Annual Report
Division of Hematology
Department of Medicine - Jewish General Hospital
January 1 - December 31, 2017
SUMMARY

General Considerations

First class patient care, excellence in clinical/translational teaching and cutting-edge research remains also in the future the mission of our Hematology Division within the Department of Medicine at the Jewish General Hospital. This spirit of unconditional commitment who animates the entire Department of Medicine, headed by Dr. Ernesto Schiffrin, fuels our nurses, laboratory technicians, administrative agents and staff physicians with energy and determination. Both are needed to keep going and to withstand successfully in a health system permanently under restrictions and financial pressure. A heartfelt thank you to our volunteers and donors whose contributions are essential in running a Division whose patients are amongst the most vulnerable Medicine knows.

Despite the fact that the Division of Hematology faces an ever increasing complexity in patient care without any new staff physician position since 2002, the 8 Clinical Programs (Stem Cell Transplant Program, Hematology-Oncology Clinic/Segal Cancer Center, CML Clinic, MPN Clinic, MDS Clinic, Gaucher Clinic, Anti-Coagulant/DOAC 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.

First of July the Division of Hematology and the Department of Medicine welcomed Dr. François Mercier after a five years’ post-doctoral Research Fellowship at Harvard. Having completed his Residency in Internal Medicine and Hematology at McGill, Dr. Mercier joined the basic leukemia research laboratory of Dr. Scadden where he developed novel experimental tools for the study of acute myeloid leukemia (AML). His innovative approach will allow us to gain a detailed understanding of gene expression changes and dependencies in AML in vivo, with the ultimate goal to identify novel therapeutic targets. Dr. Mercier took formally over the PEM of Dr. Arthur Rosenberg, as wisely planned by Dr. Caplan already in 2012. The venue of Dr. Mercier represents a major asset for our Hematology Division to progress in basic leukemia research.

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 JGH is an approved center for the performance of ASCT by an official letter from the Ministry of Health (March 23, 2007). Constraint by the price explosion for Carmustine (BCNU), the BEAM conditioning regimen was replaced by the much less costly high dose Etoposide-Melphalan (VP-16/Mel) conditioning regimen from January 2017 onwards. However, using this conditioning regimen an increased risk of infectious complications was to expect. Indeed, a few multiple myeloma (MM) patients transplanted with this cost saving outpatient approach had to be hospitalized for febrile neutropenia. A total of 30 autologous stem cell transplants have been performed in 2017; 22 ASCTs for MM, all done in the cost saving outpatient approach, 2 for light chain amyloidosis, 2 for diffuse large B-cell lymphoma (DLBCL), each 1 for Hodgkin’s lymphoma (HL), angioimmunoblastic T-cell lymphoma (T-AIL), follicular lymphoma (FL) and CNS lymphoma. Thanks to our Clinical Transplant Nurse and Transplant Coordinator, Tiziana Vadacchino, for her excellent performance.
**Hematology-Oncology Clinic/Segal Cancer Center**

The number of patient visits at the hematology-oncology division of the Segal Cancer Center has been stable over the past three years. In 2017 we totalized 9490 patient visits (2016: 9553 patient visits, i.e. a difference of 0.6%). Currently there are 21 Clinical Hematology Research Trials offering patients with relapsing/refractory or primarily aggressive hematologic diseases new hope. Dr. Sarit Assouline acts as director of the Clinical Research Unit in Hematology-Oncology and associate director of the Clinical Research Unit at LDI. Under her guidance the Clinical Research Unit in Hematology at the JGH has gained national and international reputation over the past years. Most trials recruit patients with multiple relapses or primary refractory hematologic cancers. Seven trials are phase I studies, five phase I/II, four phase II, and five trials phase III studies. Four trials are in the field of acute leukemia (AML 3, ALL one), two in chronic myeloid leukemia (CML), three in chronic lymphatic leukemia (B-CLL), five in Non-Hodgkin’s lymphoma (NHL), one in classical Hodgkin’s lymphoma (cHL), two in Myelodysplastic Syndrome (MDS), two in Myeloproliferative Neoplasia/Myelofibrosis (MPN/MF), one in multiple myeloma (MM), and one in light chain amyloidosis (AL). This year 31 patients have been successfully included. Again, the number of patients having been evaluated was much higher (about 30%) since the inclusion criteria are often very rigorous. Most patients included in these trials spontaneously mention the professionalism, availability and empathy of the CRU personnel (study coordinators and nurses) to their treating physicians. Some results obtained with these new drugs offer to the patients “new lives” and appear spectacular also to experienced Hematologists. These trials offer powerful new treatments without any financial burden for the hospital and public health, and positively impact on the JGHs’ reputation.

**CML Clinic**

The CML Clinic at the JGH is in its 13th year and integrated in the Groupe Québécois sur la recherche en leucémie myéloide chronique (GQR-LMC) and strictly adheres to their guidelines based on the European Leukemia Net (ELN) guidelines. The patients are seen either by Dr. Sarit Assouline, head of the Clinic, or Dr. Jaroslav Prchal. Currently the Clinic offers a randomized, open-label, phase 2 trial of Ponatinib in patients with resistant chronic phase CML to characterize the efficacy and safety of a range of doses. Ponatinib is a potent BCR- ABL tyrosine kinase inhibitor (TKI) that binds to native BCR-ABL and mutant forms, including the very dangerous T315I. This year the Québec CML group reported in the journal *Am J Hematol* the results of early switch to a second-line tyrosine kinase inhibitor in chronic myeloid leukemia patients failing to achieve early major molecular response (MMR). Their findings suggest that in patients with early molecular response failure or a long BCR-ABL copy number halving time, a switch in TKI therapy within 6 months is associated with a higher likelihood of achieving MMR. Notably, the first and senior authors of this manuscript are Dr. Klil-Drori, research fellow at the Hematology CRU, and Dr. Assouline, respectively.

**Myeloproliferative Neoplasmia (MPN) Clinic**

In 2017, the MPN clinic, co-directed by Drs. Jaroslav Prchal and Shireen Sirhan, has included 23 new patients and performed a total of 469 (7% increase) patient follow-ups. The clinic is still recruiting patients for a phase I dose-escalation study (PIM447) with primary myelofibrosis, and for a randomized, single-blinded phase II trial (Imetelstat) in myelofibrosis refractory to JAK inhibitors. This year Dr. Sirhan was co-author of a study entitled “Long-term efficacy and safety of momelotinib, a JAK1 and JAK2 inhibitor, for the treatment of myelofibrosis”, published in the journal *Leukemia*. 
**Myelodysplastic Syndrome Clinic (MDS) Clinic**
This nationally recognized teaching program is in its fifth year, headed by Dr. April Shamy and it is rapidly growing. However, in order to guarantee optimal patient management in the future, additional nursing support is needed. Currently the Clinic offers a randomized phase 2 study evaluating the safety, pharmacokinetics and efficacy of Venetoclax in combination with Azacitidine compared with Azacitidine alone in patients with treatment-naïve higher-risk myelodysplastic syndromes. In 2017 Dr. Shamy was co-author of two Canadian MDS Network publications which appeared in the *Brit J Haematol* and *Am J Hematol*, respectively (for details refer to publication list). The clinical training opportunities offered at the MDS Clinic are much appreciated by hematology-oncology fellows, medicine residents and interested medical students.

**Gaucher Clinic**
This is a specialized program, which has been mandated for 20 years by the government of Québec and includes all patients transferred patients from the pediatric Hôpital Sainte-Justine when they reach adulthood. Dr. Sarit Assouline was responsible for the treatment of these adult patients for almost 10 years. In spring 2018 she will “passer le flambeau” to Dr. François Mercier who will continue to lead this clinic with the same competence and empathy as Dr. Assouline did. Thanks to Dr. Sarit Assouline and the specialized E-8 nurses Andrea Olney and Tiziana Vadacchino for their dedication and excellent work. This 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.

**Anticoagulation Clinic**
The paperless anticoagulation clinic, directed by Dr. Mark Blostein, continues to attract medicine fellows and young Hematology staff physicians from other Canadian universities and overseas for completing their specialization in managing complex interdisciplinary hemostasis and thrombosis issues. The reputation of the AC Clinic as a teaching facility for internists dealing with difficult hemostatic problems in surgery and cancer care is now internationally recognized. A further asset of the fellows’ formation is the recent opening of a New Oral Anticoagulants Clinic (also called DOACs for Direct Oral Anticoagulants) in order to integrate the increasing use of these drugs. There is no doubt that Dabigatran, Rivaroxaban, Apixaban and Endoxaban are the future of thrombosis- and cerebro-vascular insult prophylaxis. The AC Clinic at the JGH is the first place in the province where reversal agents against Dabigatran (Praxbind) and the other three DOACs (Andaxanet) are available and successfully used. In summary, the AC Clinic represents a key element in the optimal functioning of many surgical and medical services of the JGH, is much appreciated by the patients and offers an excellent platform for teaching and research. The anticoagulation clinic is an integral part of the nationally and internationally recognized Centre for Thrombosis and Anticoagulation Care (CETAC), headed by Dr. Susan Kahn. Recently, Dr. Kahn had been nominated Principal Investigator of a 5 years’ 5.2 million dollar VECTOR (a consortium of Thrombosis/Anticoagulation Researchers across Eastern Canada) project emphasizing the outstanding quality of anticoagulation/thrombosis management and research at the JGH. This grant and additional support from the JGH Foundation as well as a generous contribution from Sanofi Canada made possible that the AC Clinic, the DOAC Clinic and the Thrombosis Clinic will move early in 2018 from the E-1 level into a completely new, spacious state-of-the-art facility in the B-3 level of the same building.

**Benign Outpatient Clinic**
Most hematologists and all hematology fellows participate in the Benign Hematology clinic. This clinic with about 100 weekly visits/consultations is very interactive with the Family Medicine
Department of the JGH as well as with many primary care physicians and specialized clinics of the entire McGill Hematology Division. In 2017 again anemia, mainly severe iron deficiency anemia, especially in young women, was most frequently identified, followed by leukopenia/leukocytosis, thrombocytopenia/thrombocytosis as well as by monoclonal gammopathy of unknown significance (MGUS) in the elderly patient. Most importantly, this clinic functions as a screen for more serious conditions. Malignant hematologic diseases are picked up at an early stage when patients present for low blood counts or localized lymphadenopathies. Patients with more serious presentations of microcytic anemia due gastrointestinal blood loss or combined hereditary red cell disorders are rapidly redirected to the GI Division at the JGH and the specialized thalassemia/sickle cell Clinic at RVH, respectively.

**Molecular Diagnostics Laboratory**

The molecular diagnostics laboratory is the first and only in Canada to perform Next-Generation-Sequencing (NGS) technology in a diagnostics laboratory. Thanks to the relentless efforts of Yuri Monczak, Ph.D., and Tina Haliotis, MD, Ph.D., both associate members of the Division of Hematology, the laboratory performs for all Canadian provinces NGS of the immunoglobulin heavy chain variable (IGHV) region to detect somatic hypermutation within this gene region. This molecular analysis, primordial for clinical management and prognosis of chronic lymphocytic leukemia, was made available through a generous educational grant from Janssen Pharmaceuticals to Dr. Monczak. Moreover, validation of the T-cell clonality assay by NGS was successfully performed and the B-cell clonality testing by the same technique has been partially implemented. The NGS assays are currently expanded to acute myeloid leukemia (AML) and lymphoma subtypes. Despite significant budgetary restrictions and organizational (decisional) problems related to **optilab**, the Molecular Diagnostics Laboratory, an integrative part of our Hematology CRU, had a successful year.

2. Research and publications

Dr. Sarit Assouline, director of Clinical Research in Hematology-Oncology and associate director of the LDI Clinical Research Unit, is in her third year of the FRSQ Junior 2 award. She continues to lead a successful Clinical Research Program in leukemia and lymphoma. In the McGill Hematology Division are currently 35 clinical trials under way; in 14 of them (4 phase 1 studies, 4 phase 1/2 studies, and 3 phase 2 and 3 studies, respectively) Dr. Assouline acts as a Principal Investigator. All our CRU Hematology trials are now publicly available on the net under [https://www.mcgill.ca/rcr-rcn/clinical-trials](https://www.mcgill.ca/rcr-rcn/clinical-trials), integrated in the McGill Rossy Cancer Network. For a further phase I study combining R-GDP and Venetoclax in relapsing/refractory NHL, Dr. Assouline was awarded a major grant from AbbVie. She was one of the PIs of the recently published *(Am J Hematol)* Intergroup LEAP trial (S1612) and was involved in 6 additional peer reviewed published manuscripts, in one each as a first and senior author, respectively, and acted as an expert reviewer for INESSS, reviewer for *Blood*, and *Lancet Hematology*.

Dr. Mark Blostein is successful director of the Clinical Investigator Program at McGill University (RCPC accredited in 2015), head of the Anticoagulation Clinic and Associate Chief of the Division of Hematology. He was actively involved in the planning of the new CETAC Center, who will also harbor the recently opened DOACs Clinic. It is his merit that the JGH is the first Québec university hospital to dispose of the reversal agents for the DOACs. Dr. Blostein is a site-investigator in 4 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 Québec and one of two in Canada). iii) Clinical Trial for perioperative management of ITP. iv) PAUSE, a CIHR funded clinical trial that uses a standardized protocol for the peri-procedural management for all three novel
anticoagulants. He also has pharmaceutical research contracts for examining the role of Dabigatran in cancer-associated venous thrombosis and for developing an INR for Rivaroxaban based on patient samples. Dr. Blostein was involved in 2 peer reviewed published manuscripts. He was the corresponding (senior) author of the one dealing with the role of Gas6 in venous thrombosis, who was honoured as Featured Article in the LDI Newsletter. He also got an LDI Internal Award examining the role of Gas6 in Zika virus infection.

Dr. Stephen Caplan is the director of the Health Canada accredited Blood Bank. He is still very active in academic carrier planning of Hematology fellows. Already in 2012 he secured the PEM transfer from Dr. Arthur Rosenberg to Dr. François Mercier, which allowed Dr. Mercier’s seamless integration into our Division after Dr. Rosenberg’s retirement. Dr. Caplan is a major contributor to the CRU Clinical Trials and acts as a coordinator and again as a major contributor of the Canadian Paroxysmal Nocturnal Hemoglobinuria (PNH) Network and the Global PNH registry.

Dr. Chantal Cassis successfully completed her Master’s degree entitled “Identifying the supports and barriers to the implementation of an educational intervention to promote hematology and oncology residents' use of Evidence-Based Medicine: a knowledge translation study”. This project is the scientific base to further develop and deploy an EBM curriculum for residents with the goal to increase resident research interest and productivity.

Dr. Martin Gyger, director of the ASCT program and Apheresis Clinic is the senior author of a manuscript entitled “Pharmacokinetics and safety of carfilzomib in patients with relapsed multiple myeloma and end-stage renal disease”. This open-label, single-arm, phase I study was published in Cancer Chemother Pharmacol. His clinical trial for light chain amyloidosis (AL) with NEOD001, a monoclonal antibody that targets specifically circulating and accumulated light chain amyloid, is still recruiting patients.

Dr. Nathalie Johnson directs the Hematology Flow-Cytometry Laboratory at the JGH. This facility is much appreciated for the rapid diagnostic services by several outbound hospitals in situations, where timely reports are crucial. In 2017 a total of 2809 blood, bone marrow, lymph node and body fluid samples has been analyzed. This increase of 20% compared to 2016 is mainly related to an increased accrual of samples from outbound hospitals (Gatineau, Hull and Lakeshore). 450 samples have been investigated for the possibility of acute leukemia. Dr. Johnson’s basic science laboratory with a research program focused on the molecular pathogenesis DLBCL and cHL was again successful. In 2017 Dr. Johnson acted as PI of two grants; a Canadian Cancer Society Research Institute (CCSRI) grant entitled “Optimizing Therapy for STAT6-mutated DLBCL”, and a grant entitled “Determining apoptotic blocks in primary lymphoma samples”. She is co-investigator in 4 grants dealing with the molecular pathogenesis of lymphoma. The Terry Fox Research Institute (TFRI) Team grant entitled “Overcoming treatment failure in lymphoid cancers” associates 27 Canadian researchers and extends until 2021. The study of the PD-1 inhibitor Pembrolizumab in relapsed or refractory cHL is of particular importance. 10 patients have been enrolled and the preliminary results are very promising. Two further studies assess the efficiency of Pembrolizumab versus Brentuximab/Vedotin in relapsed/refractory cHL, and the efficiency of combined immunotherapy (Nivolumab and Brentuximab/Vedotin) in relapsed/refractory NHL with CD30 expression, respectively. Dr. Johnson essentially contributed to four publications as a co-author.

Dr. Hans Knecht, in his fourth 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. This year he was first author of two basic research manuscripts including relapsing/refractory Hodgkin’s lymphoma and co-author of two manuscripts with Hematology fellows as first authors. He also is co-author of a manuscript dealing with a new imaging technique to analyze the chromatin nanostructure.

Dr. François Mercier, in his first 6 months as a staff physician in the Hematology Division, has fully attained his first goals. Two major grant awards from the Canadian Leukemia & Lymphoma Society and the Cole Foundation allow him to start rapidly with his basic leukemia research laboratory at the LDI. In a first time he will examine at single-cell resolution the AML transcriptome at diagnosis and over the course of treatment, investigate the susceptibility of AML to inhibition of galactosylation and oxidative phosphorylation as well as the mechanisms of leukemic clonal evolution during treatment using RNA sequencing. This year Dr. Mercier is co-author of two top-rated publications in *Blood* and *JCI*, respectively.

Dr. Yury Monczak has a long track record in DNA sequencing techniques and was selected as PI for an educational grant from Janssen Pharmaceuticals with the aim to implement large scale NGS in a diagnostics laboratory as ours at the JGH.

Dr. François Patenaude is a leading Canadian expert in the management of advanced kidney cancer. His treating experience was a major contribution for the 2017 consensus update of the Canadian Kidney Cancer Forum (*Can Urol Assoc J*, 2017, 11:310-320).

Dr. April Shamy co-authored two manuscripts of the Canadian MDS study group, both published this year in renowned Hematology journals (*Brit J Haemat* & *Ann Hematol*).

Dr. Shireen Sirhan is co-author of a manuscript dealing with the long-term efficacy and safety of momelotinib, a JAK1 and JAK2 inhibitor, for the treatment of myelofibrosis (*Journal Leukemia*).

### 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, Hematology Laboratory, or CTU and CRU. Particularities in teaching are listed as follows:

**Dr. Sarit Assouline**, Osler Fellow in Hematology in her second year, has taught in this function a total of 12 hours. She also introduced two first year medical students in research fundamentals and had a 2 hours’ lecture in the Department of Experimental Medicine. At the CRU she supervises Dr. Adi Klil-Drori and had one Internal Medicine Resident (Shen Li) performing a research project rewarded with a poster at ASH. She also did Fellow and Resident teaching regularly in the setting of the Hematology Consultation Service (6 weeks) and the laboratory rotation (10 hours of blood smear morphology).

**Dr. Mark 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). Dr. Blostein’s innovative teaching approaches include the initiation of Progress tracking, a system for tracking fellows in the CIP program that was well received by the Royal College, and the platform of the DOAC clinic to teach house staff about these new medications. His research trainee supervision included 2
graduate students in Physiology (Masters) and a further graduate student in his laboratory obtained a PhD degree (5th in 15 years).

Dr. Stephen Caplan again coached a team composed of 2 senior- and 3 junior residents as Ward Attending on K7 for a 2 weeks’ period in June this year. His teaching activities include also the outpatient clinics for Hematology-, Radiation/Oncology-, and Medical Oncology fellows with 200 hours per year. He did Fellow and Resident teaching regularly in the setting of the Hematology Consultation Service (8 weeks). His tremendous knowledge and experience in both, benign and malignant hematology, is most appreciated by our trainees.

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, had very well prepared the RCPC mandated internal review early in 2017. Both reviewers acknowledged the excellent work done by Dr. Cassis and her team, mentioning only one minor issue to work on until the following accreditation cycle. A cornerstone of this achievement is undoubtedly the successful completion of her Master’s project entitled “Identifying the supports and barriers to the implementation of an educational intervention to promote hematology and oncology residents' use of Evidence-Based Medicine: a knowledge translation study” in July 2017 at the university of Ohio. This major accomplishment is the result of Dr. Cassis’ relentless and dynamic engagement as a Program Developer/Director and passionate clinical teacher. Her program including 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 research mentorships for residents to increase resident research productivity, is now implemented. This results in visible and measurable progress in our Hematology Fellow Program and is most appreciated by all McGill Hematologists. Dr. Cassis’ teaching activities include 2 formal lectures per year during the Hematology academic half-day, preparation and organization of the yearly McGill Hematology in-training exam which is composed of 3 parts (written, oral scenario and morphology), as well as teaching the TCP class “An approach to anemia” since 2015 at all 3 sites (JGH, MGH and Glen) for medical students.

Dr. Martin Gyger was actively involved in teaching of Hematology, Hematology-Oncology and Radiation-Oncology fellows at his myeloma clinic at E-7. He did Fellow and Resident teaching regularly in the setting of the Hematology Consultation service (5 weeks). His knowledge in cytogenetics and bone marrow cytology is most appreciated. Residents and fellows with a particular interest in bone marrow morphology were always welcome for a teaching session at the microscope even at unconventional hours.

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 13.5 hours), as well as in teaching of Hematology fellows during her 4 weeks of Consultation service. She held a lecture to Hematology Fellows dealing with aggressive lymphomas and taught 6 hours of flow-cytometry to them. In addition to the clinical teaching mentioned above, she supervised one 3rd year Medical Biology student. Three PhD candidates of the McGill Experimental Medicine Program perform in her laboratory a thesis and are in the second and third year (two candidates), respectively. The theses are entitled “The role of FAS in lymphoma”, “Effect of loss of CD20 on B cell receptor targeted therapy in lymphoma”, and “The role of STAT6 in DLBCL. 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 the McGill Medical Oncology Training Program Committee and in the Postgraduate Awards Committee (PGAC). Since this year she heads the Promotions’ Chair of the McGill Clinical Investigator Program, a committee that meets four times per year.
Dr. Hans Knecht was involved in teaching of two groups of second year McGill Medical students (Expert Physician Rounds) and of one Overseas 5th year Medical student as well as of Hematology fellows on the microscope (10 hours), flow-cytometry and hemoglobin electrophoresis. He did Fellow and Resident teaching regularly in the setting of the Hematology and the Thrombosis Consultation Service (6 weeks of each), 10 weeks of resident teaching in his malignant Hematology consultation and 12 weeks of resident teaching in his “benign” Hematology consultation. Dr. Knecht’s research trainee co-supervision includes two graduate students (a Master’s degree at UdS and a PhD degree at UoM, respectively).

Dr. François Mercier had, after a 5 years’ postdoctoral fellowship in a basic research laboratory, to absolve a 5 months’ duration “Tutorat de perfectionnement”, according to the rules of the CMQ, Direction de l’amélioration de l’exercice. His CMQ accredited tutor was Dr. Hans Knecht. Following a detailed plan established by the CMQ, Dr. Mercier rapidly refreshed his knowledge in general hematology and increased his supervised consultation activity in general Hematology. He had regular training in blood smear cytology and bone marrow diagnostics and he participated in clinical rounds, tumor boards and teaching sessions. The 5 months’ regular interaction between the trainee and the tutor was for both very stimulating and enjoying. Already after 3 months Dr. Mercier had attained “la vitesse de croisière” needed for our Division. Both Hematologists agree that the CMQ training program for the tutorat is excellent.

Dr. Yury Monczak acted as a lecturer at the McGill Academic half-day teaching for Hematology (3 hours) and Pathology Residents (3 hours). He was very active in Hematology and Pathology residents’ rotations teaching (12 hours teaching and 5 weeks of practical activities in the lab). He participated in the University of Montreal Medicine course MMD 1229 (Pathology and Immnumunology), 1st year medicine students (18 hours) and the Medicine course MMD1231 (Hematology), 1st year medicine students (18 hours), as well as in the University of Montreal Molecular Biology course PBC6042, graduate course (6 hours).

Dr. François Patenaude continued and expanded his impressive teaching activities during the year at the JGH and the RVH. At the JGH he covered the emerging treatments in immune-oncology with 3 seminars entitled “The Dawn of a New Era” and offered a well structured quadripartite seminary entitled “Hormone receptor-positive (HR+) breast cancer: Current treatment paradigm and novel therapies”. Many 4th years’ medical students doing 4 weeks rotations in his outpatient clinics learn how to approach complex oncology patients through detailed case discussions. This year Dr. Patenaude mentored also five foreign medical students during their 8-12weeks elective clinical rotations in Hematology-Oncology. He also did Hematology fellow teaching in the setting of our Hematology Consultation Service and instructed 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/management of melanoma. Over the past three years he substantially contributed to the integration of basic oncology knowledge in the Internal Medicine Curriculum for 3rd year medical students at McGill.

Dr. April Shamy, director of the Clinical Teaching Unit (CTU) at K7, rotates as an Inpatient Ward Attending on this unit for 2 weeks twice a year and acts as a role model for many young Internists in formation. Several unofficial comments of Residents passing through K7 rate this CTU as the best of the entire McGill campus. They are not afraid to work intensively and enjoy the benefits of knowledge acquired through a supervised treatment of mostly “grand malades”. Dr. Shamys’ teaching activities include also the outpatient clinics for Hematology-, Radiation/Oncology-, and Medical Oncology fellows with 2 half-days during the entire year. Osler Fellow in Medicine since 2009, Dr. Shamy also regularly teaches in the McGill physical exam course (20 hours/year) as
well as in the setting of the RAC course (16 hours), Hematology Consultation Service (6 weeks), and Fellow teaching at the microscope (10 hours).

4. Involvement in the community:

Dr. Sarit Assouline had the honour to chair a session at ASH, was an invited speaker at the Indolent Lymphoma Workshop (May 15-17, Bologna, Italy) where she presented in the session “New Agents” the treatment experience with Ixasomib, and at the fifth SOHO (Society of Hematologic Oncology) meeting, held in September in Huston, Texas, where she presented interim results of a phase 2 study entitled “Interim Report from a Phase 2 Multicenter Study of Tazemetostat, an EZH2 inhibitor: Clinical Activity and Favorable Safety in Patients with Relapsed or Refractory B-cell Non-Hodgkin Lymphoma“. Dr. Assouline had also presentations in several Québec hospitals. She is a member of the review committee for the planned oncology Drop in Clinic on level E-8, a member of the Chemotherapy Committee, the Research Ethics Board, the Lymphoma Club Québec, and the INESSS panel for new drugs. Her reviewing activity included CIHR grants and manuscripts from Blood and Lancet Oncology.

Dr. Mark Blostein was an invited speaker at the LD1 for Medical Research January 18th, where he held a lecture entitled “Role of gas6 in the pathophysiology of cancer-associated venous thromboembolism”. He held lectures at the JGH Surgical Grand Rounds and at St.Mary’s Grand rounds dealing with the NOACs and their antidots. He held two more presentations at McGill concerning the management of bleeding in anti-coagulated patients (Family Medicine) and concerning the “new and the old” in anticoagulation bridging (JGH, GIM). Dr. Blostein reviewed articles for Blood, Thrombosis & Hemostasis, Journal of Clinical Investigation, Thrombosis Research, The Journal of Thrombosis and Hemostasis, and PLOS One.

Dr. Chantal Cassis invests weekly about 8 hours as program director for the Hematology Fellow Program and several hours in the Resident training committee meetings (every 3 months). She is also Member of the Rossy Cancer Network Cancer Quality Council.

Dr. Martin Gyger was an invited speaker at seven occasions for either updates on new treatments for hematologic malignancies, or more specifically, for relapsing/refractory multiple myeloma. His presentations included St.Mary’s, Lakeshore, Lachine, Verdun, St. Jérome, Laval and Le Gardeur hospital.

Dr. Nathalie Johnson was an invited speaker at the JGH Department of Medicine Grand Rounds June 5th 2017, where she hold a lecture entitled “Acute Toxicities of Novel Lymphoma Therapies”, dealing with hitherto unknown, if not early recognized, life threatening side effects. In the context of educational events for patients, sponsored by Lymphoma Canada, she presented three invited talks to public and patients entitled “The changing landscape of CLL”, “CLL: disease specific biology and current treatment”, and “CLL future therapies”. This year Dr. Johnson was appointed as a Director for board of Lymphoma Canada: the goal is to improve patient education and funding possibilities for lymphoma research (four meetings per year). 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. Her review activity included manuscripts for Blood and Leukemia & Lymphoma.

Dr. Hans Knecht was an invited speaker for the Cancer Seminar Series at INSERM, Institut Gustave Roussy, Villejuif, Paris, France, April 13, 2017, where he presented “New Insights into the Molecular Pathogenesis of Hodgkin’s lymphoma”. December 19th, 2017, he presented in the
Continuing Medical Education lecture series of the Department of Family Medicine at the JGH the topic “Common problems in Hematology”. Dr. Knecht reviewed manuscripts for *Brit J Haematol* (3), *CMAJ*, *Oncotarget*, *Oncology Letters*, *Viruses*, *IJMS* (3) and *Spinal Cord* as well as a proposal for an Elevate Postdoctoral Fellowship Application Mitacs/UBC. In October he was offered to act as Academic Editor of a special issue of the journal *Cancers* focusing on insights into the molecular pathogenesis and cutting-edge treatments of relapsing-refractory Hodgkin’s lymphoma. The release of the special issue is planned for May 2018.

Dr. François Mercier was an Examiner, Royal College of Physicians and Surgeons of Canada, for the Internal Medicine Examination (3 days/year). He also was an invited speaker at the Cancer Seminar Series of the Lady Davis Institute in October 2017.

Dr. Yury Monczak is a Member of *Comité Consultatif de Diagnostic Moléculaire* of the MSSS (Quebec Health Ministry), and a permanent (volunteer activity) visiting professor, Ukrainian Catholic University in Lviv, Ukraine, School of Bioethics; this year he held 18 hours of lectures on molecular biology and diagnostics from March 22-31, 2017.

Dr. François Patenaude was an invited speaker at 3 occasions in 2017. Two presentations dealt with malignant melanoma. At the Université de Sherbrooke he held a lecture entitled “*Le mélanome métastatique revu et corrigé*”, and at Charles-LeMoyne a lecture entitled” *Mélanome cutané métastatique: Mise à jour, la résistance au traitement ou peut-on vaincre le mythe de Sisyphe*”. The third presentation occurred in the context of the Canadian Kidney Cancer Forum (CKCF) in November at St. Mary’s hospital. He is a committee member of the CKCF for establishing Canadian guidelines for the management of renal cell cancer. Dr. Patenaude acts also as a Consultant for CEPO for renal cell cancer, melanoma, and breast cancer, and he is a member of the steering committees of GEOQ for these three entities.

Dr. April Shamy is a McGill Medical School Admission Examiner (Interviews), a member of the McGill Faculty of Medicine Council, the JGH Residency Training Committee and the Clinical Services Committee, as well as a Board Member of the Cedars Home for the Elderly. She was and is very active in organizing national and international speakers for our Hematology Rounds and triaging of incoming Consultation requests. Dr. Shamy organized the April 3rd Farewell Party for Dr. Arthur Rosenberg (retired September 30, 2016). It was a tremendous and emotional event with the participation of former JGH Hematologists flying in from far (Drs. Galipeau and Hammouda). 15th of December the traditional Christmas party, -as a rule-, organized by Dr. Shamy, was again the unifying social and culinary event of our Division including our volunteers. This year’s party had a record participation probably to be beaten in 2018.

5. Partnerships:

In the context of the CIUSSS organization the Division of Hematology provided the bone marrow reading for 52 patients from Rouyn-Noranda (Dr. Knecht) and flow cytometry reports for Hull and Gatineau (Drs. Johnson and Knecht). Dr. Patenaude is a frequently called oncology consultant for Rouyn-Noranda. Dr. Assouline is developing a clinical trial, which will include numerous clinical centers in Québec.

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

Dr. François Mercier has joined our Hematology Division in the rank of Assistant Professor after a successful 5 years’ fellowship in basic leukemia research at the Scadden laboratory in Harvard. The venue of Dr. Mercier, who specialized in single cell transcriptome analysis, CRISPR-Cas
technology and corresponding mice experiments, is a major asset in strengthening and completing the clinical and translational leukemia research by these basic elements. He and Dr. Sarit Assouline will form an innovative leukemia research group at the JGH and McGill Hematology Division.

Dr. Kenneth Anderson, Kraft Family Professor of Medicine, Harvard Medical School, President of the American Society of Hematology, was the invited speaker for the third Clinical Arthur Rosenberg Lecture at the JGH, November 6th, 2017. His fantastic topic was entitled «Update on Diagnosis and Treatment of Plasma Cell Dyscrasias». Professor Anderson is the internationally leading scientist in basic and translational myeloma research. For us JGH Hematologists it will be unforgettable that he spent two fruitful and memorable days with us despite the impending 2017 ASH Meeting.

Dr. Chantal Cassis, Director of the McGill Hematology Fellowship Program, successfully accomplished her Masters degree in Education (MEd) at the University of Cincinnati, Ohio, in July this year.

Both IPOs (infirmière pivot) in malignant Hematology are jewels of our Division. Chantal Cloutier was the 2016 recipient of JGH award for Excellence in Nursing. This award recognizes the relentless support Chantal offered and offers to our «grand malades». Line Bourgeois, despite the permanent clinical pressure, successfully accomplished this year her CNA certification in Oncology.

Dr. Mark Blostein was both, patient oriented and innovative by opening this year a DOACs Clinic and by offering the DOAC antidots at the JGH. His 2017(4th) Edition of “Practice Guidelines for Anticoagulation Management” fully integrates the clinical use of the DOACs.

In 2017 our Hematology Division had again a strong publication record including a Front Cover in Laboratory Investigation. Over the past five years four papers form the Hematology Division (Drs. Blostein, Assouline, Johnson, Knecht) were rewarded with the distinction “Paper of the Month” by the Lady Davis Institute for Medical Research.

In the Molecular Diagnostics Laboratory, Drs. Yuri Monczak and Tina Haliotis, both associate members of the Division of Hematology, implemented nation-wide (all Canadian provinces) NGS testing of the immunoglobulin heavy chain variable (IGHV) gene region. This tool is essential for clinical management and prognosis of chronic lymphocytic leukemia.

Dr. Anna Nikonova, former Hematology fellow, and Dr. Adi Klil-Drori, research fellow at the CRU, were first authors of two manuscripts. Dr. François Mercier got the Merit award, International Society for Stem Cell Research (Best rated abstract in the cancer category).

April 3rd, Dr April Shamy organized a memorable Farewell Party for Dr. Arthur Rosenberg who had retired in 2016 after a 49 years’ career at the JGH in the Division of Hematology. It was one of these unforgettable events in the life of our Hematology Division.


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**

<table>
<thead>
<tr>
<th>Name</th>
<th>Academic Rank</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Sarit Assouline</td>
<td>Associate Professor</td>
<td>Active</td>
</tr>
<tr>
<td>Dr. Mark Blostein</td>
<td>Associate Professor</td>
<td>Active</td>
</tr>
<tr>
<td>Dr. Stephen Caplan</td>
<td>Associate Professor</td>
<td>Active</td>
</tr>
<tr>
<td>Dr. Chantal Cassis</td>
<td>Assistant Professor</td>
<td>Active</td>
</tr>
<tr>
<td>Dr. Martin Gyger</td>
<td>Full Professor</td>
<td>Active</td>
</tr>
<tr>
<td>Dr. Nathalie Johnson</td>
<td>Associate Professor, tenured</td>
<td>Active</td>
</tr>
<tr>
<td>Dr. Hans Knecht</td>
<td>Full Professor</td>
<td>Active</td>
</tr>
<tr>
<td>Dr. François Mercier</td>
<td>Assistant Professor</td>
<td>Active</td>
</tr>
<tr>
<td>Dr. Francois Patenaude</td>
<td>Assistant Professor</td>
<td>Active</td>
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<tr>
<td>Dr. Jaroslav Prchal</td>
<td>Associate Professor</td>
<td>Active</td>
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<tr>
<td>Dr. April Shamy</td>
<td>Associate Professor</td>
<td>Active</td>
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<tr>
<td>Dr. Shireen Sirhan</td>
<td>Faculty Lecturer</td>
<td>Active</td>
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</tbody>
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**SECTION II - GRANTS, PUBLICATIONS, AND SERVICE OUTSIDE OF McGill**

1. **Grants and awards received**

**Dr. Sarit Assouline**

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.-
2017-2018 AbbVie Grant: phase I study of R-GDP and Venetoclax – to be conducted by the CCTG (Canadian Cancer Trials Group) $ 300’000.-
2017-2018 The Leukemia & Lymphoma Society of Canada New Idea Award. Co-Investigator. (PI Dr. F. Mercier). Tracking of clonal evolution in acute myeloid leukemia using single-cell RNA sequencing. $ 75’000.-

Dr. Mark Blostein

2016-2017 Site Investigator: Clinical Trial for Perioperative management of warfarin. Funded by CIHR.
2016-2017 Site Investigator: Anxena-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: 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 Received funding from Bayer to develop an INR for Rivaroxaban based on patient samples.
2017 LDI Internal Award examining the role of Gas6 in Zika virus infection

Dr. Nathalie Johnson

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.
2015-2017 CCSRI Innovation Grant; Principal Investigator. “Optimizing therapy for STAT6-mutant DLBCL”, CCSRI, $ 199’600.- for three years.
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. Merck Sharp & Dohme Corp.
2016-2021 Terry Fox Research Institute (TFRI) Team grant: “Overcoming treatment failure in lymphoid cancers”. $7’500’000.-Awarded to M. Marra (PI), C. Steidl (PI), J. Connors (PI), A. Karson (Co-investigator), R. Morin (PI), D. Scott (PI), A. Weng (PI), S. Shah (PI), P. Farinha (Co-investigator), A. Mungall (Co-investigator), G. Morin (Co-investigator), C. Hansen (Co-investigator), G. Slack (Co-investigator), S. Aparicio (Co-investigator), L. Shepherd (Co-investigator), J. Delabie (Co-investigator), Nathalie Johnson (Co-investigator), J. Kuruvilla (Co-investigator), A. Korman (Co-investigator), P. Hoodless (Co-investigator), M. Bally (Co-investigator), J. Crawford (Co-investigator), B. Nelson (Co-investigator), L. Sehn
(Co-investigator), K. Savage (Co-investigator), D. LeBrun (Co-investigator).

Dr. Hans Knecht

2016-2017  Prolongation of the grant “Nouvelles cibles thérapeutiques dans le lymphome de Hodgkin réfractaire » in the setting of a MSc thesis $ 10'000.-
CRC Étienne-Le Bel, CHUS.
2017-2018  Received funding from Apobiologix for a Resident/Fellow project analyzing the 3D telomere dynamics in cutaneous lymphoma.

Dr. François Mercier

2017-2018  The Leukemia & Lymphoma Society of Canada New Idea Award. Principal Investigator. Tracking of clonal evolution in acute myeloid leukemia using single-cell RNA sequencing. $ 75'000.-
2017-2020  Cole Foundation Transition Award: Functional genomics of acute myeloid leukemia. $ 150’000.-

Dr. Yury Monczak

2017-2018  PI of an educational grant from Janssen Pharmaceuticals. $ 205’000.-

Dr. April Shamy

2015-2018  CIHR Transitional Operating Grant. Co-Investigator. $ 1’600’000.-

2. Scholarly works published in the 2017 calendar year (in press not included):

Assouline, Sarit


Blostein, Mark


Gyger, Martin


Johnson, Nathalie


Knecht H, Johnson NA, Haliotis T, Lichtensztejn D, Mai S. Disruption of direct 3D Telomere-TRF2 interaction through two molecularly disparate mechanisms is a hallmark of primary Hodgkin and Reed-Sternberg cells. (Front Cover and Featured Article; Paper of the Month, LDI) Lab Invest. 2017, 97:772-781.


Knecht, Hans

Knecht H, Johnson NA, Haliotis T, Lichtensztejn D, Mai S. Disruption of direct 3D Telomere-TRF2 interaction through two molecularly disparate mechanisms is a hallmark of primary Hodgkin and Reed-Sternberg cells. (Front Cover and Featured Article: Paper of the Month, LDI) Lab Invest. 2017, 97:772-781.


Mercier, François


Patenaude, François

Reaume MN, Basappa NS, Wood L, Kapoor A, Bjarnason GA, Blais N, Breau RH, Canil C,

Shamy, April


Sirhan, Shireen


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:

Two staff physicians reported Consulting activities in the private sector for 3 days over the year.

Respectfully submitted,

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