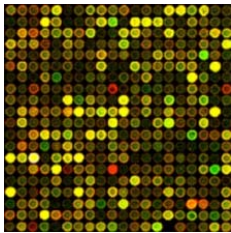




Canadian Epigenetics, Environment and Health Research Consortium (CEEHRC)

Introduction

Epigenetics is the study of changes in the regulation of gene activity and expression that are not dependent on alterations in gene sequence. There is a rapidly growing realization that complex diseases ranging from asthma, diabetes, addiction, schizophrenia, inflammatory bowel disease to the majority of cancers, may involve an interplay between specific environmental factors related to epigenetic regulation of the genetic blueprint. Epigenetics provides a compelling model for how environmental influences throughout development can have life-long (and potentially multi-generational) effects on human health.



Canada has internationally competitive research and technical expertise in epigenetics, within specific nodes of excellence across the country. This CIHR Roadmap Signature Initiative has been established to link that research capacity together, to ensure that Canada plays a leading role in an area of research referred

to as the second revolution in genetics. Epigenetics promises profound new insights into the nature of human health and disease.

Key Research Needs

One of the key health research gaps identified by CEEHRC is the lack of sufficient epigenomic research capacity. Fortunately, Canada has made major infrastructure investments in genomics over the past ten years, through the efforts of Genome Canada and the Canadian Foundation for Innovation. CEEHRC will leverage already existing genomic sequencing infrastructure by developing dedicated epigenetic research capacity focused on human health and disease. CEEHRC can therefore rapidly position Canadian epigenetics research at the forefront of the International Human Epigenome Consortium (IHEC). IHEC seeks to coordinate human epigenome maps for key cellular states relevant to health and diseases.



Also key is the support of innovative research linking epigenetic marks to human health and disease. This requires collaborative multi-disciplinary approaches that integrate all levels of research and understanding of human health. It also requires filling fundamental knowledge gaps by developing new and highly selective molecular tools and diagnostics in a targeted fashion.

Objectives

The overall goal of this pan-Canadian initiative is to position Canada for the rapid translation of epigenetic discoveries into diagnostic procedures and the eventual development of new therapeutics that can improve human health. By supporting and applying epigenetics research on a national scale, CEEHRC will harness its great potential for major breakthroughs in understanding the origins of health and also the etiology, treatment and prevention of many of the chronic diseases currently affecting the Canadian population. Specific CEEHRC objectives include:

- Establishment of a national epigenetics platform that will serve as an essential resource for the generation of human reference epigenomes and that will coordinate national efforts in epigenomic research.
- Translation of epigenetic research discoveries into clinical and medical practice by supporting large-scale epigenetics research. This includes the development of novel molecular tools for diagnostic and therapeutic applications to a wide range of complex disorders.
- Positioning Canadian researchers, clinicians and policy-makers at the forefront of epigenetics science and its translation into health-care deliverables by playing a leadership role in IHEC and other international epigenetics initiatives.

Partnerships

CEEHRC is co-led by the CIHR Institute of Neurosciences, Mental Health and Addiction, the Institute of Genetics and the Institute of Cancer Research, in partnership with most of the other CIHR Institutes. External partners include Genome BC, Genome Quebec, and NeuroDevNet, among others. CEEHRC is currently identifying and developing collaborations with funding organizations and stakeholders to enhance health research in this area. Please contact us to discuss opportunities for knowledge exchange and translation related to epigenetics.

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