

McGill's HERO Study: building more resilient communities

A pan-Canadian effort to uncover the biology of adversity and how to build resilience

Everyone experiences stress, even very young children; but we all respond to it differently.



The way our bodies react to stress when we're very young can affect our health for the rest of our lives – and this can vary from person to person. Some children may be exposed to highly stressful life experiences without any negative effects on their development. Others may experience what seem like minor challenges and develop serious physical or mental health issues as a result. To help address the pressing need for personalized early and effective intervention, **McGill University** is joining forces with **Palix Foundation** to lead the next generation of community and healthcare workers. The goal of this study is to learn more about how different children respond to stress and to enable providers and caregivers to better assess and address the impact of significant adversity on the health and development of young children.

In partnership with the Ludmer Centre

The Ludmer Centre for Neuroinformatics and Mental Health is a McGill-affiliated research centre driving innovative, collaborative and global big-data research in genetics, epigenetics, neuroimaging, single-cell genomics, and computational neuroscience. Embedded within the transdisciplinary

ecosystem of McGill University, the Douglas Research Centre, **Patrícia Pelufo Silveira, MD, PhD**, is the Scientific Director of the Epigenetics and Functional Genomics research theme at the Ludmer Centre for Neuroinformatics and Mental Health. Her research group investigates individual differences in the vulnerability to chronic adult conditions, and informs preventative and therapeutic measures.

About the study

In 2015, the Center on the Developing Child at **Harvard University** launched the JPB Research Network on Toxic Stress, a partnership among community leaders, healthcare professionals, and scientists, including McGill University's Dr. Silveira. The team works together to enable providers and caregivers to better assess and address the impact of significant adversity on the health and development of young children. This has given rise to the Health's Early Roots and Origin Study (HERO), now in phase 3 in the USA, establishing stress responsivity based on biological and behavioural data from the children, as well as parental reports. So far, the HERO has developed a robust set of metrics for the early childhood ecosystem to make it possible to:

- Enhance screening for individual differences in sensitivity to adverse experiences through biological measures of stress activation and behavioral measures of resilience;
- Strengthen providers to make targeted referrals to well-matched services and convey credible reassurance for parents, guided by direct assessment of child development and biological indicators of risk;



Patrícia Pelufo Silveira, MD, PhD

Dr. Patrícia Pelufo Silveira (she/her) is an Associate Professor at the Department of Psychiatry at McGill University and the scientific director of the Genomics and Epigenetics Pillar of the Ludmer Centre for Neuroinformatics & Mental Health, based at the Douglas Research Centre. With a multidisciplinary training in General Pediatrics, Neonatal Follow-up, Developmental Biology, and Neuroscience, Dr. Silveira's research focuses on identifying how gene networks interact with environmental adversities early in life, modifying endophenotypes that ultimately affect healthy growth and neurodevelopment, increasing an individual's risk for developing chronic metabolic diseases and psychopathologies across their lifespan. In 2022, she was elected as a Member of the College of New Scholars of the Royal Society of Canada. She is also a Senior Fellow at the Centre for the Center on the Developing Child, Harvard University.

- Augment the capacity to measure variation in intervention effects to inform ongoing individualized management and sustainable payment for effective services.

There has been a strong interest in validating the findings from the HERO study in the Canadian context. Dr. Silveira is currently the Principal Investigator of HERO U.S.. In this role, the Silveira Lab manages the receipt, processing, storage, and assaying of all the biological samples, as well as developing database platforms, performing data analysis and maintaining the digital data uploaded from every site. McGill is therefore very well positioned to lead this effort in Canada, with partner institutions: University of Lethbridge, University of Calgary, and University of British Columbia. Dr. Silveira will be leading this project at McGill, along with Nicole Letourneau, PhD, Michael Kobor, PhD, and Robbin Gibb, PhD (See appendix*), at the partner institutions.

The Palix Foundation and the Resilience Scale Framework

The Palix Foundation is a private foundation based in Calgary, Alberta, that works to mobilize the science of childhood development and its connection to mental health, addiction, and other disease and disorders from the related disciplines of developmental neuroscience, behavioural neuroscience, genetics, and epigenetics. In 2007, the Foundation launched the Alberta Family Wellness Initiative (AFWI) to turn specifically, 'what we know' about child development, addiction and mental health into 'what we do' in practice and service delivery.

In 2023 the AFWI set in motion the Resilience Scale Framework. Founded in the science of the Brain Story, using metaphors developed by the National Scientific Council on the Developing Child at Harvard University and based on its application in community, this promising Framework and toolkit can be applied at the level of individuals, organizations, and communities. The overarching goal of the program is to improve health outcomes for individuals and communities, while fostering collaboration and referrals to improve service provisions.



Specifically, the Resilience Scale metaphor highlights how resilience is influenced by the accumulation of adversity and toxic stress, access to positive supports, and the functioning of learned skills and abilities over time. In addition to the Brain Story Certification Course, the AFWI also offers the Resilience Scale Masterclass, which introduces learners to the science of the Brain Story and Resilience Scale while exemplifying how the Resilience Scale Framework can be applied to build capacity in our communities. Demonstrating a high efficacy, the Resilience Scale Framework provides a valuable and effective tool for knowledge mobilization and implementation that benefits individuals, families and communities.

Biomarkers of stress and resilience

Navigating the complex interplay between environment and psychological well-being, McGill University and the Palix Foundation propose a strategic alliance towards a pan-Canadian effort to reproduce the findings from the HERO U.S. study in a Canadian population (HERO-CAN). With the branding and credibility of the Resilience Scale Framework in parallel with McGill's standards of excellence in research, the HERO-CAN Study is set to investigate stress responsivity and identify biomarkers of resilience. In partnership with the University of Calgary, University of Lethbridge, and University of British Columbia data collection for HERO-CAN will be conducted across three provinces in Quebec, Alberta and British Columbia, using existing platforms and cohorts. Study training, material, and procedures have been standardized, and all sites will use the same questionnaires and data forms. The study will include 204 participants at each of the three collection sites for a total of 612 subjects.

"If we can identify and measure stress in children and understand why and how it impacts some more than others, we will be one step closer to preventing subsequent health problems early in life".

Dr. Silveira

A partnership...

This study aims to create standards and measures to be implemented in pediatric primary care practice as well as other community settings.

This two-year study into capacity building, working with established research sites, and funding the collection and analysis of data, will allow for this unique longitudinal study to help guide routine pediatric practices to identify children at risk for chronic health conditions. This would lead to major advancement in creating and evaluating evidence-based intervention and prevention programs.



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For more information, please contact:

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Join us.

Appendix*



Nicole Letourneau, PhD, RN, FCAHS, FAAN, FCAN, FRSC

Nicole Letourneau is a professor in the Faculty of Nursing and Cumming School of Medicine at the University of Calgary. She holds the Research Excellence Chair in Parent and Child Health. Formerly, she was the Alberta Children's Hospital/Palix Foundation's Chair in Parent-Infant Mental Health and Canada Research Chair in Healthy Child Development.

She is Scientific Director of CIHR's National Health Research Training Platform, Alliance against Violence and Adversity, comprised of over 200 partners across Canada, focused on implementation science training to address violence and adversity affecting girls and women. She is also Director of Research and Education for Solutions to Violence Alberta. She is the PI of the Child Health Intervention and Longitudinal Development Studies Program, examining parenting and child health and development in the context of maternal depression, family violence and other toxic stressors and early childhood adversity. She is also PI of APrON, the Alberta pregnancy cohort of 2200 families funded for follow-up to 12 years of child age. Her research focuses on predictors of and intersections between parental mental health, adversity and child health and development. She is founder of the **ATTACH** and **VID-KIDS** parenting programs, designed to help stressed or depressed parents support their children's healthy development.

Letourneau also currently holds nearly \$6 million in Canadian Institutes of Health Research and other funding and has published 270+ peer-reviewed papers.



Michael Kobor, PhD

Michael Kobor is a Professor in the Department of Medical Genetics at the University of British Columbia (UBC) and the **Edwin S.H. Leong UBC Chair in Healthy Aging (ELCHA)**—a UBC President’s Excellence Chair. He holds the Tier 1 Canadian Research Chair in Social Epigenetics and is an appointed Fellow of CIFAR’s Child and Brain Development Program. Kobor’s research focuses on how social environments and life experiences get “under the skin” through biological embedding to influence health and behavior, translating foundational genetic discovery into interventions and policy to promote healthy life trajectories.

As Director of the newly established ELCHA, Kobor leads the Centre in uniting faculty, trainees, and research personnel across UBC with the aim of performing holistic, interdisciplinary research to better understanding the human life course and factors that influence healthy aging from the time of conception.



Robbin Gibb, PhD

Robbin Gibb has a Bachelor’s degree in Chemistry and a Master’s and PhD in Neuroscience, all from the University of Lethbridge where she is currently a **Professor in the Department of Neuroscience**.

Her research is focused on

1. how prenatal and preconception experience influence brain development and
2. how to improve outcomes for kindergarten children by enhancing early literacy, executive function and self-regulation, and motor skills in preschool children.

She has over 100 publications including journal articles, book chapters, and books. She is a mother of 2 and a grandmother of 8.

