Hôpital général juif
Jewish General Hospital

Hôpital d'enseignement de l'Université McGill
A McGill University Teaching Hospital

SERVICE DE MÉDECINE GÉNÉTIQUE - DIVISION OF MEDICAL GENETICS
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Annual Report
Division of Medical Genetics
Department of Specialized Medicine - Jewish General Hospital
January 1 - December 31, 2020

PREAMBLE

Medical Genetics had been a Department at the Jewish General Hospital from 2005-2018. It was the first such department in a hospital in Quebec. Since the end of 2018, with the restructuring of hospital departments in Quebec by the MSSS, Medical Genetics has been a Division in the Department of Specialized Medicine, at the Jewish General Hospital. The academic activities of Dr. David Rosenblatt can be found in the annual report of the Finestone laboratory (https://publications.mcgill.ca/humangenetics/faculty-profiles/finestone/). Information on academic and research activities of all McGill faculty members can also be found in the annual report of the McGill Department of Human Genetics.

EXECUTIVE SUMMARY

HIGHLIGHTS

It is a great honour to acknowledge in this report that Dr. William Foulkes was awarded "The Prix Wilder-Penfield" by the Government of Quebec. This award is part of "The Prix du Québec" which, since 1977, are awards given by the Government of Quebec to individuals for cultural and scientific achievements. The Wilder-Penfield has been given out since 1993 for outstanding individuals in the areas of biology, medicine, and engineering. Dr. Foulkes is an internationally recognized expert in the area of hereditary cancer and we are all extremely proud of this well-deserved recognition. The only other scientist from the JGH and LDI to have received this award was Mark Wainberg, Ph.D.

There are two new members of the Division in 2020. Catherine Hudon, a graduate of the McGill Genetic Counselling program with previous experience in Cancer Genetics, was hired to replace Marie Jeanjean who is currently working in Miami. Kristel Zapico was hired to replace Rose-Mary Scigliano as the secretary in cancer genetics. Although new to the hospital, she has rapidly become a valuable team player.

This year plans were finalized and approved for the renovation of the space on A8 beginning in 2021. In preparation for the renovations, almost all the cancer genetic charts that had accumulated over decades were catalogued by Medical Records and sent to storage. The staff in Medical Genetics has adjusted very quickly to the need to retrieve old files on active patients.

CHALLENGES

2020 has not been a typical year, and like for all services in the hospital the way care is provided to patients has had to change. Because of our adhering to public health recommendations and increasing virtual consultations and follow-ups, it is difficult to judge the meaning of statistics in 2020 when compared to those of 2019. Total activity in prenatal diagnosis was 21% decreased and that in cancer genetics was decreased 8% compared to 2019, and approximately 70% of all clinical contact was virtual.

The Division is continuing to function without a full complement of genetic counsellors. Although Catherine Hudon was hired (June 2020) as a full time replacement for Marie Jeanjean (left August 2019) in cancer genetics, Janine El Helou transferred from 0.6 to 1.0 FTE in prenatal diagnosis because of the medical leave of Maria Lalous (October 2020) leaving Cancer Genetics and Prenatal Diagnosis understaffed.

A major challenge for the optimal care of patients remains in the area of communication and electronic resources. There is as yet no common platform at the JGH for all the needed information for patients in cancer genetics. For patients in prenatal diagnosis, there is no easy way for non-physicians to obtain results on tests performed on the fetus at the MUHC. Although the Dossier santé Québec (DSQ) is an excellent platform, it does not contain all necessary results, and also in not easily accessible to non-physicians.

There remains a very long waiting list for patients with a strong family history of cancer but for whom immediate action is not urgent. Now that the physical structure of the unit has been improved, efforts must be increased to find innovative ways to handle patient needs in a timely fashion.

The MSSS reorganization that caused the change in status of Medical Genetics from a Department to a Division in Specialized Medicine remains a challenge. Although the Department of Specialized Medicine is a big tent and welcoming, some of the key activities in Medical Genetics, particularly in prenatal diagnosis, are not central to the mission of Specialized Medicine. It would be optimal to reinstate departmental status.

DIVISION STATUS UPDATE

Mission and objectives of the Division

Medical Genetics at the Jewish General Hospital is committed to the best possible patient care and teaching in the area of prenatal diagnosis. It is committed to excellence patient care, teaching and research in Hereditary Cancer. In the area of Hereditary Cancer Research, it aspires to being among the best centers in the world.

The Division strives to provide comprehensive service to our clientele. Its priority is to assure that sufficient resources are available for prenatal, cancer and other general genetics services at the Jewish General Hospital. The Division of Medical Genetics at the Jewish General Hospital

attempts to make the needs of both individuals and families in the area of medical genetics better known to the hospital and the community at large.

NOMINATIVE LIST OF ACADEMIC STAFF AND McGILL RANK

Janine El Helou	Faculty Lecture
Catherine Hudon	Faculty Lecturer (pending) (Started seeing patients July 2020)
William Foulkes	Professor
Maria Lalous	Faculty Lecturer (Medical leave October 2020)
Lynn Macrae	Faculty Lecturer
David Rosenblatt	Professor
Nora Wong	Faculty Lecturer

Nora Wong (1.0 FTE), Lynn Macrae (0.6 FTE), Catherine Hudon (1.0 FTE) and Janine El Helou (0.4 FTE), are genetic counsellors who provide service in cancer genetics. Maria Lalous (1,0 FTE) and Janine El Helou (0.6 FTE) are genetic counsellor in the area of prenatal diagnosis. Rose-Mary Scigliano (transferred to another division in 2020), Kristel Zapico (since August 2020) and Martah Urquilla provide administrative support for the division, with various other individuals providing help on an ad hoc basis.

Laura Hayes has the responsibility to help patients who carry mutations in cancer susceptibility genes navigate the medical system and obtain the follow-up care they require. This has been particularly important during the pandemic.

Dr. Laura Russell, Dr. Bettina Mucha-Le Ny, and Dr. Thomas Kitzler are Medical Geneticists based at the MUHC with associate appointments in the JGH Division. Dr. Russell has experience in all areas of Medical Genetics with specific expertise in syndromes and developmental abnormalities. Dr. Much-Le Ny is the acting chief of the Division of Medical Genetics in the Department of Specialized Medicine at the MUHC and is the faculty member responsible for hospital affairs the Department of Human Genetics at McGill. Dr. Kitzler is a clinician scientist with expertise in renal genetics; he also has a clinical interest in cancer genetics.

Dr. William Foulkes supervises the clinical and research aspects of hereditary cancer predisposition at the JGH. In his role as Director of the Program in Cancer Genetics, housed in the Departments of Human Genetics and Oncology at McGill, he has succeeded in bringing expertise together from these two different but crucially important disciplines. Dr. Foulkes divides his time between the MUHC and the JGH. His close links to the Departments of Oncology and Pathology, and to a number of surgical divisions, reflects the multidisciplinary nature of the clinical service.

Dr. David Rosenblatt is the Division Chief. His PEM has been at the JGH since 2019. His research laboratory has remained at the Research Institute of the MUHC. His area of research is inherited metabolic disease, specifically inborn errors of folate and vitamin B_{12} metabolism. Dr. Rosenblatt provides medical supervision of the activities in prenatal diagnosis at the JGH.

CLINCAL ACTIVITIES

On the eighth floor of the A Pavilion, the division has administrative space and a dedicated counselling room, primarily used for prenatal diagnosis. Plans were finalized in 2020 for complete renovation of the space starting in January 2021.

Until the onset of the COVID pandemic, the genetic counsellors in prenatal diagnosis also saw patients in Obstetrical Ultrasound in Pavilion H. Also, most of the clinical consultations in cancer genetics took place in the Cancer Prevention Centre in the Segal Cancer Centre in Pavilion E, providing state of the art facilities for managing individuals and families with a hereditary predisposition to cancer.

Since September 2019, the Hereditary Cancer team has a new initiative approach to genetic testing of women recently diagnosed with breast cancer. This is the GREAT/AGATA clinic, whereby a research genetic counsellor (Zoulikha Rezoug) is responsible for counselling and arranging *BRCA1*, *BRCA2* and *PALB2* genetic testing for all women diagnosed with first primary breast cancer, without regard to family history or age. The program is funded to run for 3 years at the JGH, MUHC and SMH jointly by the JGH and the Quebec Breast Cancer Foundation. To date, 340 women received breast cancer genetic counselling, 188 of which were JGH patients. Genetic test results are available for 250 patients at all sites, with a positivity rate of 5.2% (13/250), comprised of *BRCA1* (9 patients), *BRCA2* (4 patients) and *PALB2* (0). The program has received strong endorsement from the treating medical and surgical oncologists and has benefitted from the key role played by Dr. George Chong, in the Department of Pathology, a member of OPTILAB.

CANCER GENETICS Annual Statistics (2019-2020)
Clinical Activities

Consultation Type	2019	2020
New consultations	549	525
Return visits	390	528
Phone consults	421	202
Total	**1360**	**1255**
Year over Year Ratio		**0.92**

In **Cancer Genetics** there were 525 new visits and 528 follow-up visits in 2020 as compared to 549 new visits and 390 follow-up visits in 2019. In this very difficult COVID year, 71.4% of the new visits and 78.2% of the follow-up visits were virtual visits. In addition there were 202 total phone calls in 2020 as compared to 421 in 2019.

The growth of non-invasive techniques for prenatal diagnosis and the rapid advances in next generation genetic technologies continue to have significant impact on current counselling models of practice. The genetic counsellors are currently evaluating new counselling approaches to ensure patients benefit from state of the art genetic services, while ensuring education and

patient guided-care. Genetic counsellors share their knowledge with many McGill University students registered in the Genetic Counselling master program, the medical faculty or residents, and fellows from McGill and other universities. 2020 has been particularly challenging for teaching since consultations as well as follow-up visits moved to virtual platforms.

PND Annual Statistics (2005-2013; 2018-2020)
Clinical Activities

Consultation Type	2005	2006	2007	2008	2009	2010	2011	2012	2013	2018	2019	2020
new consultations	245	281	260	203	304	283	301	371	316	319	375	321
return visits	75	162	112	306	156	97	123	204	217	220	331	279
phone consults	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3*	384	834	614
Total	**320**	**443**	**372**	**509**	**460**	**380**	424	**575**	**536**	**923**	**1540**	**1214**
Year over Year Ratio											1.67	0.79

In **Prenatal Diagnosis** there were 321 new visits and 279 follow-up visits in 2020 as compared to 375 new visits and 331 follow-up visits in 2019. In this very difficult COVID year, 63.64% of the new visits and 69% of the follow-up visits were virtual visits. In addition there were 614 total phone calls in 2020 as compared to 834 in 2019.

TEACHING AND LEARNING

Dr. Foulkes and Dr. Rosenblatt are involved in teaching at all levels-undergraduate, graduate and residency training. The genetic counsellors are actively involved in teaching in the M.Sc. program in Genetic Counselling and with residents in several specialty programs, in particular Medical Genetics and Obstetrics and Gynecology.

GENETIC COUNSELLORS: Teaching and other Activities

Nora Wong
Teaching
HGEN 610, HGEN 611
Independent study project committee reviewer
Student supervision

Clinical Training Supervisor-Genetic Counselling Trainees (McGill)-two second year genetic counselling students for 5 weeks each:
Samantha Rojas (Y2)
Robyn Hebert 2020 (Y2)

Tutor 1st year medical students (Block A)
Small group sessions for on Family History Taking and Risk Assessment

Community/Advisory Boards

Genetic Counselling Admissions Committee McGill: Application reviewer
McGill University: Executive Board Member, Advisory Board Member
Communities of Practice: The Society of Gynecologic Oncology of Canada

Maria Lalous
Student supervision
One 2nd year genetic counselling student for 2 weeks
One 2nd year genetic counselling student for 1 week
Two 1st year genetic counselling students for 4 weeks each

Janine El Helou
Student Supervision
One 2nd year genetic counselling student for 10 weeks
One 2nd year genetic counselling student for 4 weeks
One 2nd year genetic counselling student for 1 week
One maternal-fetal medicine fellow for 4 weeks

Teaching:
Class coordinator of HGEN-600D1
Classes taught INDS211, HGEN-617, HGEN-600D1
Teaching to doctor and residents as part of WELS
Academic half day January 10, 2020- role play session

Member of the Genetic Counselling Admissions Committee 2020

Committees and other activities

Co-chair of the genetic counselling awareness committee of the Canadian Association of Genetic Counsellors: Individuals who are interested in a career in genetic counselling shadowing in cancer clinics

Conferences attended:
New Developments in Prenatal Diagnosis and Medical Genetics**.** May 13, 2020.

12th Annual Philadelphia Prenatal Virtual Conference. June 4th- June 6th, 2020.
European Society for Human Genetics. June 6-9, 2020.
Canadian Association of Genetic Counsellors Annual Education Conference. October 21-23, 2020.

Lynn Macrae
Student Supervision
One 2nd year genetic counselling student for 3 weeks
One 1st year genetic counselling students for 4 weeks
HBOC lecture taught in HGEN-600

Application review of genetic counselling candidates

Catherine Hudon
Committees and other activities
Member of the board of Directors of the Canadian Association of Genetic Counsellors (Eastern Representative)
Created Electronic Health Record SOP for Cancer Genetics Clinic
Genetics Practice OSCE for genetic counselling students: Evaluator

PARTNERSHIPS

The faculty of the JGH Division continues to have close working relationships with the hospital and university Departments of Specialized Medicine and Medicine, Oncology, Pediatrics (Neonatology), and Obstetrics.

HONOURS, AWARDS, AND PRIZES

Dr. Rosenblatt is the Chair holder of the Dodd Q. Chu and Family Chair in Medical Genetics at McGill. In 2018 he was awarded the Founders Award of the Canadian College of Medical Geneticists.

As noted above, Dr. Foulkes was awarded Dr. William Foulkes was awarded "The Prix Wilder-Penfield" by the Government of Quebec. In 2020, he also was awarded the MUHC Dept of Medicine Senior Researcher Award and the Dept of Human Genetics Teaching Award. Dr. Foulkes is a James McGill Professor of Medicine at McGill University.

FUNDRAISING

Laura Hayes is supported by funds from the Hereditary Breast and Ovarian Foundation (HBOC).

GRANTS, PUBLICATIONS, AND SERVICES

Highlights for Dr Foulkes were two corresponding author pieces in the same issue of the NEJM – July 20. One was a research letter, introducing a new epidemiological measure of BRCA1/2 associated risk. doi: 10.1056/NEJMc1913988, and the other was an invited "Clinical Implications of Basic Research" piece about bilateral Wilms Tumor. doi:10.1056/NEJMcibr2007784.

CURRENT RESEARCH FUNDING

Dr. W.D. Foulkes

Huang s (PI), Foulkes WD (co-A). Canadian Institutes for Health Research, Exploiting genetic vulnerabilities to improve outcomes in small cell carcinoma of the ovary. 2020-2025: $200,000 CAD to WDF ($952,426 total grant)

Foulkes WD (PI). Canadian Institutes for Health Research, Inherited susceptibility to cancer: from gene discovery to mechanisms to clinical applications. 2016-2023: $2,533,601 CAD

Pollett A (PI); Kim R (PI); Pugh T (PI), Foulkes WD (co-I), 23 others. Canadian Institutes of Health Research, Early detection of cancer in high-risk patients through profiling of circulating tumour DNA. 2018-2022: $40,000 CAD to WDF ($1,977525 CAD total grant)

Foulkes WD (PI). McGill University, James McGill Professor Research endowment. 2016-2022, $525,000 CAD.

Foulkes WD (PI). The Eve Appeal, The development of an International SCCOHT Consortium and Registry. 2020-2022: $49,450 GBP.

Foulkes WD (PI). Québec Breast Cancer Foundation/Jewish General Hospital Foundation, Genetic Rapid, Easy-Access Testing program for women with breast cancer. 2018-2021: $355,000 CAD

Foulkes WD (PI), Sidong Huang. Alex's Lemonade Stand Foundation, Identifying targeted treatments for DICER1-associated sarcomas. 2019-2021: $250,000 USD.

Foulkes WD (PI), Orthwein A (co-PI), Polak, P (Co-A). Canadian Cancer Society, Using mutational signatures and functional genomics to classify breast cancer gene variants. 2019-2021: $200,000 CAD.

Mes-Masson, A-M (PI); Foulkes WD (Co-PI), multiple Co-PIs. Fonds de Recherche du Québec - Santé, Budget alloué dans le cadre du projet FRQS-Réseau de recherche sur le cancer - Axe de recherche et de banques de tissus et données en cancers solides (BTD). 2017-2021: $120,000 CAD

Dr. David Rosenblatt

CIHR Project Grant: Next generation sequencing for the discovery of inborn errors of cobalamin metabolism-funding extension until 2021 16/09-19/08

NIH (R01): Ronin (THAP11) in Neural Crest Cell Development 19/07-24/06
PI: Ross A.Poché Collaborator (PI): David Rosenblatt

PUBLICATIONS IN 2020

Foulkes, William D.

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variants in RAD51C and RAD51D. J Natl Cancer Inst. 2020 Dec 14;112(12):1242-1250. doi: 10.1093/jnci/djaa030.

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3. Apellaniz-Ruiz M, Colón-González G, Perlman EJ, Bouron-Dal Soglio D, Sabbaghian N, Oehl-Huber K, Siebert R, **Foulkes WD**. A child with neuroblastoma and metachronous anaplastic sarcoma of the kidney: Underlying DICER1 syndrome? Pediatr Blood Cancer. 2020 Dec;67(12):e28488. doi: 10.1002/pbc.28488. Epub 2020 Jun 22.

4. Agaimy A, Witkowski L, Stoehr R, Cuenca JCC, González-Muller CA, Brütting A, Bährle M, Mantsopoulos K, Amin RMS, Hartmann A, Metzler M, Amr SS, **Foulkes WD**, Sobrinho-Simões M, Eloy C. Malignant teratoid tumor of the thyroid gland: an aggressive primitive multiphenotypic malignancy showing organotypical elements and frequent DICER1 alterations-is the term "thyroblastoma" more appropriate? Virchows Arch. 2020 Dec;477(6):787-798. doi: 10.1007/s00428-020-02853-1. Epub 2020 Jun 7.

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7. Kamihara J, Paulson V, Breen MA, Laetsch TW, Rakheja D, Shulman DS, Schoettler ML, Clinton CM, Ward A, Reidy D, Pinches RS, Weiser DA, Mullen EA, Schienda J, Meyers PA, DuBois SG, Nowak JA, **Foulkes WD**, Schultz KAP, Janeway KA, Vargas SO, Church AJ. DICER1-associated central nervous system sarcoma in children: comprehensive clinicopathologic and genetic analysis of a newly described rare tumor. Mod Pathol. 2020 Oct;33(10):1910-1921. doi: 10.1038/s41379-020-0516-1. Epub 2020 Apr 14.

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ACADEMIC AND COMMUNITY ENGAGEMENT

Dr. William Foulkes

November 25, 2020
Title: *SMARCA4* and Small Cell Carcinoma of the Ovary, Hypercalcemic type
Research Progress Update, The Eve Appeal, UK (Online presentation)

November 18, 2020
Title: DICER1, microRNA biogenesis, and the thyroid gland
University of Pittsburgh Multidisciplinary thyroid cancer conference. Online presentation

November 6, 2020
Title: How does DICER dice?
Cancer Predisposition Family Conference on DICER1, St-Jude Children's Research Hospital
Online presentation

July 9, 2020
Title: In Conversation with… William Foulkes: How molecular biology can lead to cancer prevention
2020 NCRI Cancer Conference, online (YouTube) – in lieu of Plenary Lecture

SUPPLEMENTARY INFORMATION

Consulting activities: Both Dr. Foulkes and Dr. Rosenblatt are involved in editorial reviews of manuscripts, and on various committees at the local, provincial and national levels. Dr. Rosenblatt completed his term on the committee of INESSS that evaluated the introduction of new laboratory tests in Quebec. He continued to serve on the Genetics Committee of the CIHR. He is a Corresponding Editor of the journals, Molecular Genetics and Metabolism and Human Mutation.

Respectfully submitted,

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