

ANNUAL REPORT for 2018
Division of Medical Biochemistry
Department of Medicine – Jewish General Hospital
January 1, 2018 – December 31, 2018

SUMMARY

(1) Continuing the implementation of the digitalized Patient Order Sets throughout the Jewish General Hospital and continue to expand this throughout the CIUSSS including LTC and eReferrals.

(2) To expand Special Chemistry testing by incorporating Mass Spectrometry in separation techniques, to further reduce costs and developing mass spectrometry assays.

(3) Upgrade out-of-date, overtaxed and sluggish instrumentation particularly in the Corelab and Special Hematology sections.

(4) To work on a Mobile app development for critical values alert service with Concordia. The purpose of the App is to allow instantaneous transfer of the critical patient result to the physician's phone.

(5) Try to get funds and continue the upgrading of the Proteomics Laboratory at the Jewish General Hospital.

(6) Digital Health and IT upgrade implementation

1. Research and publications:

Research

- The Proteomics Department at the Jewish General Hospital has had 14 projects that were either completed or ongoing this past year, including 7 collaborations with different researchers within the Lady Davis Institute/Jewish General Hospital.

2. Teaching and learning (undergraduate and graduate):

2.1 MacNamara, Elizabeth, M.D., FRCPS(C)

Undergraduate, McGill University
Medical Student Elective (4 week period)
Medical Biochemistry Resident (12 month/year)
Medical Student elective (4 week period)
Attendance at Medical Grand Rounds (4/month)
Internal Medicine Rounds
Palliative Care Attending on 4M, (26weeks/year)
Palliative Care (6 weekends/year)
Palliative Care on call (1 in 6weeks/year)

Palliative Care Residents' Teaching on wards
LDI Cancer Seminars
Attendance at the Association des Médecins Biochimistes du Québec/Canadian
Association of Clinical Biochemists Annual Congress
Comité de suivi des examens(FMSQ)
Mass Spectrometry: Applications to the Clinical Lab (MSACL)
Canadian Society of Palliative Care Physicians Conference, Alberta
Palliative Care Continuing Professional Education Day, McGill
Abstract Reviewer for the 22nd International Palliative Care Congress of Canada

Lectures given:

CIUSSS West-Central Montreal, Frontline Services Medical Forum.
-How family medicine physicians from the community and the CIUSSS specialists can work together to improve the patient experience.

AMBQ- Journée de Développement professionnel continu
-Pertinence des analyses de biochimie médicale : expérience du JGH

Medical Grand Rounds, Palliative Care-JGH
-Becoming A Resident In Your 60s: Learning The Obvious In Palliative Care With Presentations Of Three Clinical Scenarios

Biochemistry and Metabolic Medicine Program
Kuwait Institute for Medical Specializations (KIMS)
-Clinical Audits- Theory And What Makes A Good And Bad Audit
-Examples in the Laboratory
-Laboratory Errors- Do They Matter
-Bariatric Surgery- Pre and Post Op Complications

Medical Biochemistry- Jewish General Hospital
-Gastric Bypass Metabolic problems

2.2 Eintracht, Shaun, M.D., FRCPS(C)

Undergraduate, McGill University
Postgraduate, McGill University
Resident Supervision/One-on-One Teaching
McGill Medical Biochemistry Residents teaching (12 month period)
Teaching of Hematology and Rheumatology Resident
Attendance at Medical Grand Rounds (4/month)
Attendance at the Association des Médecins Biochimistes du Québec/Canadian
Association of Clinical Biochemists Annual Congress
Internal Medicine Rounds
Journal Club (Ad hoc basis)

Lectures given:

Jewish General Hospital, Montreal, Québec
-Benefits of Ketogenic Diet
-Pseudo Hyperkalemia

3. Involvement in the community:

4. Partnerships:

- Dr. MacNamara has been appointed as the Chair and External Examiner for the Medical Biochemistry and Metabolic Medicine Program, Kuwait Institute for Medical Specialization (KIMS). Duties include reviewing the exam questions, participating in the oral module of the final exam, and marking the exam with the members of the exam committee.
- Abstract Reviewer for the 22nd International Palliative Care Congress of Canada
- Vice President of Canadian Association of Medical Biochemist: 2016-present
- Dawson College

5. Milestones:

Dr. Christoph Borchers has been appointed Head of the Division of Clinical and Research Proteomics at the Jewish General Hospital.

Dr. René Zahedi has been appointed the facility manager of the Proteomics Laboratory, Jewish General Hospital.

SECTION I – DIVISION STATUS UPDATE

**1. Mission and Objectives of the Division
Mission Statement**

To provide laboratory and clinical services consistent with the needs of the health care team and their patients in a professional and caring manner.

To initiate and collaborate in research activities directed towards the improved understanding of disease, its diagnosis and monitoring.

To ensure the optimal use of the laboratory service.

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

Dr. Elizabeth MacNamara, Medical Biochemist, Chief, Division of Medical Biochemistry, Jewish General Hospital
Associate Professor of Medicine, McGill University (active)

Dr. Shaun Eintracht, Medical Biochemist, Division of Medical Biochemistry, Jewish General Hospital
Assistant Professor of Medicine, McGill University (active)
JGH Medical Biochemistry Site Director Optilab

SECTION II – GRANTS, PUBLICATIONS AND SERVICE OUTSIDE OF MCGILL

1. Grants and Awards received: currently active

Agency	Title	PI	Time Period	Total amount awarded to Dr. Borchers
Ministry of Economy and Innovation - Quebec	Curbing Atherosclerosis Through Precision Medicine	C. Borchers T. Alquier JC. Tardiff	2018-22	\$237, 500
Genome Canada / Genome BC	Proteogenomic Improved Guided Quantification Pipeline (PIGQpipe): Toward Personalized Targeted Proteomics	C. Borchers	2018-21	\$556, 472
NSERC - EGP	Molecular characterization of SSI products from Qu biologics	C. Borchers	2018-19	\$25, 000
The Fonds de recherche du Québec and the Flemish Research Foundation	Innovative cleavable link strategy based on mass spectrometry for the elucidation of drug binding sites	C. Borchers	2017-20	\$298, 450
Genome Canada / Genome BC	The Pan-Canadian Proteomics Centre: An Integrated Platform for Comprehensive, Innovative, Translational Proteomics Research in Canada	C. Borchers L. Foster	2017-22	\$7, 467, 485
Genome Canada / Genome BC	The Metabolomics Innovation Centre	C. Borchers D. Wishart	2017-22	\$1, 782, 990
CFI-MSI	The Metabolomics Innovation Centre	C. Borchers D. Wishart	2017-22	\$899, 215

Personal Support Awards (Indicate type of award, agency, term)

Agency	Subject	\$ /Year	Year
The Warren Y. Soper Charitable Trust	The Innovative Translational Proteomics Program	100, 000	2015 - 24
Segal McGill Chair	Molecular Oncology	40, 000	2014 - 19
BC Leading Edge Endowment	LEEF Chair	200, 000	2011 - 28

2. Scholarly works published in the 2018 calendar year:

Publications

Chen M., Gerson H., Eintracht S, Nessim SJ, MacNamara E.
Effect of Hemodialysis on Levels of High-Sensitivity Cardiac Troponin T. Am J Cardiol. 2018 Dec 1; 120(11):2061-2064.

Glisovic S, Eintracht S, Longtin Y, Oughton M, Brukner I.
Rectal swab screening assays of public health importance in molecular diagnostics: Sample adequacy control. J Infect Public Health. 2018 Mar-April 11(2):234-237

Anwar MA, Dai DL, Wilson-McManus J, Smith D, Francis GA, Borchers CH, McManus BM, Hill JS, Cohen Freue GV.
Multiplexed LC/ESI-MRM-MS-based Assay for Identification of Coronary Artery Disease Biomarkers in Human Plasma.
Proteomics ClinAppl, 2019 Jan 11:e1700111. doi: 10.1002/prca.201700111. [Epub ahead of print]. IF: 3.567

Shultis D, Mitra P, Huang X, Johnson J, Khattak NA, Gray F, Piper C, Czajka J, Hansen L, Wan B, Chinnaswamy K, Liu L, Wang M, Pan J, Stuckey J, Cierpicki T, Borchers CH, Wang S, Lei M, Zhang Y.
Changing the Apoptosis Pathway through Evolutionary Protein Design.
J MolBiol, 2019 Jan 6. pii: S0022-2836(18)31061-1. doi: 10.1016/j.jmb.2018.12.016. [Epub ahead of print]. IF: 4.894

Wang R, Sheps JA, Liu L, Han J, Chen PSK, Lamontagne J, Wilson PD, Welch I, Borchers CH, Ling V.
Hydrophilic bile acids prevent liver damage caused by lack of biliary phospholipid in Mdr2^{-/-} mice. J Lipid Res, 60(1): 85-97 (2019).

Popp R, Li H, Borchers CH.
Immuno-MALDI (iMALDI) mass spectrometry for the analysis of proteins in signaling pathways.
Expert RevProteomics, 15(9): 701-708 (2018). IF: 3.489

Han J, Higgins R, Lim MD, Atkinson K, Yang J, Lin K, Borchers CH.
Isotope-labeling derivatization with 3-nitrophenylhydrazine for LC/multiple-reaction monitoring-mass-spectrometry-based quantitation of carnitines in dried blood spots.
Anal ChimActa, 1037: 177-187 (2018).

Michaud SA, Sinclair NJ, Pětrošová H, Palmer AL, Pistawka AJ, Zhang S, Hardie DB, Mohammed Y, Eshghi A, Richard VR, Sickmann A, Borchers CH.
Molecular phenotyping of laboratory mouse strains using 500 multiple reaction monitoring mass spectrometry plasma assays. Common Biol, 1:78 (2018)

Zahedi RP, Parker CE, Borchers CH.
Immuno-MALDI-TOF-MS in the Clinic.
ClinChem, 64(9):1271-1272 (2018) IF: 8.008

Penn AM, Bibok MB, Saly VK, Coutts SB, Lesperance ML, Balshaw RF, Votova K, Croteau NS, Trivedi A, Jackson AM, Hegedus J, Klourfeld E, Yu A YX, Zerna C, Modi J, Barber PA, Hoag G, Borchers CH; SpecTRA study group.
Validation of a Proteomic Biomarker Panel to Diagnose Minor-Stroke and Transient Ischaemic Attack: Phase 2 of SpecTRA, a Large Scale Translational Study. Biomarkers, 793-803 (2018). IF: 2.016

Wölter M, Okai CA, Smith D, Ruß M, Rath W, Pecks U, Borchers CH, Glocker MO.
Maternal Apolipoprotein B100 Serum Levels are Diminished in Pregnancies with Intrauterine Growth Restriction and Differentiate from Controls.
Proteomics ClinAppl, 12(6): e1800017. (2018). IF: 3.814

Mahdavi S, Jenkins DJA, Borchers CH, El-Sohemy A.
Genetic Variation in 9p21 and the Plasma Proteome.
J Proteome Res, 17(8): 2649-2656 (2018). IF: 4.268

Mnatsakanyan R, Shema G, Basik M, Batist G, Borchers CH, Sickmann A, Zahedi RP.
Detecting post-translational modification signatures as potential biomarkers in clinical mass spectrometry.
Expert Rev Proteomics, 15(6): 515-535 (2018). IF: 3.489

Bhowmick P, Mohammed Y, Borchers CH.
MRMAssayDB: an integrated resource for validated targeted proteomics assays. Bioinformatics, 34(20): 3566-3571 (2018). IF: 5.481

Popp R, Basik M, Spatz A, Batist G, Zahedi RP, Borchers CH.
How iMALDI can improve clinical diagnostics.
Analyst, 143(10): 2197-2203 (2018). IF: 3.885

Parker CE, Borchers CH.
The Special Issue: Clinical Proteomics for Precision Medicine.
Proteomics ClinAppl, 12(2) (2018). IF: 3.814

Boczonadi V, King MS, Smith AC, Olahova M, Bansagi B, Roos A, Eyassu F, Borchers C, Ramesh V, Lochmüller H, Polvikoski T, Whittaker RG, Pyle A, Griffin H, Taylor RW, Chinnery PF, Robinson AJ, Kunji ERS, Horvath R.
Mitochondrial oxodicarboxylate carrier deficiency is associated with mitochondrial DNA depletion and spinal muscular atrophy-like disease.
Genet Med, 20(10): 1224-1235 (2018). IF: 8.229

Luehr TC, Koide EM, Wang X, Han J, Borchers CH, Helbing CC.
Metabolomic insights into the effects of thyroid hormone on Rana [Lithobates] catesbeiana metamorphosis using whole-body Matrix Assisted Laser Desorption/Ionization-Mass Spectrometry Imaging (MALDI-MSI).
Gen Comp Endocrinol, 265: 237-245 (2018). IF: 1.999

Liu T, Wang RX, Han J, Hao CZ, Qiu YL, Yan YY, Li LT, Wang NL, Gong JY, Lu Y, Zhang MH, Xie XB, Yang JC, You YJ, Li JQ, Knisely AS, Borchers CH, Ling V, Wang JS.
Comprehensive bile acid profiling in hereditary intrahepatic cholestasis: Genetic and clinical correlations. Liver Int, 38(9): 1676-1685 (2018). IF:4.116

Penn AM, Bibok MB, Saly VK, Coutts SB, Lesperance ML, Balshaw RF, Votova K, Croteau NS, Trivedi A, Jackson AM, Hegedus J, Klourfeld E, Yu A YX, Zerna C, Borchers CH. *Verification of a Proteomic Biomarker Panel to Diagnose Minor Stroke and Transient Ischaemic Attack: Phase 1 of SpecTRA, a Large Scale Translational Study*. *Biomarkers*, 23(4): 392-405 (2018). IF: 2.016

Penn AM, Saly V, Trivedi A, Lesperance ML, Votova K, Jackson AM, Croteau NS, Balshaw RF, Bibok MB, Smith DS, Lam KK, Morrison J, Lu L, Coutts SB, Borchers CH. *Differential Proteomics for Distinguishing Ischemic Stroke from Controls: a Pilot Study of the SpecTRA Project*. *Transl Stroke Res*, 9(6): 590-599 (2018). IF: 3.52

Dilworth D, Gudavicius G, Xu X, Boyce AKJ, O'Sullivan C, Serpa JJ, Bilenky M, Petrochenko EV, Borchers CH, Hirst M, Swayne LA, Howard P, Nelson CJ. *The prolyl isomerase FKBP25 regulates microtubule polymerization impacting cell cycle progression and genomic stability*. *Nucleic Acids Res*, 46(5): 2459-2478 (2018). IF: 10.162

Perzanowska A, Fatalaska A, Wojtas G, Lewandowicz A, Michalak A, Krasowski G, Borchers CH, Dadlez M, Domanski D. *An MRM-Based Cytokeratin Marker Assay as a Tool for Cancer Studies: Application to Lung-Cancer Pleural Effusions*. *Proteomics ClinAppl*, 12(2) (2018). IF: 3.814

Brodie NI, Huguet R, Zhang T, Viner R, Zabrouskov V, Pan J, Petrotchenko EV, Borchers CH. *Top-down hydrogen-deuterium exchange analysis of protein structures using ultraviolet photodissociation (UVPD)*. *Anal Chem*, 90(5): 3079-3082 (2018). IF: 6.320

Jardim A, Hardie DB, Boitz J, Borchers CH. *Proteomic Profiling of Leishmaniadonovani Promastigote Subcellular Organelles*. *J Proteome Res*, 17(3): 1194-1215 (2018). IF: 4.269

b. Other publications

CH Borchers, "Newly Funded Genome Canada Projects Focus on Proteomics, Rare Disease, Crop Genomics". Interview for Genomeweb, (01/02/2018)

CH Borchers, "New funding strengthens UVic's national leadership in protein research". Interview for UVic Communications and Media Relations. (23/01/2018)

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

Conference organizational committees

MRM & PRM Proteomics Workshop, Workshop Organizer, Montreal, 16/10 – 19/10/18
8th Symposium of Structural Proteomics, Symposium Organizer, Berlin, Germany, 10/10 - 12/10/18

2nd Int. Workshop of PROTEOMICS – from Introduction to Clinical Applications, Workshop Organizer, Iasi, Romania, 07/09-07/13/18

MRM & PRM Proteomics Workshop, Workshop Organizer, Montreal, 06/26 – 06/29 2018

Membership and service on international, national and provincial professional bodies and societies

HUPO Council	Committee member, 2009-present, once per year, 4 hrs per year
HUPO Marketing Committee	Member & chair, 2015-2018, 24 hours/year
Structural Proteomics Society	Founding member, 2018, 24 hours/year

Grant committees

Grant proposals reviewed

2018: NIH Diabetes – DiaComp Collaborative Funding Program, US NIH National - National Institute of Diabetes and Digestive and Kidney Disease

Thesis review

2018: Popp – University of Victoria (Ph.D.)

Visiting scientists hosted in 2018 (include lab visitors who have spent more than two weeks in your group)

Mengxuan Wang, Fudan University, China (UVic-GBC Proteomics Centre)
 Lucia Gonzalez, CHUAC a Coruña, Spain (UVic-GBC Proteomics Centre)
 Margherita Dell’Aica, ISAS Institute, Germany (JGH-Pr)
 Sheila Garica, University of Campinas, Brazil (UVic-GBC Proteomics Centre)
 Georgia Mitsa, Fresenius Institute, Germany (McGill University)
 IzzahShahid, Forman Christian College, Pakistan (UVic-GBC Proteomics Centre)
 Evgeniy Petrotchenko (McGill University)

Editorships

Editorial Boards (Journal name, years)

Executive Advisory Board for “Proteomics”	2015-present
Executive Editor for “Journal of Proteomics”	2013-present
Member, Editorial Board of “Journal of Metabolomics and Systems Biology”	2013-present
Member, Editorial Board of “Journal of Mass Spectrometry”	2012- present
Member, Editorial Board of “BBA Proteins and Proteomics”	2012-present
Member, Editorial Board of “Proteomics Clinical Application”	2011-present
Member, Editorial Advisory Board of “Journal of Proteome Research”	2008-present
Member, Editorial Board of “Current Molecular Pharmacology”	2006-present
Member, Editorial Board of “Expert Review of Proteomics”	2003-present

Ad hoc reviews (List journals for last three years)

American Journal of Tropical Medicine & Hygiene
Analytical and Bioanalytical Chemistry
Analytical Chemistry
BBA GEN

BBA PRO
Bioanalysis
Bioinformatics
Chemical Science
Clinical Mass Spectrometry
Current Medicinal Chemistry
Expert Reviews of Proteomics
International journal of proteomics
Journal of Chromatography A
Journal of Mass Spectrometry
Journal of Pharmaceutical and Biomedical Analysis
Journal of Proteome Research
Journal of Proteomics
Journal of the American Society for Mass Spectrometry
Molecular and Cellular Proteomics
Nature Biotech
Nature Communications
Oncotarget
Phytochemical Analysis
Proceedings of the Natl Acad of Science USA
Proteome Science
Proteomics
Proteomics Clinical Applications
Scientific Reports

Reviews for journals, book reviews, published commentaries (19 papers reviewed in 2018)

Analytical and Bioanalytical Chemistry, Analytical Chemistry, Bioanalysis, Chemical Science, Current Medical Chemistry, Journal of the American Society for Mass Spectrometry, Journal of Proteomics, Journal of Molecular and Cellular Proteomics, PNAS, Journal of Proteome Research, Phytochemical Analysis, Proteomics, Proteomics - Clinical Applications, Nature Communications, Science Report.

Respectfully submitted,

Elizabeth MacNamara, MD
 Chief, Division of Medical Biochemistry
 Department of Medicine-JGH