

CHELSEA HERDMAN, PhD

Eccles Institute of Human Genetics
University of Utah
15 N 2030 East, Rm 3160
Salt Lake City, UT, 84112
cherdman@genetics.utah.edu

CURRENT POSITION

Eccles Institute of Human Genetics, University of Utah
Postdoctoral Fellow

Salt Lake City, UT
2017-Present

EDUCATION

Université Laval

PhD, Biologie cellulaire et moléculaire

Thesis: Relative roles of UBF and RRN3 in the transcription of the ribosomal RNA genes and ribosome biogenesis determined using *in vivo* mouse models

Québec, QC
2017

Université Laval

MSc, Biologie cellulaire et moléculaire

Accelerated transition to PhD program

Québec, QC
2013

University of Manitoba – Université de Saint-Boniface

BSc, Majeure conjointe en biochimie et microbiologie

Thesis: Synthèse chimique et enzymatique de cis-benzyle-2-méthyle-6-phényle-4-pipéridone

Winnipeg, MB
2011

RESEARCH EXPERIENCE

Eccles Institute of Human Genetics, University of Utah

Postdoctoral Fellow; Advisor: H. Joseph Yost

Salt Lake City, UT
05/2017-Present

- Determined the dynamic transcriptome of small non-coding RNAs with paired total RNA samples during zebrafish heart development (10X scRNA-seq and bulk RNA-seq).
- Analyzed temporal patterns of gene expression during heart development using in-house produced R scripts and various Python packages.
- Generated seven mutant zebrafish lines in transgenic backgrounds based on candidates from the RNA-sequencing data (CRISPR)
- Performed heart regeneration assays to determine the requirements of specific cell types in the regenerative process
- Collaborated on novel CRISPR based screening protocols to identify previously unstudied essential heart genes
- Created a novel genome annotation of zebrafish embryonic hearts

Centre de recherche sur le cancer, Université Laval

Graduate Student; Advisor: Tom Moss

Québec, QC
09/2011-04/2017

- Produced high resolution mapping of the regulatory proteins found on the ribosomal RNA genes in the presence and absence of two essential RNA Polymerase I transcription factors (UBF and Rrn3) (ChIP-seq and qPCR).
- Discovered a novel chromatin boundary upstream of the ribosomal DNA (rDNA) repeat, clarifying our understanding of the chromatin landscape of a poorly mapped region of the genome.
- Revealed that the loss of UBF leads to a synchronous, p53-independent apoptosis specifically in cells transformed by viral and cellular oncogenes.
- Identified a novel regulatory mechanism for establishing and/or maintaining the active state of the rDNA in pluripotent cells based on methylation status.

- Established the *in vivo* role of Extended-Synaptotagmins in mouse.

TEACHING AND MENTORING EXPERIENCE

University of Utah	Salt Lake City, UT
Supervisor of summer undergraduate student, Katherine Morelli	2018, 2019
Supervisor of undergraduate research associate, Avery Abelhouzen	02/2019-present
Supervisor of graduate student, Luke Sanders	11/2018-present
Guest Lecturer, Cell Biology 300	02/2019
Utah Valley University	Orem, UT
Guest Lecturer, Special Topics in Biotechnology	10/2018
Université Laval	Québec, QC
Supervisor of summer undergraduate student, Samuel Boisjoly-Villeneuve	2014
Université de Saint-Boniface	Winnipeg, MB
Lab Instructor, Microbiology	01/2010-04/2010
Lab Monitor, Microbiology	09/2009-12/2009

RELATED PROFESSIONAL EXPERIENCE

Université de Saint-Boniface	Winnipeg, MB
Research Assistant, Physiology Department	03/2010-07/2011
Research Assistant, Chemistry Department	01/2010-04/2010
Four Rivers Medical Clinic Broadway	Winnipeg, MB
Medical Assistant	08/2007-07/2008

FELLOWSHIPS AND AWARDS

<i>Postdoctoral Fellow;</i>	
CIHR Postdoctoral Fellowship (\$50,000/yr)	2020-2023
SDB travel award (\$500), Weinstein Cardiovascular Development Conference	2019
Cardiovascular Development Consortium Collaborative Fellowship (\$48,000/yr)	2018-2019
Prize for best poster presentation, Utah Fish Conference poster competition	2018
Prize for best poster presentation, Utah Postdoc Association poster competition	2018
Travel grant (\$500), International Zebrafish Society	2018
<i>Graduate Student;</i>	
CIHR Frederick Banting and Charles Best Canada Graduate Scholarship (\$35,000/yr)	2013-2016
Travel grant (\$500) for best poster presentation, Journée scientifique des étudiants, ULaval	2015
Travel grant (\$750) for best oral presentation, Journée scientifique des étudiants, ULaval	2012
Leadership and Sustainability Scholarship –Humanitarian, ULaval (\$10,000/year)	2011-2013
<i>Undergraduate Student;</i>	
YMCA/YWCA Young Woman of Distinction Nominee, nominated by the United Way of Winnipeg	2011
Student Community Service Award, United Way of Winnipeg	2006
University entry scholarship (\$1,300), University of Winnipeg	2006
Leadership in sport scholarship (\$1,000), Portage Trail Soccer Club, Winnipeg	2006
Kappa Sigma, École secondaire Kelvin High School	2006
Fred G. Gilbert Memorial scholarship for academic success and leadership (\$750)	2006
Canadian Millennium Scholarship (\$4,000)	2006

SKILLS AND TECHNIQUES

- Isolation of RNA and analysis by transcriptional profiling (RNA-seq)
- Chromatin immunoprecipitation and analysis by sequencing and by quantitative PCR
- Immunofluorescence/Immunohistochemistry and confocal microscopy
- Single cell isolation from tissues and analysis by flow cytometry or single cell RNA-seq
- Statistical analysis of sequencing data (R)
- Phenotypic screening of embryos (mouse and zebrafish)
- Mammalian cell culture (primary and transformed cell lines)
- Isolation of DNA and genotyping by PCR or Southern blot
- Isolation of protein and Western blot
- Mutant generation by homologous recombination in mouse or CRISPR sgRNAs in zebrafish
- Cloning and *in vitro* mutagenesis
- Fully bilingual in French and English

LEADERSHIP EXPERIENCE

- Utah Fish Conference, University of Utah** Salt Lake City, UT
Member of organizing committee 2018
- Planned the inaugural Utah Fish Conference for 95 attendees, built the website, managed publicity for the conference and chaired committee meetings
- RNA Interest Group, University of Utah** Salt Lake City, UT
Facilitator 2017-Present
- Organized in-house and invited speaker seminars
- Cellular and Molecular Biology Program Committee, Université Laval** Québec, QC
Student Representative 2013-2016
- Assisted in the evaluation of the PhD program, initiated a program newsletter, set guidelines for program standards of teaching
- Commission de la capitale nationale du Québec** Québec, QC
Presenter and moderator 2011-2016
- Presented cancer research to visiting school groups of all ages and demonstrated basic lab techniques
- Comité étudiant regroupement cancer, Graduate student committee** Québec, QC
Chair 2012-2015
Member 2011-2012
- Developed a new program, LaboPatient, which was an event organized for patients and their families every three months to explain cancer research
 - Organized multiple scientific events, including local conferences for 200+ people, scientific outreach activities, and invited speaker seminars
 - Represented students on the faculty committees and wrote the statutes of the student committee, helping it to become an officially recognized entity of the CHU de Québec network
- International Students' Program, Université Laval** Québec, QC
Partner for new international students 2012-2014
- Committee to select the department head for BMBMP, Université Laval** Québec, QC
Student Representative 2013
- United Way of Winnipeg** Winnipeg, MB
Board member 2008-2011

Chair of the Youth Relations Council	2008-2011
Member of the Youth Relations Council	2006-2008
Member of the Student Leadership Conference planning committee	2006-2007
Founding member of the Get Something Started initiative	2004-2011
<ul style="list-style-type: none"> Organized outreach activities in schools across Winnipeg, awarded scholarships, planned events, organized a conference, spoke in schools across Winnipeg about leadership 	

PRESENTATIONS

International Conferences

Upcoming:

Canadian Developmental Biology Conference (SDB), Banff, Alberta, Canada (Postdoc, poster, **abstract selected by the organizers for 60 sec science**) Herdman C. Demarest B.L. Hernandez E.J. Yandell M. and Yost H.J. (2019) Dynamic miRNAs and their target mRNAs during zebrafish heart development.

Past:

Weinstein Cardiovascular Development Conference, Indianapolis, Indiana, USA (Postdoc, poster) Herdman C. Demarest B.L. Hernandez E.J. Yandell M. and Yost H.J. (2019) Dynamic miRNAs and their target mRNAs during zebrafish heart development.

Weinstein Cardiovascular Development Conference, Indianapolis, Indiana, USA (Postdoc, **abstract selected by the organizers for a short talk**) Herdman C. Abdul-Wajid S. Sanders L.E., Bisgrove B.W. Su Y-C. Demarest B.L. Serrano MA and Yost H.J. (2019) Neural crest-derived cardiomyocytes prevent adult onset cardiomyopathy and heart failure, and are required for cardiac regeneration.

International Zebrafish Society Conference, Madison, Wisconsin, USA (Postdoc, poster) Herdman C. Demarest B.L. and Yost H.J. (2018) Posttranscriptional regulation by miRNAs during heart development.

Stem Cell Biology, Cold Spring Harbor, USA (PhD, poster) Herdman C. Mars J-C. Boutin J. Hamdane N. Stefanovsky V. Tremblay MG. and Moss T. (2015) Activation and silencing of the ribosomal RNA gene repeats in the differentiated and pluripotent cell states.

OddPols: International Conference on Transcription by RNA Polymerases I, III, IV and V, Ann Arbor, USA (PhD, **abstract selected by the organizers for a short talk**) Herdman C. Hamdane N. Stefanovsky V. Tremblay MG. and Moss T. (2014) Conditional mouse models in the study of the regulation of RNA Polymerase I transcription.

The 19th Annual Meeting of the RNA Society, Québec, Canada (PhD, poster) Herdman C. Stefanovsky V. Hamdane N. Tremblay MG. and Moss T. (2014) Rescuing the UBF knockout in order to investigate the function of UBF post-translational modifications.

Keystone Symposia, Transcriptional Regulation, Santa Fe, USA (PhD, poster) Herdman C. Stefanovsky V. Hamdane N. Tremblay MG. and Moss T. (2014) Rescuing the UBF knockout in order to investigate the function of UBF post-translational modifications.

IRIC Institute for Research in Immunology and Cancer International Symposium on Phosphoinositide Biology, Signalling and Cancer, Montréal, Canada (MSc, poster) Herdman C. Tremblay MG. Jean S. and Moss T. (2012) Regulation of Fibroblast Growth Factor Receptor Endocytosis and Signal Transduction by Extended-Synaptotagmin2.

National Conferences

NHLBI Bench to Bassinet Annual Face-To-Face, Rockville, Maryland, USA (Postdoc, talk) Herdman C. Demarest B.L. and Yost H.J. (2019) Dynamic miRNAs and their target messenger RNAs in zebrafish heart development.

NHLBI Bench to Bassinet Annual Face-To-Face, Rockville, Maryland, USA (Postdoc, talk) Herdman C. Demarest B.L. and Yost H.J. (2018) Dynamic miRNAs and their target messenger RNAs in zebrafish heart development.

NHLBI Bench to Bassinet Annual Face-To-Face, Rockville, Maryland, USA (Postdoc, poster) Herdman C. Demarest B.L. Gorski B. Hill J.T. and Yost H.J. (2017) Bioinformatic analysis of miRNA expression and target mRNAs in embryonic zebrafish hearts.

Local Conferences

Developmental Biology Annual Retreat, Snowbird, University of Utah (Postdoc, poster, 2019)

Developmental Biology Annual Retreat, Snowbird, University of Utah (Postdoc, poster, 2018)

Utah Fish Conference, Crocker Science Center, University of Utah (Postdoc, poster, 2018)

Utah Postdoc Association Poster competition, HSEB, University of Utah (Postdoc, poster, 2018)

Journée scientifique des étudiants, Cancer Research Centre, Université Laval (PhD, poster, 2015)

Journée scientifique des étudiants, Cancer Research Centre, Université Laval (PhD, poster, 2014)

Annual Research Day, Faculty of Medicine, Université Laval (PhD, poster, 2014)

Journée scientifique des étudiants, Cancer Research Centre, Université Laval (PhD, poster, 2013)

Journée scientifique des étudiants, Cancer Research Centre, Université Laval (MSc, talk, 2012)

Annual Research Day, Faculty of Medicine, Université Laval (MSc, poster, 2012)

PUBLICATIONS

Peer-reviewed manuscripts

Capasso TL. Li B. Volek HJ. Khaid W. Rochon ER. Anbalagan A. **Herdman C.** Yost HJ. Villanueva FS. Kim K. Roman BL. (2019) *BMP10-mediated ALK1 signaling is continuously required for vascular development and maintenance*. *Angiogenesis* doi: 10.1007/s10456-019-09701-0

Herdman C. Mars JC. Stefanovsky V. Tremblay MG. Sabourin-Felix M. Lindsay H. Robinson MD. and Moss T. (2017) *A unique enhancer boundary complex on the mouse ribosomal RNA genes persists after loss of Rrn3 or UBF and the inactivation of RNA polymerase I transcription*. *PLoS Genetics* 13(7): e1006899

Hamdane N. **Herdman C.** Mars JC. Stefanovsky V. Tremblay MG. and Moss T. (2015) *Depletion of the cisplatin targeted HMGB-box factor UBF selectively induces p53-independent apoptotic death in transformed cells*. *Oncotarget* 6(29): 27519-27536.

Tremblay MG. **Herdman C.** Guillou F. Mishra PK. Baril J. Bellenfant S. and Moss T. (2015) *Extended Synaptotagmin interaction with the Fibroblast Growth Factor Receptor depends on receptor conformation, not catalytic activity*. *Journal of Biological Chemistry* 290(26): 16142-16156.

Herdman C. Tremblay MG. Mishra PK. and Moss T. (2014) *Loss of Extended Synaptotagmins ESyt2 and ESyt3 does not affect mouse development or viability, but in vitro cell migration and survival under stress are affected*. *Cell Cycle* 13(16): 2616-2625.

Herdman C. Diop L. and Dickman M. (2013) *Carbohydrate Analysis Experiment Involving Mono- and Disaccharides with a Twist of Glycobiology: Two New Tests for Distinguishing Pentoses and Glycosidic Bonds*. *Journal of Chemical Education* 90(1): 115-117.

Jean S. Tremblay MG. **Herdman C.** Guillou F. and Moss T. (2012) *The endocytic adapter ESyt2*

recruits the p21 GTPase activated kinase PAK1 to mediate actin dynamics and FGF signaling. Biology Open 1: 731-738.

De Moissac D. Bohémier M. **Herdman C.** Roch-Gagné M. Paillé J. Johnston C. Arpin-Molinski M. Dupuis G. Saint-Hilaire M. Prairie L. (2012) *Agir! Pour ma santé: une intervention harmonisant services médicaux et services communautaires pour les Franco-Manitobains souffrant de dépression.* Reflets : revue d'intervention sociale et communautaire, 18(1): 155-163.
<http://id.erudit.org/iderudit/1012336ar>

Herdman C and Dickman M. (2011) *An easy and effective demonstration of enzyme stereospecificity and equilibrium thermodynamics.* Biochemistry and Molecular Biology Education 39(5): 341-343.

Review articles

Herdman C. and Moss T. (2016) *E-Syts: the extended story.* Pharmacological Research 107:48-56.

Manuscripts in preparation

Herdman C. Demarest B.L. Morelli K.A. and Yost H.J. *Dynamics of the miRNA transcriptome and target mRNAs during zebrafish heart development.* To be submitted March 2020

SOCIETY MEMBERSHIPS

Society of Developmental Biology
International Zebrafish Society