New Developments in the Cancer Cytogenetics Laboratory – implementation of white blood cell counting method for bone marrow cultures

In the Cancer Cytogenetics Laboratory, we culture bone marrow specimens for a short duration (a few hours up to 24 hours) to obtain cells in the metaphase step of the cell division cycle in order to visualize the 23 pairs of chromosomes. Chromosomes, the bearers of the genes, display various and recurrent changes in number and structure in patients affected with haematological cancers. Assessment of the changes in chromosome number and structure are crucial in providing information to physicians on the diagnosis, prognosis and treatment of these diseases.

It is important to obtain a sufficient number of cells in metaphase (this is called the mitotic index), and of sufficient quality (spreading of the 46 chromosomes of the cell on the slide, uniform and appropriate staining) for a successful chromosome analysis with conclusive identification of structural and numerical abnormalities. This is frequently a challenge in bone marrow specimens due to various pre-analytical factors, one of them being a number of dividing cells in the specimens.

The Cancer Cytogenetics Laboratory recently implemented a change in the bone marrow culture set-up with the aim of improving the quality and quantity of metaphase cells in the bone marrow specimens received for chromosome analysis. Previously, we were adding a fixed volume of bone marrow in the culture medium. However, since the spontaneously
Lab Connections

Dividing white blood cells (WBC) are targeted in this test, adding a fixed volume of bone marrow does not accommodate for fluctuating concentrations of WBC especially for elevated counts in acute leukemias. We have hypothesized that inoculation of culture media with the recommended WBC concentration will reduce culture failure, provide consistency between specimens and improve the quality of cytogenetic chromosome analysis. Improved quality leads to improved patient care (more accurate analysis), reduction of technical time for analysis, increased efficiency and ultimately reduced reporting turnaround time.

We chose the Beckman Coulter AcT diff2 to measure WBC counts in our bone marrow specimens. After validation of the instrument measurements with specimens from other HRLMP laboratories (Core lab, Flow Cytometry), we undertook to set-up parallel bone marrow cultures inoculating our current fixed volume and a volume corresponding to $2 \times 10^9$ cells/L. Both cultures were assessed for quality parameters such as mitotic index, metaphase spreading and chromosome staining. Of 47 specimens set-up in parallel, 53% were of better quality with the new inoculation method and 40% were equivalent. Therefore, setting up bone marrow specimens with a fixed WBC count concentration (instead of a fixed volume) has proven to improve the quality of the bone marrow preparations; thereby, resulting in a lower failure rate, more accurate diagnosis and a reduction in turnaround time. This additional step in our protocol has gone live on February 3rd.

We would like to thank Diana Munavish Joschko, Melanie Sawka, Walter Scott, Lori Marini and Connie Ellingham for their work on validation and implementation of the AcT diff2 method in the Cytogenetics Laboratory.

By:
Suzanne Demczuk, PHD, FCCMG
Head of Cancer Cytogenomics
Hamilton Regional Laboratory Medicine Program,

News from Administration

We are pleased to announce recent appointments to the HRLMP management and leadership team.

Amanda Hurdowar has accepted the position of Project & Office Operations Manager for the HRLMP and joined the HRLMP as of January 20, 2020. Amanda has extensive experience working on a number of complex and innovative projects with HHS clinical and leadership teams.

Teresa Di Francesco has accepted the position of Senior Manager, Quality, effective December 23, 2019. Teresa is well known to our leadership teams and has held numerous managerial and leadership positions in various disciplines.

Deborah Johnson has accepted the position of Microbiology Manager, effective April 1, 2020. For the last 10 years, Deborah has been the Supervisor of the Microbiology Lab at the HGH site, and the Virology/Molecular Microbiology Lab at St. Joseph’s Healthcare.

Congratulations and all the best in your new roles.

Please click on the links below for the full announcements:
Announcement - Project Operations Manager.pdf
Announcement - Senior Manager, Quality.pdf
Announcement - Microbiology Manager.pdf
Hamilton Health Sciences (HHS) has been named to Forbes’ top employer list!

Click on the link below to read the full story:
https://www.hamiltonhealthsciences.ca/share/forbes-top-employers/?utm_source=HHS+Share+internal&utm_campaign=3e7d28e3f7-EMAIL-CAMPAIGN_2018_08_08_05_40_COPY_01&utm_medium=email&utm_term=0_80933b006d-3e7d28e3f7-72370613

Education News

Registration is open for the Beyond Phlebotomy Symposium.

Join CSMLS and BD on March 28, 2020 in Toronto for sessions led by leaders in the field of phlebotomy.

News from Chemistry and Core Laboratory

New Ortho VITROS Chemistry Analyzers Going Live in May 2020

In August 2019, we announced that the Hamilton Regional Laboratory Medicine Program (HRLMP) Core Laboratories and the Clinical Chemistry and Immunology (CCI) laboratory would be replacing their Abbott Architect series chemistry analyzers with Ortho Clinical Diagnostics VITROS series dry-slide chemistry analyzers, along with Instrument Manager middleware.

Since the receipt of the new Ortho instruments, MLTs, quality specialists, and biochemists have performed and reviewed over 66,000 individual measurements of 84 analytes to verify the manufacturer’s claimed performance. In addition to the verification process, Data Innovations, our middleware vendor, has also written 158 autovalidation rules for 1231 different test codes, based on fluid type, sex, and age, which have been validated by our LIS team.

Currently we are working on the final pieces of getting the Ortho platform ready to be put into operation:
• Testing all 158 autovalidation rules through simulation and real sample testing, to ensure that hardware and software systems are performing and interacting correctly;
• Finalizing all training documents and SOP’s
• Training all core laboratory staff to operate new instruments and middleware software.

In preparation for go-live, we will inform all affected individuals and services that the core laboratories and CCI will be transitioning from the Abbott Architect series of chemistry analyzers to the Ortho Clinical Diagnostics VITROS series in May 2020. The go-live dates will be as follows:
• May 4, 2020: Hamilton General Hospital
• May 11, 2020: Juravinski Hospital
• May 13, 2020: St. Joseph’s Healthcare Hamilton
• May 19, 2020: McMaster University Medical Centre
• May 21, 2020: West Lincoln Memorial Hospital
• May 25, 2020: Clinical Chemistry and Immunology

With change, comes a degree of uncertainty. To ensure that our clinical decision makers are supported, the following precautions will be taking place:

• Between May 4, 2020 and May 6, 2020 at HGH, our initial go-live site, all results will be held and reviewed by MLT’s, to ensure that our autoverification system is working correctly;
• Our discipline director, Dr. Tony Chetty, or his delegates will be on-call to answer questions clinicians may have regarding their results; and
• At JHCC, one Abbott Architect 8200 will be kept for an additional 2 months for dual reporting of tumor markers.

All tests offered on the previous Abbott Architect chemistry analyzers will still be available on the new Ortho platform. There will, however, be some noticeable changes to the reference intervals for a small number of analytes. Some of the critical values will also change. More detailed information will come to specific users and services through different forms of media, including memorandums, before go-live.

The next month will be largely performing validation of middleware rules and training of staff. We appreciate the support of the Core Lab staff in ensuring that these activities stay on track.

An ENORMOUS THANK YOU to the Implementation Team for their hard work and commitment to making this project a success. The Senior Techs, LIS team, Key Operators, Quality Specialists, along with various managers have all contributed greatly and this will help us to realize our goal of a successful transition to the Ortho Vitros instruments in May.

Stay tuned as we get closer to May!

Submitted by:
Brian Banh, Project Manager
Tracy Carrier, Implementation Team Lead

Environment Hamilton’s Good Food Box Program works to make affordable fresh local produce accessible to all Hamilton residents, including vulnerable neighbourhoods.

Participants sign up and pay for a low-cost selection of local fresh produce that is available for pickup at select locations across the city once a month. The non-profit Program works with a local food box provider and uses the cost advantage of purchasing in bulk at wholesale prices to pass the savings on to the household purchasing the Good Food Box. The Program is intended to supplement people’s intake of fresh fruits and vegetables, supporting a healthy diet and lifestyle at a more affordable cost, in addition to supporting local agriculture and reducing the distance that food travels to get to you.

The Hamilton General Hospital has teamed up with the “Good Food Box” program to allow staff to participate in the purchase of these amazing food bags on a monthly basis. In addition, donations are accepted to provide food bags to a patient who would benefit from fresh produce and is being discharged on the delivery day at the HGH.

Jill Boreyko, Senior Technologist, has taken a lead on collecting change from the Core Lab staff to provide bags to some of these patients. Our very generous team has provided up to 5 bags for patients in a month. Way to go Core Lab HGH!

Thank you to all staff for your compassion and to Jill for her leadership in this initiative.

Submitted by:
Tracy Carrier, HRLMP Core Laboratory Manager, General and Juravinski sites
News from Genetics

Molecular testing in Gastrointestinal Stromal Tumors (GIST)

We are excited to announce that the Cancer Genetics Laboratory has started to offer molecular genetics testing for mutational hotspots in the KIT and PDGFRA genes for Gastrointestinal Stromal Tumors (GIST). GIST is the most common mesenchymal neoplasm of the gastrointestinal tract. Approximately 80% of GIST have a KIT mutation, and 5-10% have PDGFRA mutation. Mutational analysis for KIT exons 9, 11, 13 and 17 and PDGFRA exons 12, 14, and 18 is recommended for aiding with diagnosis when immunohistochemistry is negative or inconclusive as well as to predict the response to treatment with tyrosine-kinase inhibitors (1).

The above listed exons of the KIT and PDGFRA genes are covered on the AmpliSeq Cancer HotSpot V2 panel (ThermoFisher) which we already use in our laboratory for companion diagnostics in lung, colorectal, thyroid cancers and melanoma. The specimen requirements are the same as for other molecular tests for solid tumors: 5 unstained FFPE slides with tissue specimen 5-10 micron thick + 1 stained H&E slide with area containing tumor circled. Requisition and pathology report should accompany each test request.

By:
Dr. Daria Grafodatskaya, Genetics

References:

Congratulations and all the best to Connie Ellingham and Diana Munavish Joschko, who both retired from the HRLMP Cytogenetics and Cancer Genetics laboratory.

Connie Ellingham retired on January 22, 2020. She worked for 28 years in the Core Lab and over 3 years in Cytogenetics Lab. In the core lab Connie was one of the first MLA’s to be involved in the skill mix initiative.

During her career Connie was the recipient of two awards - a Resident Teaching Award and Medical Laboratory Technology Excellence Award.

Connie truly made a difference in our day-to-day laboratory activities with her positive attitude. A celebration tea saw over 100 people attending from across HHS, not only the laboratory.

Connie will be greatly missed by her colleagues and we wish her wonderful time with her family in her retirement!

Teresa Di Francesco (L) and Connie Ellingham (R)

Diana Munavish Joschko worked as a MLT since 1980, and as a cytogenetics MLT since 1990 and worked over 10 years in the HRLMP Cytogenetics
laboratory and dedicated 40 years to a career that she loved.

Diana was a valuable member of our team and brought her enthusiastic personality to all she did. She was instrumental in a number of validation and quality improvement projects in Cytogenetics Laboratory.

Her commitment to patient care, quality work, knowledge, laughter and singing will be missed by all and we wish her well as she starts a new chapter in her life!

The HRLMP Genetics laboratory welcomes our new laboratory staff: Emily McDonald, Jennifer Wale and Danielle Waite.

Microbiology News

Congratulations to Dr. Deborah Siegal, Hematologist at the Juravinski site, for being a recipient of a 2020 ASH Scholar Award to support her research to improve anticoagulant safety and anticoagulant use after GI bleeding.

Congratulations to Rajan Dahal, Senior Technologist in the HRLMP Microbiology laboratory, for being invited to speak at the CSMLS National Annual Meeting, LABCON 2020, in Winnipeg, Manitoba.

Rajan will present on Friday, June 5th, 2020 and the title of his talk is: Sharing lessons learned from inadvertent possession of risk group 3 pathogens in a regional level 2 laboratory.

Click on the link below to learn more about LABCON 2020:
https://labcon.csmls.org/
Quality News

Preparation for HRLMP’s 2020 IQMH Accreditation visit

Our next IQMH peer assessment is scheduled to take place on April 20-24, 2020.

During this time, the assessment team will assess how our quality management system (QMS) is functioning against more than 500 accreditation requirements.

Preparations are well underway with HRLMP staff members performing focused audits in their departments and ensuring that records will be available for the assessors to review.

How can staff make sure they are IQMH ready?

1. Complete the QMS at a glance eLearn module
2. Complete all mandatory eLearning assignments on https://elearning.hrlmp.ca
3. Complete your Paradigm action items
4. Familiarize yourself with where records for equipment, maintenance and inventory are stored in your department
5. Document what you do – inventory control, temperature and humidity charts, bench decontamination, maintenance, training records, etc.
6. Use only controlled copies of SOPs, charts and forms
7. Follow safety precautions in your laboratory – wear your PPE.
8. Take time to reflect on the excellent quality of care you provide to our patients every day.
9. Be proud to share the excellent work you do every day with the IQMH assessors.
10. Remember that you do not need to know all of the answers yourself; ask someone to help.

An IQMH assessment is an opportunity for us to proudly share what we do in providing excellent service to our patients.

Thank you to everyone for his or her time and effort in preparing for this visit!

Submitted by:
HRLMP Quality Team

The Specimen Collection Centre’s (SCC) participated in a Patient Survey throughout the month of November. This survey consisted of five questions related to their recent visit to the SCC.

Three hundred and forty-five (345) responses were received with overwhelmingly positive feedback.

Many comments included congratulating the staff for an excellent job, the caring and kindness of the staff, and that they performed a painless phlebotomy.

We also received some concerns that we will focus on and work to improve the patient experience moving forward.

A big shout out to all the staff in the SCCs across all sites for your hard work and patient focus. Your kindness, compassion and professionalism is greatly appreciated by your patients and your teams.

Submitted by:
Tracy Carrier, Sue McIntee and Aliya Merchant,
HRLMP Core Laboratory and SCC Managers