Hôpital général juif
Jewish General Hospital

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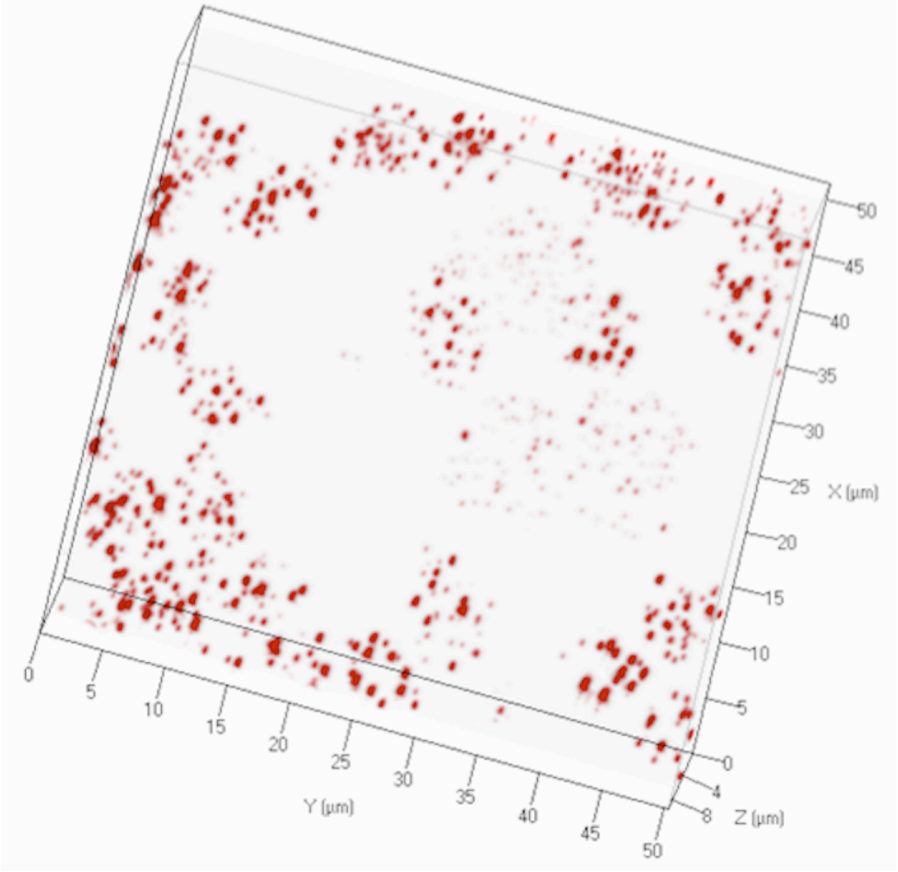

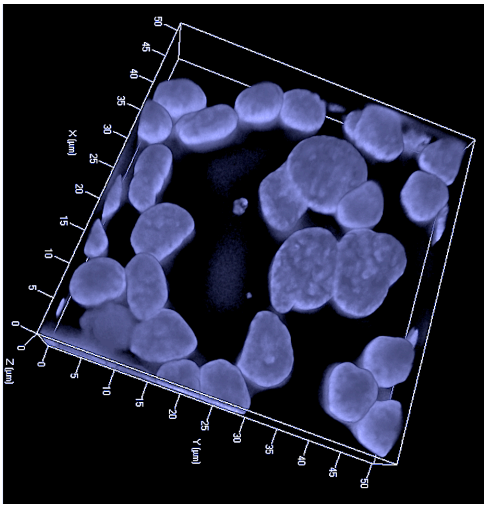

Annual Report
Division of Hematology
Department of Medicine - Jewish General Hospital
January 1 - December 31, 2016

SUMMARY

General Considerations

The Division of Hematology is an integral part of the Department of Medicine at the Jewish General Hospital and we are proud of it. In times where budgetary restrictions and shortening of grant money are major issues a coherent team animated by the "esprit d'équipe" is the only way to guarantee first class patient care, excellence in clinical teaching and cutting-edge research. This tripartite mission has been in the center of our Hematology Division over the past years and will not change in the future, whatever adversities may emerge. Over the past year all our nurses, laboratory technicians, administrative agents and staff physicians, all have worked even more intensely in order to achieve these standards. And we achieved them successfully and will continue to progress.

Our 8 Clinical Programs (Stem Cell Transplant Program, Hematology-Oncology Clinic/Segal Cancer Center, CML Clinic, MPN Clinic, MDS Clinic, Gaucher Clinic, Anti-Coagulant Clinic, and Benign Outpatient Clinic), backed-up by up to date clinical and molecular hematopathology, flow-cytometry and hemostasis laboratories, are straightforward and guarantee timely high standard patient care. It is mandatory that these laboratories remain located at the Jewish General Hospital in order to allow treatments when rapid therapeutic interventions are life saving.

A special thank goes to Dr. Arthur Rosenberg, who retired September 30st shortly after his 80st birthday after having offered 49 years of dedicated service to thousands of thankful patients. Dr. Rosenberg is a brilliant Hematologist who headed our Division for 22 years. He and his successor for 17 years, Dr. Steven Caplan, are at the origin of our modern, complete, nationally and internationally respected Hematology Division. Dr. Rosenberg initiated already in 1982 by private money donations Palliative Care at the JGH and again he and Dr. Caplan were in 1991 at the origin of the Molecular Pathology Laboratory.

1. Clinical programs

Autologous Stem Cell Transplant Program

The Jewish General Hospital's Hematology Autologous Stem Cell Transplant (ASCT) Program, headed by Dr. Martin Gyger, is an essential component of the McGill Bone Marrow Transplant Program. The excellence of this program was again Canada wide recognized in November 2016, when Tiziana Vadacchino, our Transplant Coordinator and Stem Cell Nurse Clinician for more than 13 years, was honoured by the Myeloma Canada Marion State Memorial Nursing Award. This award is presented annualy to a Canadian nurse who has demonstrated distinction and leadership in the care of multiple myeloma patients. The JGH is an approved center for the performance of ASCT by an official letter from the Ministry of Health (March 23, 2007). A total of 43 autologous stem cell transplants have been performed in 2016: 22 (51%) ASCTs for multiple myeloma (MM), 18 of these were done in the cost saving outpatient approach, 10 for diffuse large B-cell lymphoma (DLBCL), 6 for Hodgkin's lymphoma (HL), each 2 for mantle cell lymphoma (MCL) and follicular lymphoma (FL) and 1 for marginal cell lymphoma. This approach, i.e. increasing the number of ASCTs but in parallel lowering the total costs, was imprevisibly counteracted by a price explosion for Carmustine (BCNU) due to the monopoly of one pharmaceutical company. The price for one Carmustine vial increased from $ 1785.- in 2015

to $ 4965.- in 2016. Thus, for an average patient the expenses for the BEAM conditioning regimen increased to $ 28749.- Knowing that the costs of the additiaonal 3 medications of the BEAM regimen acccount for only $ 1787.-, this unpredictable increase of the conditioning regimen expenses was due to Carmustine (BCNU). Our patients had to be transplanted for life saving purpose and there was never a doubt not to proceed. We early started to look for a less expensive conditioning regimen. From January 2017 onwards the BEAM regimen is replaced by the much less costly high dose Etoposide-Melphalan (VP-16/Mel) regimen. However, by this conditioning regimen an increased risk of infectious complications is to expect.

Hematology-Oncology Clinic/Segal Cancer Center

The continued redirection of many patients from outside the 514 area code to hospitals located near to their place of residence stabilized the number of patient visits at the hematology-oncology division of the Segal Cancer Center in 2016. We were still very busy with a total of 9553 patient visits (2015: 9595 patient visits, i.e. a difference of 0.4%). Currently there are 15 Clinical Hematology Research Trials offering patients with aggressive disease new hope. Most trials recruit patients with multiple relapses, relapse post ASCT or primary refractory hematologic cancers. Three trials are phase I studies, four phase I/II, four phase II, and four trials phase III studies. Five trials are in the field of acute leukemia (AML four, ALL one), one in chronic myeloid leukemia (CML), one in chronic lymphatic leukemia (B-CLL), two in Non-Hodgkin's lymphoma (NHL), one in classical Hodgkin's lymphoma (cHL), one in Myelodysplastic Syndrome (MDS), two in Myeloproliferative Neoplasia/Myelofibrosis (MPN/MF), and two in light chain amyloidosis (AL). This year 29 patients have been successfully included. The number of patients having been evaluated is much higher since the inclusion criteria are often very rigorous. These trials offer powerful new treatments without any financial burden for the public health system, help the hospital to save money and positively impact of the JGHs' reputation. There is a deep satisfaction for the patient and the treating physician to realize that there is again a remission for a lymphoma after the six relapses, the last one occuring 19 years after the initial diagnosis.

CML Clinic

The CML clinic has been started in 2004 and since than an exemplary follow-up of the patients has been documented. The patients are seen either by Dr. Sarit Assouline, head of the Clinic, or Dr. Jaroslav Prchal. Both MDs are assisted 2 days a week by a CML nurse who has frequent contact with patients during clinic visits and is available for telephone calls. This is primordial in a disease where compliance and proper patient monitoring ensure good outcomes for now more than a decade. The CML Clinic at the JGH is integrated in the Groupe Québecois sur la recherche en leucémie myéloide chronique (GQR-LMC) and strictly adheres to their guidelines based on the European Leukemia Net (ELN) guidelines. The CML Clinic is very active in clinical research and participates at national and international studies. The results of an international randomized study with participation of the Clinic, comparing Pomatinib versus Imatinib for newly diagnosed CML, have recently been published in *Lancet Oncology*.

Myeloproliferative Neoplasia (MPN) Clinic

In 2016, the MPN clinic, co-directed by Drs. Jaroslav Prchal and Shireen Sirhan, has included 40 new patients and performed a total of 439 patient follow-ups. Both physicians as members of the Canadian MPN group participated in the publication of recommendations for laboratory investigation of MPNs *(Am J Clin Pathol. 2016, 146:408-22)*. Currently the clinic offers a phase I dose-escalation study (PIM447) for patients with primary myelofibrosis and a randomized, single-blind phase II trial (Imetelstat) for myelofibrosis patients refractory to JAK inhibitors. The MPN

Clinic, -like the CML Clinic-, offers an ideal teaching environment for Hematology-, Radiation-Oncology-, and Oncology Fellows.

Myelodysplastic Syndrome Clinic (MDS) Clinic
This nationally recognized teaching program is in its fourth year and is headed by Dr. April Shamy. The MDS Clinic participated in a prospective Canadian study analyzing the impact of patient-related factors on overall survival in patients with MDS. These interesting results have been published this year in the *British Journal of Haematology* (2016,174:88-101). MDS is mainly a disease of the elderly and thus, the frailty of the patients has also to be taken in consideration in a treatment approach. Due to demographic changes (the life expectancy is still increasing) an ever increasing accrual of patients is predictable. Despite of financial constraints additional nursing support in order to guarantee optimal patient management in the near future is mandatory. Like the other specialized Clinics, the MDS Clinic offers excellent clinical training opportunities to hematology residents and interested medical students.

Gaucher Clinic
For the past 19 years, this specialized program has been mandated by the government of Québec and includes >30 patients with this rare storage disease. The increase in patients corresponds to the transfer of pediatric patients from Hôpital Sainte-Justine when they reach adulthood. Dr. Sarit Assouline is responsible for the treatment of these adult patients. The highly specialized treatment program for patients with Gaucher's disease includes established relationships with designated specialists, a research nurse, and a pharmacist for assistance with the dispensation of medication with its side effects, as well as a Gaucher's disease website in order to ensure optimal patient care. The patient satisfaction in this Clinic is very high, as evidenced by spontaneous testimony of patients followed for a long time.

Anticoagulantion Clinic
The anticoagulation clinic is organized and supervised by the director, Dr. Mark Blostein and has successfully passed the first year of paperless functioning. This seamless transition to a fully computerized service has been minutely orchestrated by Drs. Blostein and MacNamara already from 2014 onwards. The AC Clinic is much appreciated by residents, inhouse fellows and visiting fellows from other university and community hospitals rotating through a Thrombosis elective and coagulation teaching prior their return as future staff physicians. The high standing of the AC Clinic as a teaching facility for future internists is Québec and Canada wide accepted. In order to integrate the increasing use of the new oral anticoagulants (NOACs), expertise in the management of these drugs has become an additional aim of the Clinic. Indeed, with raised funds from the pharmaceutical industry Dr. Blostein is on the way to start a New Oral Anticoagulant Clinic.
The AC Clinic represents a cornerstone in the optimal functioning of many surgical and medical services of the JGH. This issue has to be considered in the planning and introductory phase of *Optilab*. The close vicinity to the hematology and hemostasis laboratory guarantees a short turnaround time of coagulation tests for life threatening bleeding situations, perioperative management for surgical procedures, endoscopies, dental extractions, and other invasive procedures where quick clinical decisions are mandatory. Thus, the hemostasis laboratory and the AC Clinic have to remain in the same place in order to deliver optimal patient care.
The anticoagulation clinic is an integral part of the nationally and internationally recognized Centre for Thrombosis and Anticoagulation Care (headed by Dr. Susan Kahn) and collaborates with VECTOR, a consortium of Thrombosis/Anticoagulation Researchers across Eastern Canada. In 2015 Dr. Kahn had been nominated Principal Investigator of a 5 years' 5.2 million dollar VECTOR project emphasizing the outstanding quality of anticoagulation/thrombosis research at

the JGH. This year again the AC Clinic participated in a *New England Journal of Medicine* publication and a McGill Hematology fellow was first author of a multicenter prospective study concerning risk factors and treatment of unusual site thrombosis published in *Thromb Res.*

Benign Outpatient Clinic

Most hematologists and all hematology fellows participate in the benign hematology clinic the most involved still Dr. Arthur Rosenberg until his retirement September 30 this year. To guarantee a seamless transition of Dr. Rosenberg's numerous patients, -followed over many years-, to other physicians and to cope with a considerable accrual of Consultations, we were happy to get a 3 months' limited temporary appointment of Dr. Lissa Ajjamada, an excellent young McGill trained Hematologist. Dr. Ajjamada integrated immediately in our team and was highly appreciated by patients, nurses and staff doctors. Again, like other clinics the benign outpatient clinic had to redirect many patients with residence outside the 514 area code towards outbound Hematologists. The Benign Hematology clinic is very interactive with primary care physicians and specialized Clinics of the entire McGill Hematology Division. Patients with severe or combined hereditary red cell disorders are rapidly redirected to the specialized Clinic at RVH. Malignant hematologic diseases are picked up at an early stage when patients present with thrombocytosis or or polyglobulia and are transferred to our specialized MPN clinic at the JGH. Especially in young women severe iron deficiency anemia is still frequently identified and the diagnosis of monoclonal gammopathy of unknown significance (MGUS) is frequent in the elderly patient.

Molecular Diagnostics Laboratory

The molecular diagnostics laboratory is located in the 6th floor of the Segal Cancer Center and is run by Yuri Monczak, Ph.D., and Tina Haliotis, MD, Ph.D., both associate members of the Division of Hematology. This facility represents a cornerstone for our clinical programs and serves as the referral laboratory for molecular diagnostics for the entire McGill hematology university network. Despite financial and personal restrictions a stepwise change to Next-Generation-Sequencing (NGS) was successfully initiated in 2016. In particular, immunoglobulin heavy chain variable (IGHV) gene sequencing to detect somatic hypermutation within the IGHV gene region was transferred to the NGS platform. This test is important for prognosis and clinical management of chronic lymphocytic leukemia. NGS will also soon be applied in acute myeloid leukemia (AML) since the validation of the AML panel by this method (NGS) was successfully terminated end of 2016.

The introduction of a new pathology resident rotation program in 2016, -much appreciated by the Pathology residents-, brings them in closer contact with new molecular methods and allows them a deeper understanding of molecular hematopathology and translational research in the field of acute leukemia and multiple myeloma.

2. Research and publications

Dr. Sarit Assouline, in the second year of her FRSQ Junior 2 award, is director of Clinical Research in Hematology-Oncology and associate director of the Clinical Research Unit. She continues to lead a strong Clinical Research Program in leukemia and lymphoma. Currently she acts as PI in 4 clinical AML trials as follows: i) Phase I dose escalation study of AEB1102 in patients with R/R AML or MDS patients refractory to hypomethylating agents. ii) Phase Ib/II study of GS-9973 monotherapy and in combination with chemotherapy in AML. iii) Phase Ib/II multi-arm study with venetoclax in combination with cobimetinib and venetoclax in combination with idasanutlin in patients aged > 60 years with R/R AML, not eligible for cytotoxic therapy. iv)

Phase II multi-center, open label, randomized study of ribavirin and hedgehog inhibitor with or without decitabine in AML. She is also PI of a phase Ib open-label, dose escalation and expansion study evaluating the safety and efficacy of GS-9973 with vincristine and dexamethasone in adults with R/R ALL. In the NHL field she participates in a phase I/II study of E7438 as single agent in patients with B-NHL. During 2016, Dr. Assouline was involved in 9 peer reviewed published manuscripts, in two of them as a first author *(Blood with Editorial, Lancet Oncology)*.

Dr. Mark Blostein is director of the Clinical Investigator Program at McGill University, head of the Anticoagulation Clinic and Associate Chief of the Division of Hematology. Under his guidance the Clinical Investigator Program received in 2015 accreditation from the Royal College of Physicians of Canada (RCPC) for the first time since 20 years. This accreditation is the result of his longstanding, excellent performance as an academic teacher, researcher and clinician. 2016 was the first year of the AC Clinic as a paperless service. This substantial improvement is much appreciated by the participating Hematology staff physicians, the rotating residents and fellows, as well as by visiting staff physicians from other university hospitals. Dr. Blostein is a site-investigator in 5 Clinical trials as follows: i) Clinical Trial for Perioperative management of warfarin. Funded by CIHR. ii) Annexa-4. Clinical Trial examining the use of a Reversal agent for the New Oral Anticoagulant Factor Xa inhibitors (only site in Quebec and one of two in Canada). iii) REVERSA-AD. Clinical Trial examining the use of a Reversal agent for the New Oral Anticoagulant Dabigatran (only site in Quebec and one of two in Canada). iv) Clinical Trial for Perioperative management of ITP. v) PAUSE, a CIHR funded clinical trial that uses a standardized protocol for the peri-procedural management for all three novel anticoagulants. Dr. Blostein was involved in 4 peer reviewed published manuscripts.

Dr. Stephen Caplan, director of the Blood Bank, is a major contributor to the Clinical Research programs and a highly appreciated adviser for fellows and younger physicians in our Division for clinical problem solving and academic carrier planning. Under his lead the JGH Blood Bank got the definite accreditation of Health Canada during the inspection of November 8-10, 2016. His long standing experience as former Chief of Hematology (17 years) is also a source of advice for the Division Director. Dr. Caplan acts as a coordinator and major contributor of the Canadian Paroxysmal Nocturnal Hemoglobinuria (PNH) Network and the Global PNH registry. He is currently involved in two clinical trials with new agents for PNH. He was senior author of one peer-reviewed manuscript identifiying a new therapeutic indication of Eculizumab in severe complement mediated AIHA.

Dr. Chantal Cassis has introduced a research mentorship program for residents to increase resident research productivity. This is an essential prerequisite to increase a targeted research activity of our fellows.

Dr. Martin Gyger, director of the ASCT program and Apheresis Clinic is a major contributor to the Clinical Research programs. Two abstracts of protocol studies dealing with multiple myeloma where Dr. Gyger participated as the local site PI have been presented at ASH 2016 and the results of his study of high dose cyclophosphamide in refractory MM will be presented at CCOLD this spring by Dr. Anna Nikonova, former Hematology resident. Dr. Gyger is PI of a promising clinical trial for light chain amyloidosis (AL) with NEOD001, a monoclonal antibody that targets specifically circulating and accumulated light chain amyloid.

Dr. Nathalie Johnson heads a productive basic science laboratory with a research program focused on the molecular pathogenesis DLBCL and cHL. She also directs the Hematology Flow-

Cytometry Laboratory at the JGH. Under her leadership this facility progressed over the past three years to a cutting-edge diagnostic tool for tailored therapies. In 12 months a total of 2341 blood, bone marrow, lymph node and body fluid samples has been analyzed, i.e. 50/week. 415 samples have been investigated for the possibility of acute leukemia. The acute leukemia panels are mandatory and have to be run immediately by specialized technicians interacting with the staff physician in charge since live-saving therapeutic decisions depend on these results. Out-sorting of the Flow-Cytometry to another hospital in the setting of *Optilab* would be deleterious for many patients, our Hematology Division and several outbound hospitals, which appreciate our quick diagnostic services.
In 2016 Dr. Johnson acted as PI of four grants. End of 2015 she was awarded a 2 years' Canadian Cancer Society Research Institute (CCSRI) grant entitled *"Optimizing Therapy for STAT6-mutated DLBCL"*, and in 2016 a 2 years' grant entitled "*Determining apoptotic blocks in primary lymphoma samples"*. 2016 was the last year of her grant entitled "*Overcoming therapeutic resistance in lymphoma".* She furthermore is co-investigator in four grants dealing with the molecular pathogenesis of lymphoma. Amongst them the study of the PD-1 inhibitor Pembrolizumab in relapsed or refractory cHL is of particular importance. Until today 10 patients have been enrolled. Two further studies assess the efficiency of combined immunotherapy (Nivolumab and Brentuximab/Vedotin) in relapsed/refractory NHL with CD30 expression, and the efficiency of Pembrolizumab versus Brentuximab/Vedotin in relapsed/refractory cHL, respectively. This year Dr. Johnsons' sustained advances in lymphoma research were recognized through the invitation by *Blood* to publish a review dealing with *myc* and *bcl2* and/or *bcl6* rearrangements.

Dr. Hans Knecht, in his third year at the JGH, continued his basic and translational research in the 3D molecular pathogenesis of cHL in collaboration Professor Sabine Mai, PhD, Director of the Genomic Center for Cancer Research and Detection (GCCRD) at the University of Manitoba, and with Drs. Johnson and Haliotis at the JGH. Their nano-morphology results of the 3D interaction of telomeres and telomere related factor 2 (TRF2) in primary Hodgkin and Reed-Sternberg cells of EBV-associated Hodgkin's lymphoma get published this spring in *Laboratory Investigation*. Drs. Knecht and Mai were recently invited to publish this forefront 3D technology as a chapter in the Springer series *Methods Mol Biol.*

Dr. Yury Monczak is a key-player in the composition and introduction of the NGS-platform in molecular hematology. He obtained the INESS designation for MYD88 mutation testing and validated a commercial myeloid leukemia gene panel on the NGS plateform. His relentless efforts to keep molecular leukemia diagnostics at top level despite of budgetary constraints are much appreciated by the Hematology Division.

Dr. François Patenaude is a leading expert in novel therapeutic approaches for renal cell carcinoma and innovative immunotherapies in melanoma. Unfortunately, due to budgetary restrictions, the hospital administration was not willing to re-open the High Dose IL-2 program for metastatic renal cell carcinoma, a domain where Dr. Patenaude has the largest treating experience in Canada.

Dr. Arthur Rosenberg will be co-author of a particular lymphoma case report after having retired as a JGH Hematologist. This fact underscores his fascination and unrestricted passion for clinical research.

Dr. April Shamy participated as a co-author in a prospective MDS-CAN study published this year in the *British Journal of Haematology.*

3. Teaching and learning:

All doctors in the Division of Hematology participate in teaching activities, whether through the consultation service (Hematology and Thrombosis), clinics, Introduction to Internal Medicine, Senior Physician Rounds or Clinical Teaching Unit on K7, E-7, Academic half-day lectures, McGill Department of Medicine Research Day, and Hematology Laboratory. Particularities in teaching are listed as follows:

Dr. Sarit Assouline has been elected Osler Fellow in Hematology this year. This nomination rewards her relentless activity in clinical research including teaching of her 1st year class, rotating Hematology fellows and supervision of a post-doctoral research trainee (Dr. Adi Klil-Drori) in the Clinical Research Unit. She also acts as a mentor of Liya Roudaia, PhD, and 1st year Hematology fellow, and of a Medicine resident.

Dr. Mark Blostein shaped the Clinical Investigator Program (CIP) curriculum in its present form. This program, with an integrated Progress tracking module, continues to be popular and successful; since September 2016 it is also available for General Internal Medicine residents. Dr. Blostein taught Coagulation to Hematology fellows (10 hours a week for 8 weeks, i.e. 80 hours/year) and management of Coumadin/NOACs to residents rotating through the Anticoagulation clinic (4 hours/week, i.e. 160 hours/year). His research trainee supervision included 2 graduate students in Physiology (1 PhD, 1 Masters), 1 post-doctoral fellow in Experimental Medicine, and 1Internal Medicine resident.

Dr. Stephen Caplan coached a team composed of 2 senior-, 3 junior residents and 2 medical students as a Medicine Ward Attending on K7 for a 2 weeks' period. He participates at the outpatient clinics for Hematology-, Radiation/Oncology-, and Medical Oncology fellows with 200 hours per year.

Dr. Chantal Cassis, Program Director of the McGill University Teaching Program and Director of the Hematology Fellow Program accredited by the RCPC in February 2015, has accomplished substantial work to further improve the Hematology Residency program. In preparation of the internal accreditation of April 5th, 2017, all goals and objectives of all rotations in the Hematology program have been reviewed. In particular, Dr. Cassis has developed PGY-1/2 (post graduate year) specific expectations for all clinical rotations, new ITERS (In-Training Evaluation Reports) to reflect the changes in the goals and objectives, and a research mentorship program for residents to increase resident research productivity. These efforts have already been felt beneficial for the residents' Hematology rotations as well as the introduction of a Health advocacy course for Hematology residents. A further innovative teaching approach represents the participation of all Hematology residents in a quality improvement project. An excellent innovation is the monthly published 2-3 pages McGill Hematology Program Journal *"BOOD DROPS",* where all pertinent information concerning rotations, resident call on holiday periods, courses and seminars is timely covered. Over the past two years Dr. Cassis has substantially improved several program issues and this is most appreciated by all McGill Hematologists. We are still waiting for the proper Residents' room, though the planning including location of the room had been finished early in 2016. The delay in the realization of this mandatory project (RCPC duty) appears to be related to administrative problems. Dr. Cassis is very active in education and teaching. She gives about 2

formal lectures per year during the Hematology academic half-day, prepares, organizes and conducts the yearly McGill Hematology in-training exam which is composed of 3 parts (written, oral scenario and morphology), and teaches the TCP class "An approach to anemia" for the last 2 years at all 3 sites (JGH, MGH and Glen) for medical students. Dr. Chantal Cassis has well progressed in her Masters' degree in Medical Education and her graduation is scheduled for July 2017.

Dr. Martin Gyger who regularly has several patients hospitalized on K7, discusses these patients every day with the K7 team. Hematology, Hematology-Oncology and Radiation-Oncology fellows appreciate the clinical teaching they get in his busy myeloma clinic. He also spends many hours teaching the residents and Hematology fellows blood and bone marrow morphology and cytology at the microscope. His tremendous knowledge in this field is very helpful and most appreciated.

Dr. Nathalie Johnson has been actively involved in teaching students at the undergraduate and post-graduate levels at McGill (EXMD607B, 614, 635, and PHGY516 total of 13 hours), as well as in teaching of Hematology fellows during her 4 weeks of Consultation service. In addition to the clinical teaching mentioned above, she supervised two 3rd year Medical Biology and one 2rd year Medicine students. One PhD candidate of the McGill Experimental Medicine Program started in her laboratory a thesis entitled "*The role of FAS in lymphoma"*. Claudia Weaver, a post-doctoral fellow in her laboratory continued to study "*Relapsed and refractory Burkitt's lymphoma"* awarded by a transition grant from the Cole Foundation. Dr. Johnson participated in two PhD and one MSc committee meetings. Jointly with Drs. Patenaude and Knecht she was responsible for teaching Flow Cytometry to the Hematology fellows.

Dr. Hans Knecht was involved in teaching of two groups of second year McGill Medical students (Expert Physician Rounds, 2 x 2 hours) and of two 5th year European Medical students as well as of Hematology fellows on the microscope (8 hours). He does Fellow and Resident teaching regularly in the setting of the Hematology and the Thrombosis Consultation Service (6 weeks of each), participated in the formation of the Hematology Residents in Flow-Cytometry and gave a formal teaching session on CRISPR-Cas-Systems. Dr. Knecht holds still a minor appointment with the Department of Medicine at the CHUS where he supervises 1 Hematology Resident and 1 MSc student in her second year in Infectiology/Microbiology.

Dr. Yury Monczak implemented a new program for pathology resident rotations (case-based learning) at the JGH and acted as a lecturer at the McGill Academic half-day (3 hours) and during Hematology resident rotations (6 hours). He participated in the development of a graduate-level course in molecular biology (PBC6042) at the Université de Montréal where he also teaches molecular biology for undergraduates (40 hours). Again, he tought medical technology at the Dawson College (3h).

Dr. François Patenaude participates with 4x2 hours' for the second year in the successful course entitled "*Introduction to Oncology"* for 3rd year medical students at McGill. This course was initiated by Drs. Patenaude and Asselah in 2015 and closed a gap in the Internal Medicine Curriculum. This excellent initiative responds to the need to mediate basic oncology knowledge already during the formation of future MDs. Dr. Patenaude also teaches small groups of McGill residents (3-12 residents) on neo-adjuvant treatments for breast cancer, triple negative breast cancer, basic pathogenesis and targeted therapies in renal cell cancer, and staging and management of melanoma. He is regularly solicited by physicians from Rouyn-Noranda, Val

d'Or, and Amos for oncologic treatment advice.

Dr. April Shamy is director of the Clinical Teaching Unit (CTU) at K7 and acts as a role model for many young Internists in formation. Osler Fellow in Medicine since 2009, Dr. Shamy regularly teaches in the McGill physical exam course (20 hours/year) and rotates as an Inpatient Ward Attending on K7 for 2 weeks twice a year. The K7 team supervised includes 2 senior and 3 junior residents as well as 2 medical students. In January 2016 year Dr. Shamy orchestrated a seamless move from 7NW to K7 in the new hospital building.

4. Involvement in the community:

Dr. Sarit Assouline was an Abstract reviewer for the ASH 2016 meeting and a grant reviewer for FRSQ and CIHR. In 2016 she acted also as a session chair at ASH and as reviewer for *Blood, Cancer, and Leukemia & Lymphoma.* Dr. Assouline is also a member of the Chemotherapy Committee and the Research Ethics Board. She regularly participates at the Oncology Research Pharmacy meetings. In collaboration with Marie-Pascale Guay, BPharm, MSc, oncology pharmacist, she established this autumn the internal guidelines for the indications for use of rituximab in the treatment of B cell malignancies. Dr. Assouline was an invited speaker for the CCH-QC Conférence CARE sur l'Hématologie, Montréal, where she presented new treatment options for follicular lymphomas entitled *"Lignes directrices du lymphome folliculaire*".

Dr. Mark Blostein was an invited speaker at the JGH Department of Medicine Grand Rounds November 7th 2016, where he hold a lecture entitled "*What's new in Anticoagulation",* dealing with the NOACs and their antidots. On the same topic he hold presentations at the JGH Department of Anesthesia , at the Journée de Formation Interdisciplinaire du FMRQ, and at the Hotel Vogue. He reviewed articles for *Blood, Thrombosis & Hemostasis, Journal of Clinical Investigation, Thrombosis Research, The Journal of Thrombosis and Hemostasis, and PLOS One.*

Dr. Chantal Cassis has been elected as a member of the Rossy Cancer Networks' Cancer Quality Council.

Dr. Martin Gyger was the invited speaker for the second *Clinical Arthur Rosenberg Lecture* at the JGH in June 2016 entitled "Bone marrow transplantation in Québec: past, present and future". His unique clinical experience in allogeneic and autologous bone marrow transplantation including cutting-edge treatment of multiple myeloma results in frequent invitations for conferences at other hospitals including university clinics.

Dr. Nathalie Johnson was an invited speaker at the McGill University-Department of Medicine Research Symposium, Montréal, May 9th 2016, where she presented "*The Dynamics of Clonal Evolution in Lymphoma during Chemotherapy*" as well as at the GEOC Hematology half day, at the Princess Margaret Hospital (double hit lymphomas at both sites), and at the 12th Canadian CLL Meeting. She acted as a grant reviewer for the Leukemia & Lymphoma Society of Canada (10 grants) and for the Canadian Cancer Society Research Institute. Since 2013 Dr. Johnson is a member of the Medical Oncology Training Program Committee and the Postgraduate Awards Committee at McGill. Since 2011 she build up the lymphoma axis of the "*Banque des Cellules Leucémiques du Québec".* This remarkably persistent effort is at the origin of numerous successful grant applications and manuscripts in top-ranked journals within the Division of Hematology. Dr. Johnson also reviewed manuscripts for *Experimental Hematology*, *British Journal of Haematology, Blood, Leukemia, and PLOS1.*

Dr. Hans Knecht was an invited speaker for the Cancer Seminar Series at the LDI, March 1th, 2016, where he presented "*3D TRF2-Telomere Interaction in Primary Hodgkin- and Reed-Sternberg cells*", as well as for the CCH-QC Conférence CARE sur l'Hématologie, Montréal, (*Lymphome de Hodgkin: Avancées thérapeutiques et pathogénétiques)*. He acted again as a reviewer for a multi-laboratory INSERM research project (France) and an Elevate Postdoctoral Fellowship Application Mitacs/Unversity of British Columbia. Dr. Knecht reviewed manuscripts for *British Journal of Haematology (3)*, *Cell Death & Disease, IJMS and Spinal Cord.*

Dr. Yury Monczak is a permanent Advisor to the Québec Régie de la Santé, section biologie moléculaire (30-35 hours) and a guest lecturer (volunteer activity) in molecular biology at the Catholic University in Lviv, Ukraine (12 hours/year).

Dr. François Patenaude was an invited speaker for metastatic renal cell carcinoma at 5 occasions in 2016. Amongst his presentations to note the one held at the Canadian Kidney Cancer Forum in Toronto in February this year and entitled: *"Immunoherapy for mRCC: 1986-2016: a personal appraisal of 3 decades of clinical research"*. Dr. Patenaude acts as a Consultant for CEPO for renal cell cancer, melanoma, and breast cancer, and he is also member of the steering committees of GEOQ for these three entities.

Dr. April Shamy organized in January this year the seamless move from 7NW to K7 in the new hospital building and in November the traditional Christmas party. This party reflects best the spirit of our Hematology Division, which equals that one of the Habs during their glorious years.

5. Partnerships:

Due to the new CIUSSS organization the Division of Hematology treated 1 acute leukemia patient from Rouyn-Noranda, provided the bone marrow reading for 46 patients (Dr. Knecht) and flow cytometry reports for this region (Drs. Johnson and Knecht).

Due to budgetary restrictions the Division of Hematology is still forced not to accept patients living in the 450 telephone area code unless they insist to be treated at the Jewish General Hospital or participate in a Research protocol.

6. **Milestones: new hires, highlights, promotions, and retirements:**

Tiziana Vadacchino, our Transplant Coordinator and Stem Cell Nurse Clinician was the 2016 recipient of the Myeloma Canada Marion State Memorial Nursing Award. This award recognizes excellence and leadership in the care of multiple myeloma patients.

Dr. Martin Gyger was the invited speaker for the second *Clinical Arthur Rosenberg Lecture* at the JGH in June 2016. This lecture honours the achievements of an outstanding clinician-scientist in either innovative patient-care ore translational/basic research of high clinical impact.

Definite accreditation of the JGH Blood Bank by Health Canada during the inspection of November 8-10, 2016. This success is the merit of the Blood Bank Director Dr. Stephen Caplan and the team of specialized laboratory technicians led by Gale Stratton.

Dr. Chantal Cassis edits a monthly published 2-3 pages McGill Hematology Program Journal *"BOOD DROPS",* informing all McGill Hematology Residents and staff Hematologists timely

about rotations, resident call on holiday periods, courses and seminars.

Dr. Nathalie Johnson was appointed as Tenure Track physician at the McGill Department of Medicine. Since 2011 she has developed the lymphoma axis of the "*Banque des Cellules Leucémiques du Québec"* located at the JGH. The lymphoma bank has significantly stimulated translational and basic lymphoma research in Québec and in Canada. It resulted for our Division of Hematology in 7 successful grant applications and >10 publications in top rated journals.

Drs. Nathalie Johnson and April Shamy, directors of the flow-cytometry and CTU, respectively, successfully accomplished their first year in the rank of Associate professor.

Dr. Sarit Assouline was elected Osler Fellow in Hematology. This distinction rewards her relentless teaching activity in the context of Clinical Research.

The AC Clinic directed by Dr. Mark Blostein has been successfully computerized (paperless).

Our Hematology Division has this year again a strong publication record including two *Blood* manuscripts. Drs. Sarit Assouline and Natahlie Johnson authored each one manuscript with *Editorial Comment* and as an *Invited Review*, respectively. Kim Ma, Hematology fellow was first author of 2 manuscripts.

September 30, 2017, Dr. Arthur Rosenberg retired after a 49 years' career in the Division of Hematology including 22 years in the function of Chief.

6. Honours, awards, and prizes: Reported above under 6.

SECTION I - DIVISION STATUS UPDATE

1. Mission and objectives of the Division:

The principle goals for the next years will be (unchanged):
to offer cutting-edge treatment to the very sick hematology patients,
to increase patient recruitment for phase I and II trials,
to progress in our Hematology Fellowship program,
to strengthen and expand laboratory hematology,
to increase the collaboration with the other Hematology McGill sites,
to increase top-level research production in basic, translational and clinical research,
to solidify the administrative (secretarial) domain of the Division,
and to improve our Clinical Programs despite forthcoming financial restrictions and reorganization of the current healthcare system.

Concerning the recruitment of new young staff Hematologists the vision remains exactly the same as that formulated by Dr. Stephen Caplan in the 2013 Annual Report, as follows (verbatim):
The principle goals for the future will be to recruit young physicians with academic ambition and appropriate training to accomplish their goals. This requires identification early on of residents

during their training, assisting them in finding the best academic programs to further their goals, and providing an attractive environment to which they could be recruited and flourish as clinical or laboratory researchers. The success of clinician-scientists hinges on planning to ensure mentoring by senior physicians or scientists, protected time for research and a strong financial base to support their research activities.

2. A nominative list of academic staff, their academic rank

Dr. Lissa Ajjmada	Faculty Lecturer	Active	01/10 – 31/12/2016
Dr. Sarit Assouline	Associate Professor	Active	
Dr. Mark Blostein	Associate Professor	Active	
Dr. Stephen Caplan	Associate Professor	Active	
Dr. Chantal Cassis	Faculty Lecturer	Active	
Dr. Martin Gyger	Full Professor	Active	
Dr. Nathalie Johnson	Associate Professor, tenure track	Active	
Dr. Hans Knecht	Full Professor	Active	
Dr. Francois Patenaude	Assistant Professor	Active	
Dr. Jaroslav Prchal	Associate Professor	Active	
Dr. Arthur Rosenberg	Associate Professor	Active	until 30/09/2016
Dr. April Shamy	Assoicate Professor	Active	
Dr. Shireen Sirhan	Faculty Lecturer	Active	

SECTION II - GRANTS, PUBLICATIONS, AND SERVICE OUTSIDE OF McGILL

1. Grants and awards received

Dr. Sarit Assouline

2015-2018 Fonds de Recherche en Santé du Québec, chercheur clinicien boursier Junior 2
2013-2017 Co-applicant with Dr. Wilson Miller on CIHR grant; $150,000 for 4 years
2014-2017 Co-applicant with Dr. Nathalie Johnson for "Optimizing therapy for STAT6-mutant DLBCL", CCSRI; $ 199,600 for three years.
2016-2017 PI of a Rossy Cancer Network Grant project: L'adhésion aux lignes directrices dans la gestion de la leucémie myéloïde chronique au Québec; $59,000

Dr. Mark Blostein

2016-2017 Site Investigator: Clinical Trial for Perioperative management of warfarin. Funded by CIHR.
2016-2017 Site Investigator: Annexa-4. Clinical Trial examining the use of a Reversal agent for the New Oral Anticoagulant Factor Xa inhibitors (only site in Quebec and one of two in Canada).

2016-2017 Site Investigator: REVERSA-AD. Clinical Trial examining the use of a Reversal agent for the New Oral Anticoagulant Dabigatran (only site in Quebec and one of two in Canada).

2016-2017 Site Investigator: Clinical Trial for Perioperative management of ITP. Funded by Glaxo).

2016-2017 Site Investigator: PAUSE, a CIHR funded clinical trial that uses a standardized protocol for the peri-procedural management for all three novel anticoagulants.

2016-2017 Research Contract from Boehringer-Ingelheim examining the role of Dabigatran in Cancer-associated Venous Thrombosis.

2016-2017 Received funding from Bayer to develop an INR for Rivaroxaban based on patient samples.

Dr. Nathalie Johnson

2013-2016 CIHR; Principal Investigator. Overcoming therapeutic resistance in lymphoma. $449,166.00

2013-2018 CIHR; co-PI; (PI Dr. Ryan Morin); $612,720 total but $22,500 for her work Investigating the mutations driving non Hodgkin lymphomas and developing plasma-based assays for tumour detection and monitoring

2014-2016 Co-PI. (PI Dr Koren Mann) RASGRP4 mutations in R-CHOP resistant DLBCL.The Leukemia & Lymphoma Society of Canada. $ 120,000

2014-2016 Merck, Sharp & Dohme Corp./MCGill Faculty of Medicine Grant. (PI Dr. Jerry Pelletier). Conditional Genome Engeneering in Mice. Dr. Johnsons' part is sequencing of human Burkitt lymphoma exomes (4,000/year)

2015-2017 CCSRI Innovation Grant; Principal Investigator. "Optimizing therapy for STAT6-mutant DLBCL", CCSRI , $ 199,600 for three years.

2015-2017 Phase II Clinical trial. Pembrolizumab in in R/R cHL. Merck Sharp & Dohme Corp.

2016-2017 Phase I/II study to evaluate the safety and preliminary efficacy of Nivolumab in combination with Brentuximab-Vedotin in R/R NHL with CD30 expression. Bristol Myers Squibb.

2016-2017 Phase III randomized, open-label, Clinical trial to compare Pembrolizumab with Brentuximab-Vedotin in subjects with R/R cHL. Merch Sharp & Dohme Corp.

2016 Obinotuzumab, Bendamustine and Venetoclax in R/R DLBCL. $862'688.- Trial was cancelled due to high toxicity of Obinutuzumab in DLBCL patients (Roche).

Dr. Hans Knecht

2015-2016 Principal Investigator : Nouvelles cibles thérapeutiques dans le lymphome de Hodgkin réfractaire. Pilot project $ 15,000. CRC Étienne-Le Bel, CHUS.

2016-2017 Prolongation of the above grant in the setting of a MSc thesis $ 10'000.- CRC Étienne-Le Bel, CHUS.

2. Scholarly works published in the 2016 calendar year (*in press* not included):

Assouline, Sarit

MacDonald D, Prica A, **Assouline S**, Christofides A, Lawrence T, Sehn LH.

Emerging therapies for the treatment of relapsed or refractory follicular lymphoma.
Curr Oncol. 2016 Dec;23(6):407-17.

Alcaide M, Yu S, Bushell K, Fornika D, Nielsen JS, Nelson BH, Mann KK, **Assouline** S, **Johnson NA**, Morin RD. Multiplex Droplet Digital PCR Quantification of Recurrent Somatic Mutations in Diffuse Large B-Cell and Follicular Lymphoma. Clin Chem. 2016, 62(9):1238-47.

Damlaj M, Lipton JH, **Assouline S**. A safety evaluation of omacetaxine mepesuccinate for the treatment of chronic myeloid leukemia. Expert Opin Drug Saf. 2016,:1279-86..

Engel NW, Constantin A, Fowlkes S, **Assouline S**. Unexpected Success of Watch and Wait Strategy in a Ponatinib-Intolerant Patient With Chronic Myeloid Leukemia. J Oncol Pract. 2016, 12:592-4.

Dupéré-Richer D, Kinal M, Pettersson F, Emond A, Calvo-Vidal MN, Nichol JN, Guilbert C, Plourde D, Klein Oros K, Nielsen TH, Ezponda T, Licht JD, **Johnson NA**, **Assouline** S, Cerchietti L, Miller WH Jr, Mann KK. Increased protein processing gene signature in HDACi-resistant cells predicts response to proteasome inhibitors. Leuk Lymphoma. 2017, 58:218-221. (E-pub Mai 17, 2016)

Assouline SE, Nielsen TH, Yu S, Alcaide M, Chong L, MacDonald D, Tosikyan A, Kukreti V, Kezouh A, Petrogiannis-Haliotis T, Albuquerque M, Fornika D, Alamouti S, Froment R, Greenwood CM, Oros KK, Camglioglu E, Sharma A, Christodoulopoulos R, Rousseau C, **Johnson N**, Crump M, Morin RD, Mann KK. Phase 2 study of panobinostat with or without rituximab in relapsed diffuse large B-cell lymphoma. Blood. 2016, 128:185-94. (Manuscript with Editorial Comment)

Lipton JH, Chuah C, Guerci-Bresler A, Rosti G, Simpson D, **Assouline S**, Etienne G, Nicolini FE, le Coutre P, Clark RE, Stenke L, Andorsky D, Oehler V, Lustgarten S, Rivera VM, Clackson T, Haluska FG, Baccarani M, Cortes JE, Guilhot F, Hochhaus A, Hughes T, Kantarjian HM, Shah NP, Talpaz M, Deininger MW; EPIC investigators. Ponatinib versus imatinib for newly diagnosed chronic myeloid leukaemia: an international, randomised, open-label, phase 3 trial. Lancet Oncol. 2016, 17:612-21.

Assouline S, Buccheri V, Delmer A, Gaidano G, Trneny M, Berthillon N, Brewster M, Catalani O, Li S, McIntyre C, Sayyed P, Badoux X. Pharmacokinetics, safety, and efficacy of subcutaneous versus intravenous rituximab plus chemotherapy as treatment for chronic lymphocytic leukaemia (SAWYER): a phase 1b, open-label, randomised controlled non-inferiority trial. Lancet Haematol. 2016, 3:e128-38.

Reis B, Jukofsky L, Chen G, Martinelli G, Zhong H, So WV, Dickinson MJ, Drummond M, **Assouline** S, Hashemyan M, Theron M, Blotner S, Lee JH, Kasner M, Yoon SS, Rueger R, Seiter K, Middleton SA, Kelly KR, Vey N, Yee K, Nichols G, Chen LC, Pierceall WE. Acute myeloid leukemia patients' clinical response to idasanutlin (RG7388) is associated with pre-treatment MDM2 protein expression in leukemic blasts. Haematologica. 2016, 101:e185-8.

Blostein, Mark

Connolly SJ, Milling TJ Jr, Eikelboom JW, Gibson CM, Curnutte JT, Gold A, Bronson MD, Lu G, Conley PB, Verhamme P, Schmidt J, Middeldorp S, Cohen AT, Beyer-Westendorf J, Albaladejo P, Lopez-Sendon J, Goodman S, Leeds J, Wiens BL, Siegal DM, Zotova E, Meeks B, Nakamya J, Lim WT, Crowther M; ANNEXA-4 Investigators*. Andexanet Alfa for Acute Major Bleeding Associated with Factor Xa Inhibitors. N Engl J Med. 2016, 375:1131-41. ***M Blostein** Local site investigator.

Ma K, Wells P, Guzman C, Anderson D, **Blostein** M, Hirsch A, Lazo-Langner A, Kovacs MJ, Rodger M, Tagalakis V, Kahn SR. A multicenter prospective study of risk factors and treatment of unusual site thrombosis. Thromb Res. 2016, 144:100-5.

Effect of standardized perioperative dabigatran interruption on the residual anticoagulation effect at the time of surgery or procedure. Douketis JD, Wang G, Chan N, Eikelboom JW, Syed S, Barty R, Moffat KA, Spencer FA, **Blostein** M, Schulman S.
J Thromb Haemost. 2016, 14:89-97.

Prostaglandin E synthase is upregulated by Gas6 during cancer-induced venous thrombosis. Aghourian MN, Lemarié CA, Bertin FR, **Blostein M**. Blood. 2016, 127:769-77. (Manuscript with Editorial Comment)

Caplan, Stephen

Ma K, **Caplan S**. Refractory IgG Warm Autoimmune Hemolytic Anemia Treated with Eculizumab: A Novel Application of Anticomplement Therapy. Case Rep Hematol, 2016, 2016: 9181698.

Johnson, Nathalie

Savage KJ, Slack GW, Mottok A, Sehn LH, Villa D, Kansara R, Kridel R, Steidl C, Ennishi D, Tan KL, Ben-Neriah S, **Johnson NA**, Connors JM, Farinha P, Scott DW, Gascoyne RD. The impact of dual expression of MYC and BCL2 by immunohistochemistry on the risk of CNS relapse in DLBCL. Blood, 2016, 127:2182-8.

Dupéré-Richer D, Kinal M, Pettersson F, Emond A, Calvo-Vidal MN, Nichol JN, Guilbert C, Plourde D, Klein Oros K, Nielsen TH, Ezponda T, Licht JD, **Johnson NA**, **Assouline S**, Cerchietti L, Miller WH Jr, Mann KK. Increased Protein Processing Gene Signature in HDACi-resistant cells predicts response to proteasome inhibitors. Leuk Lymphoma. 2016, 17:1-4.

Assouline S, Yu S, Holm Nielsen T, Alcaide M, Chong L, MacDonald D, Tosikyan A, Kukreti V, Kezouh A, Petrogiannis-Haliotis T, Albuquerque M, Fornika D, Alamouti S, Froment R, Greenwood C, Klein Oros K, Camglioglu E, Sharma A, Christodoulopoulos R, Rousseau C., **Johnson NA**., Crump M., Morin R.D., Mann K.K. A randomized, phase II study of panobinostat +/- rituximab in relapsed diffuse large B cell lymphoma and assessment of molecular biomarkers predictive of response. Blood. 2016, 128:185-94. (Manuscript with Editorial Comment).

Alcaide M, Yu S, Bushell K, Fornika D, Nielsen JS, Nelson BH, Mann KK, **Assouline S**, **Johnson NA**, Morin RD. Multiplex droplet digital PCR quantification of recurrent somatic

mutations in Diffuse Large B-Cell and Follicular Lymphoma. Clin Chem. 2016 62:1238-47.

Johnson NA, Functional and clinical impact of MYC mutations in DLBCL. Transl Cancer Res. 2016, 5(S2):S257-S260.

Sesques P, **Johnson NA**. Approach to the diagnosis and treatment of high-grade B cell lymphomas with MYC and BCL2 and/or BCL6 rearrangements. (Invited review). Blood, 2016 Nov 7 [Epub ahead of print]

Kridel R, Chan FC, Mottok A, Boyle M, Farinha P, Tan K, Meissner B, Bashashati A, McPherson A, Roth A, Shumansky K, Yap D, Ben-Neriah S, Rosner J, Smith MA, Nielsen C, Giné E, Telenius A, Ennishi D, Mungall A, Moore R, Morin RD, **Johnson NA**, Sehn LH, Tousseyn T, Dogan A, Connors JM, Scott DW, Steidl C, Marra MA, Gascoyne RD, Shah SP. Histological Transformation and Progression in Follicular Lymphoma: A Clonal Evolution Study. PLoS Med. 2016, 13(12):e1002197.

Knecht, Hans

Knecht H, Mai S. The use of 3D telomere FISH for the characterization of the nuclear architecture in EBV-positive Hodgkin's lymphoma. Methods Mol Biol 2016 (e-pub November 25) 2017, 1532:93-104. (Invited manuscript)

Bobbala D, Kandhi R, Chen XL, Mayhue M, Bouchard E, Yan J, **Knecht H**, Barabe F, Ramanathan S, and Ilangumaran S. Interleukin-15 deficiency promotes the development of T-cell acute lymphoblastic leukemia in non-obese diabetes mice with severe combined immunodeficiency. Leukemia 2016, 30:1749-52.

Patenaude, François

A simple prognostic model for overall survival in metastatic renal cell carcinoma. Assi HI, **Patenaude F**, Toumishey E, Ross L, Abdelsalam M, Reiman T. Can Urol Assoc J. 2016, 10:113-19.

Shamy, April

Buckstein R, Wells RA, Zhu N, Leitch HA, Nevill TJ, Yee KW, Leber B, Sabloff M, St Hilaire E, Kumar R, Geddes M, **Shamy A**, Storring J, Kew A, Elemary M, Levitt M, Lenis M, Mamedov A, Zhang L, Rockwood K, Alibhai SM. Patient-related factors independently impact overall survival in patients with myelodysplastic syndromes: an MDS-CAN prospective study. Br J Haematol. 2016, 174:88-101.

Sirhan, Shireen

Gupta V, Mesa RA, Deininger MW, Rivera CE, **Sirhan S**, Brachmann CB, Collins H, Kawashima J, Xin Y, Verstovsek S. A phase 1/2, open-label study evaluating twice-daily

administration of momelotinib in myelofibrosis. Haematologica. (e-Pub 2016 Sep 15). 2017 Jan;102:94-102.

Busque L, Porwit A, Day R, Olney HJ, Leber B, Éthier V, **Sirhan S**, Foltz L, Prchal J, Kamel-Reid S, Karsan A, Gupta V. Laboratory Investigation of Myeloproliferative Neoplasms (MPNs): Recommendations of the Canadian Mpn Group. Am J Clin Pathol. 2016, 146:408-22.

3. Academic and community engagement service outside of McGill by individual members of the unit:

This issue has already been dealt with under: 4. Involvement in the Community.

SECTION III - CONFIDENTIAL INFORMATION

1. Consulting activities:

One staff physician reported Consulting activities in the private sector for 2 days over the year.

Respectfully submitted,

Hans Knecht, MD, FRCPC, FMH, FMAH
Director, Division of Hematology