



The Lymphoma and Multiple Myeloma Center



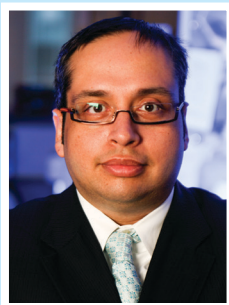
We provide multidisciplinary treatment for **optimal survival and quality of life** for patients with all types and stages of lymphoma, chronic lymphocytic leukemia, multiple myeloma and other plasma cell disorders.

What Sets Us Apart

- **Experienced, nationally and internationally recognized physicians** dedicated exclusively to treating patients with lymphoid or plasma cell malignancies
- **Cellular therapies** such as Chimeric Antigen T-Cell (CAR T) therapy for relapsed/refractory disease
- **Specialized diagnostic laboratories**—flow cytometry, cytogenetics, and molecular diagnostic facilities—focusing on the latest testing that identifies patients with high-risk lymphoid malignancies or plasma cell dyscrasias, which require more aggressive treatment
- **Novel targeted therapies or intensified regimens** based on the cancer's genetic and molecular profile
- **Transplant & Cellular Therapy** program ranked among the top 10% nationally in patient outcomes for allogeneic transplant
- **Clinical trials** that offer tomorrow's treatments today



We want to give every patient their very best chance for cure, and that means choosing the best and optimal front-line treatment.”



— Francisco J. Hernandez-Ilizaliturri, MD

Chief, Lymphoma Service and Head, Lymphoma Translational Research Laboratory



Roswell Park Pathology—Taking Diagnosis to a New Level

Lymphoma and myeloma are a diverse and heterogeneous group of malignancies. Lymphoid malignancy classification currently includes nearly 60 different variants, each with distinct pathophysiology, clinical behavior, response to treatment and prognosis.

Our diagnostic approach in hematopathology includes the comprehensive examination of lymph node, bone marrow, blood and other extranodal and extramedullary tissue samples, and integrates clinical and diagnostic information, using a complex array of diagnostics from the following support laboratories:

- **Bone marrow laboratory**
- **Immunohistochemistry laboratory** with wide array of markers available
- **Flow & Image Cytometry laboratory** with spectrum of marker panels to characterize hematolymphoid neoplasms immunophenotypically
- **Cytogenetic laboratory** with karyotypic analysis and large number of fluorescence in situ hybridization (FISH) probes for many types of genetic abnormalities
- **Molecular diagnostic laboratory** with polymerase chain reaction (PCR) and next-generation sequencing

Our board-certified hematopathologists work closely with our medical oncologists, surgical oncologists and interventional radiologists in order to get adequate and appropriate diagnostic tissue for these essential studies upon which subsequent patient care decisions and outcomes rest.

Our functional imaging capabilities guide determination of when it's appropriate to go the extra mile to intensify treatment at a time when long-term survival and cure is possible."

— Dominick Lamonica, MD
Director of Nuclear Medicine



Prognosis is Part of Treatment Planning

Predicting outcomes guides early treatment decisions

Choosing a patient's treatment requires cutting-edge technology and a high-level of expertise to assess all the data—the pathology, radiology, staging, symptoms and laboratory values—to conclude whether the patient will do well with standard therapy or needs more aggressive treatment—from the start.

Functional imaging expertise provides key data

Roswell Park specialists use metabolic imaging for determining tumor stage and grading disease activity, with particular attention to directing therapy and gauging treatment response in patients with lymphomas and myelomas.

Metabolic imaging studies we offer:

- 18F-FDG_PET/CT
- 18F-Na_PET/CT

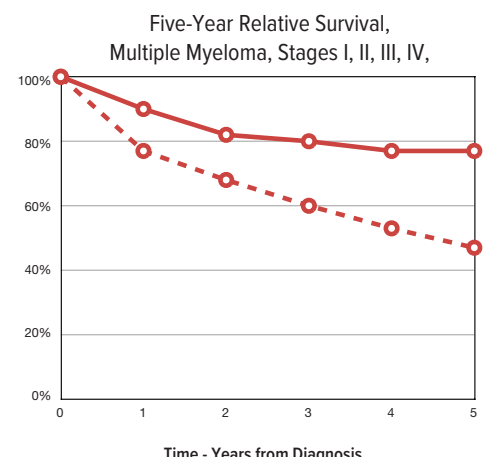
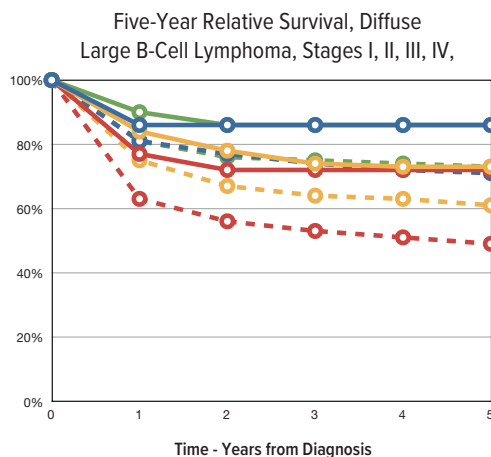
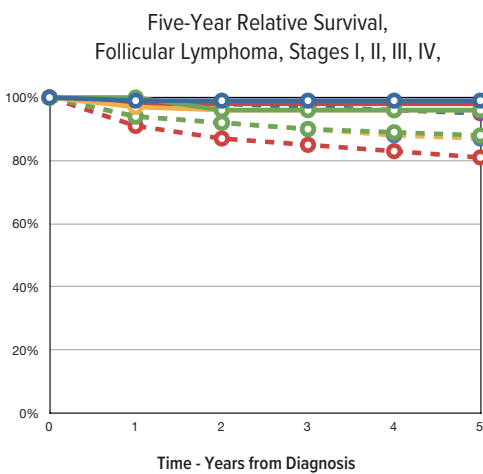
Our **risk stratification data** leads to a prediction of approximately 10% of DLBCL patients unable to achieve complete remission with front-line chemotherapy-immunotherapy. We tailor a more aggressive approach for these patients, including those with the following variants:

- Primary mediastinal DLBCL
- Double-hit DLBCL (patients harboring both Bcl-2 and 2-Myc gene rearrangements)
- High Ki-67 proliferation index
- Mantle cell lymphoma
- High risk chronic lymphocytic leukemia (i.e. deletion 17p)
- "Slow" responders based on functional imaging

Our Patient Outcomes

Roswell Park data has been benchmarked against data collected by Surveillance, Epidemiology, and End Results. The SEER program of the NCI collects and provides information on cancer incidence, prevalence, mortality and survival from population-based cancer registries and represents 28% of the U.S. population. Data for this publication were available from 1975-2013.

CASES DIAGNOSED (2006-2013)



ROSWELL — Stage I — Stage II — Stage III — Stage IV
SEER — - - Stage I - - - Stage II - - - Stage III - - - Stage IV

Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases Nov 2015 Sub (1973-2013 varying) - Linked To County Attributes - Total U.S., 1969-2014 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2016, based on the November 2015 submission. Accessed February 8, 2017



Personalized Medicine at Roswell Park



Targeting treatment to each patient

The ability to examine tumor tissue at the molecular level and distinguish its unique characteristics, proteins, pathways, chromosomal arrangements or other features, combined with the advent of therapies that target those characteristics, has revolutionized the approach to lymphoma and myeloma—everything from pathology and staging to treatment planning and prognosis.

With this better understanding of lymphoid neoplasms, our advanced technologies in immunophenotyping and cytogenetic studies, and our functional imaging capabilities, our **Lymphoma and Myeloma team is able to:**

- **Deliver a more precise diagnosis and staging**
- **Identify and validate clinically-based score indices or biomarkers**
- **Predict clinical outcomes and/or response to therapy**
- **Develop and incorporate novel and effective agents, such as monoclonal antibodies, drug conjugates, proteasome inhibitors and immunomodulatory drugs**
- **Identify earlier in the disease course, those patients that need aggressive therapy, novel agents or cellular strategies such as bone marrow or stem cell transplant.**

While chemotherapy remains a component of treatment, by determining the cancer's molecular profile, we can add or substitute targeted therapies that attack certain critical proteins, pathways or molecules in that specific lymphoma or myeloma, offering patients treatments that are more effective against the cancer, less toxic, and pose fewer side effects than standard chemotherapy regimens. Other medical therapeutic approaches include:

- **Monoclonal antibodies**, such as Rituximab for B-cell lymphomas, chronic lymphocytic leukemia and related disease; and Daratumumab and Elotuzumab for myeloma.
- **Next generation monoclonal antibodies**, such as a newly approved anti-CD30 drug conjugate. Roswell Park researchers are currently developing anti-CD19 and anti-CD22 agents.
- **Immunotherapy approaches**. Boosting the body's immune system to attack the cancer cells using immunomodulatory agents such as interferon, lenalidomide, pomalidomide or novel vaccines.
- **Epigenetic therapies** such as panobinostat.

The Roswell Park Advantage

The challenge with lymphomas and myelomas is to choose the appropriate combination of therapies for each individual patient—a choice based on sound, logical evidence.

As a comprehensive cancer center intimately involved in the research and development of these therapies—and determining how best to optimize their benefits—Roswell Park is uniquely equipped to meet that need for each patient.

The Way Forward

Translational research program brings new therapeutics to patients

Despite improved clinical outcomes of lymphoma and myeloma patients over the last decades, a significant number of patients fail to respond to initial treatment (primary refractory disease) or relapse after a remission period. In several histological subtypes such as follicular lymphoma, mantle cell lymphoma, T-cell lymphoma, chronic lymphocytic leukemia, and multiple myeloma, the need for curative therapies remains urgent.

Our research focuses on

- **Developing novel diagnostic tools** to better understand disease biology in myeloma
- **Improving the biological activity of monoclonal antibodies** against B-cell lymphoma
- **Overcoming rituximab-chemotherapy resistance** in B-cell lymphoma
- **Evaluating novel small molecule inhibitors** targeting key regulatory pathways in lymphomas
- **Identifying biomarkers** for response to treatment in patients with myeloma and B-cell lymphoma
- **Discovering new targets or pathways** to shut down multiple myeloma at the molecular level
- **Understanding the bone marrow environment's supporting role** in the growth of multiple myeloma and finding ways to disable that support
- **Determining the best timing and approach** for eligible patients to undergo blood and marrow transplant (BMT)
- **Investigating spatial and temporal clonal heterogeneity** to improve diagnostics and treatment in multiple myeloma
- **Exploring ways to assess and improve** quality of life

New markers to assess response

As treatment options for patients with lymphomas and related neoplasms become more diverse and complex, it's imperative to **identify and validate biomarkers to select, assess and predict response** to a given specific therapy. To date, we have investigated the following predictive markers:

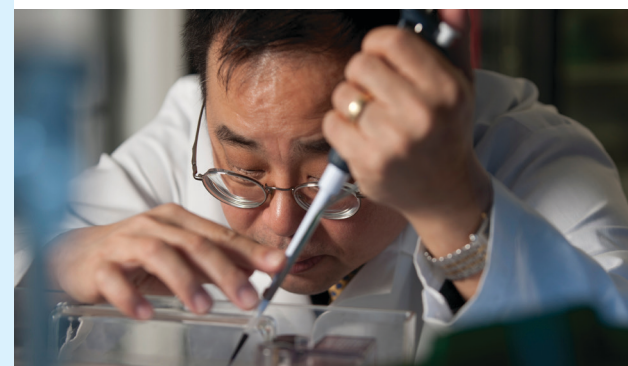
- Using Han's algorithm to identify patients with relapsed/refractory DLBCL most likely to benefit from lenalidomide-based therapy
- MUM-1 expression in patients with newly diagnosed DLBCL, treated with chemo-immunotherapy
- Prognostic predictive value of functional imaging at the time of initial diagnosis in outcomes of patients with follicular lymphoma
- CD5 expression as biomarker of clinical outcome in patients with newly diagnosed mantle cell lymphoma (MCL)
- Incorporating intensified treatments in double hit DLBCL

New Hope for Multiple Myeloma

Roswell Park researchers were among the first to recognize the potential for attacking multiple myeloma by disrupting the microenvironment that nurtures myeloma cells.

With a better understanding of the interaction between myeloma cells and the bone marrow environment, we aim to develop a way to stop myeloma cells — not directly, but through the soil in which they grow.

Kelvin Lee, MD, Chair of the Department of Immunology and The Jacobs Family Chair in Immunology, led a team that provided the first evidence that the cell surface receptor CD28 is absolutely necessary for myeloma cells to survive. Our investigators are now studying novel treatment strategies that block the interaction between the CD28 receptor on multiple myeloma cells and the cells in the bone marrow microenvironment that help the cells grow. **The goal—to kill cancerous plasma cells and make the remaining cells more vulnerable to chemotherapy.**



Dr. Lee is working on a vaccine for multiple myeloma, using novel vaccines developed and clinically tested by **Roswell Park's Center for Immunotherapy**. The vaccines are combined with small-molecule drugs that wake up the immune system to recognize myeloma cells as harmful and destroy them.

Radiotherapy Approaches

While functional imaging helps us to identify which patients could omit radiation therapy, a significant number of Hodgkin's lymphoma and DLBCL patients may require consolidation therapy following front-line or second-line chemotherapy. Roswell Park uses the following radiotherapy techniques for patients with lymphomas:



Involved field radiation therapy (IF-XRT) is used for consolidation therapy to target the site of any involved organs or lymph nodes. Because these nodes have generally been removed, determining the appropriate treatment field requires CT-based simulation and planning capabilities, PET and MRI.

External beam radiation therapy for selected patients with central nervous system (CNS) lymphoma who are not suitable for intense chemotherapy

Total skin radiation for patients with cutaneous T-cell lymphoma

Gamma Knife for selected patients with primary CNS lymphoma



Transplant & Cellular Therapy Center

Roswell Park's high-volume **Transplant & Cellular Therapy Center** performs approximately 160 transplants each year to treat patients with Hodgkin and non-Hodgkin lymphoma, multiple myeloma, acute and chronic leukemia, selected solid tumors and other malignant and non-malignant hematologic disorders.

Our center can accommodate more than 30 transplant inpatients at one time. Private patient rooms are HEPA-filtered to maintain protection against airborne pathogens and our nursing staff is specially trained in managing immune-compromised patients. We offer a range of transplant and cellular therapies, including:

- **Autologous transplant** using patient's bone marrow and peripheral blood as hematopoietic stem cell source
- **Chimeric Antigen T-cell (CAR T) Therapy** for relapsed/refractory B cell malignancies.
- **Allogeneic transplant** using donor bone marrow, peripheral blood or cord blood
- **Reduced intensity and non-myeloablative transplant**
- **On-site blood and marrow collection** and processing in dedicated apheresis unit and hematopoietic stem cell processing laboratory
- **Ongoing evaluation and monitoring** through entire continuum of care related to transplant

Roswell Park is recognized by the Center for International Blood and Marrow Transplant Research for achieving better-than-predicted outcomes for patients receiving allogeneic transplants.

Roswell Park is designated a Blue Distinction Center® by BlueCross BlueShield for Transplant, based on superior measures for patient safety and outcomes.



Supportive Care

[At Roswell Park, we treat
the whole patient,
not just the cancer]

Clinical Pharmacy Support

Clinical pharmacy specialists play a key role in a patient's cancer care in both inpatient and outpatient settings. Two clinical pharmacists dedicated to the Lymphoma/Myeloma program work closely with the physicians, nurse practitioners and physician assistants to optimize each patient's pharmacological treatments.

Our pharmacy specialists provide:

- **Monitoring** of all therapeutic drugs for the patient
- **One-on-one education** for patients starting chemotherapy or changing drugs in their regimen
- **Recommendations** for growth factor support, antiemetics, pain control, renal and hepatic insufficiencies, and other supportive care issues
- **Medication review** and patient **discharge counseling**

Most patients and families don't have the knowledge or time to prepare for the demands of a cancer journey, which may involve a hospital stay or home care needs. While the services provided through the departments of **Social Work** and **Supportive & Palliative Care** are beneficial to many cancer patients, they are often essential for those with lymphoma and myeloma diagnoses, and include:

- Educational programs about the cancer and its treatment
- Assistance with FMLA, sick leave and disability processes
- Arrangement of lodging, transportation or language/interpreter needs
- Linkage with programs and other community resources
- Counseling and support groups for patients and caregivers
- Assistance with advance care planning, palliative care, and/or hospice referrals as needed
- Nutrition counseling and tobacco cessation program
- Home care needs
- Young Adult (YA) program offering workshops, social events and supportive care to address unique needs of our younger cancer patients

Our new Rehabilitation Center helps lymphoma and myeloma patients regain strength and mobility and relieve symptoms such as pain and neuropathy.



Meet the Team



Medical Oncology

- 1 Francisco J. Hernandez-Ilizaliturri, MD
Chief, Lymphoma
- 2 Jens Hillengass, MD, Chief, Myeloma
- 3 Kelvin Lee, MD
- 4 Philip McCarthy, MD
- 5 Sadat Ozair, MD
- 6 Suchitra Sundaram, MD
- 7 Pallawi Torika, MD

Pathology

- 8 Bora Baysal, MD, PhD
- 9 Antonios Papanicolau-Sengos, MD, MS
- 10 Paul Wallace, PhD
- 11 Jerry Wong, MD, PhD

Cytogenetics

- 12 AnneMarie Block, PhD
- 13 Sheila Jani Sait, PhD

Radiation Oncology

- 14 Dheerendra Prasad, MD, MCh, FACRO
- 15 Anurag Singh, MD

Nuclear Medicine

- 16 Dominick Lamonica, MD

Clinical Pharmacy

- 17 Ryan Hare, PharmD
- 18 Eugene Przespolewski, PharmD

Refer a Patient

Call us today to discuss a case, confirm a diagnosis or refer a patient, **716-845-RPMD** or 716-845-7763

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Isosceles Garbes, MD
Yasar Shad, MD

Roswell Park Jamestown
Jairus Ibabao, MD

Roswell Park Niagara
Bhavana Ramkumar, MD

Your patient may prefer to receive cancer care closer to home at one of Roswell Park's community practices at these convenient locations.

Elm & Carlton Streets | Buffalo, New York 14263

www.RoswellPark.org/rpmd

716-845-RPMD (716-845-7763)