP, Blackwell SE, Vishwakarma A, Chimenti MS, Salem AK, Weiner GJ. Direct and indirect immune effects of CMP-001, a virus-like particle containing a TLR9 agonist J Immunother Cancer 2021

A major project of the SPORE is focused on an approach called "in situ immunization" where injection of a treatment (in this case designated CMP-001) directly into a lymphoma activates the immune system in a way that induces an anti-lymphoma immune response. The changes that take place within the lymphoma that result in this immune response are complex. This paper describes the changes in the immune response induced by treatment. Information contained in this publication will help in the design of treatments using this exciting new approach to lymphoma immunotherapy.

Sabree SA, Lemke-Miltner CD, Blackwell SE, Yin C, Bossler A, Ebeid K, Salem AK, Weiner GJ. Monocytes Exposed to Immune Complexes Reduce pDC Type 1 Interferon Response to Vidutolimod. Vaccines (Basel) 2021

Singh N, Gao Y, Field E, Link BK, Weiss N, Curtis JR, Lynch CF, Vaughan-Sarrazin M. Trends of lymphoma incidence in US veterans with rheumatoid arthritis, 2002-2017 RMD Open 2020

Slager SL, Lanasa MC, Marti GE, Achenbach SJ, Camp NJ, Abbasi F, Kay NE, Vachon CM, Cerhan JR, Johnston JB, Call TG, Rabe KG, Kleinstern G, Boddicker NJ, Norman AD, Parikh SA, Leis JF, Banerji V, Brander DM, Glenn M, Ferrajoli A, Curtin K, Braggio E, Shanafelt TD, McMaster ML, Weinberg JB, Hanson CA, Caporaso NE.

Natural history of monoclonal B-cell lymphocytosis among relatives in CLL families Blood 2021

St-Pierre F, Broski SM, LaPlant BR, Maurer MJ, Ristow K, Thanarajasingam G, Macon WR, Habermann TM, Witzig TE. Fluorodeoxyglucose-Positron Emission Tomography Predicts Bone Marrow Involvement in the Staging of Follicular Lymphoma Oncologist 2020

Thanarajasingam G, Leonard JP, Witzig TE, Habermann TM, Blum KA, Bartlett NL, Flowers CR, Pitcher BN, Jung SH, Atherton PJ, Tan A, Novotny PJ, Dueck AC. Longitudinal Toxicity over Time (ToxT) analysis to evaluate tolerability: a case study of lenalidomide in the CALGB 50401 (Alliance) trial Lancet Haematol 2020

Veeramani S, Weiner GJ. Quantification of Receptor Occupancy by Ligand-An Understudied Class of Potential Biomarkers Cancers (Basel) 2020

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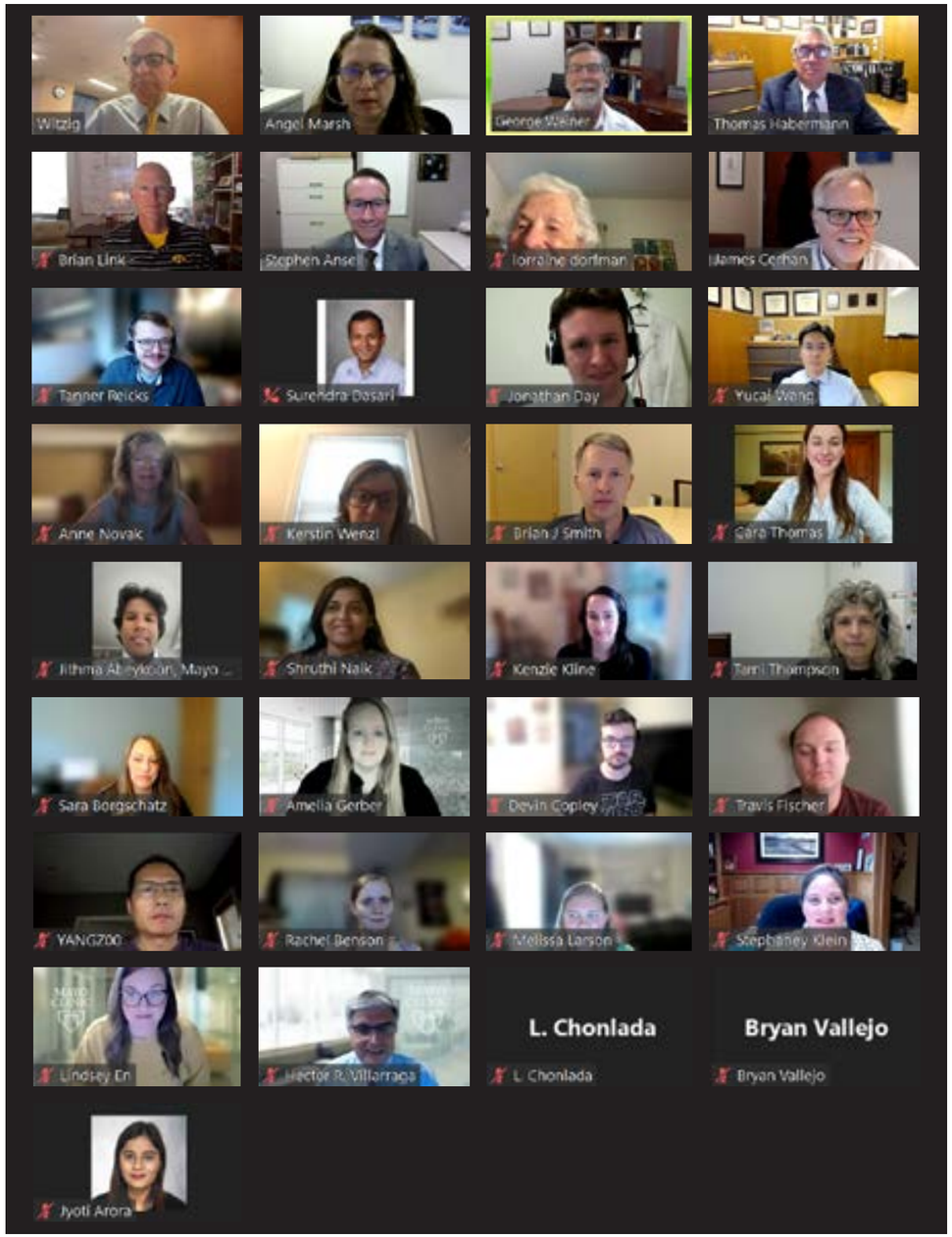
Yan H, Tian S, Kleinstern G, Wang Z, Lee JH, Boddicker NJ, Cerhan JR, Kay NE, Braggio E, Slager SL. Chronic lymphocytic leukemia (CLL) risk is mediated by multiple enhancer variants within CLL risk loci Hum Mol Genet 2020

We want to express our sincere appreciation to you for participating in this study, and for being willing to share your information and samples. We realize that at the time we approach you in the clinic/hospital to participate in the study, you have many decisions to make and a lot of information coming at you. It is only through your participation and generosity that we are able to study new aspects of these diseases and publish our results, such as in the examples below. If you have questions related to this research project, please feel free to contact us at: Mayo Clinic 800-610-7093 or University of Iowa 800-237-1225.

IOWA AND MAYO

SPORE researchers, providers, staff, trainees, and patient advocates meet every month by Zoom to discuss research results and how they can be applied to help Lymphoma patients.



CONTACT US

MAYO CLINIC 800-610-7093

UNIVERSITY OF IOWA 800-237-1225