



International Human Epigenome Consortium (IHEC)

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InTBIR, October 31, 2017

International Human Epigenome Consortium



Generate reference maps of human epigenomes for key cellular states relevant to health and disease.

→ Ambitious initial goal to complete 1000 epigenomes

Rapid Data Release, Data Coordination, Archiving

Environment

Disease

Aging

Translation into Improved Human Health

Mechanism

Prevention

Diagnosis

Therapy

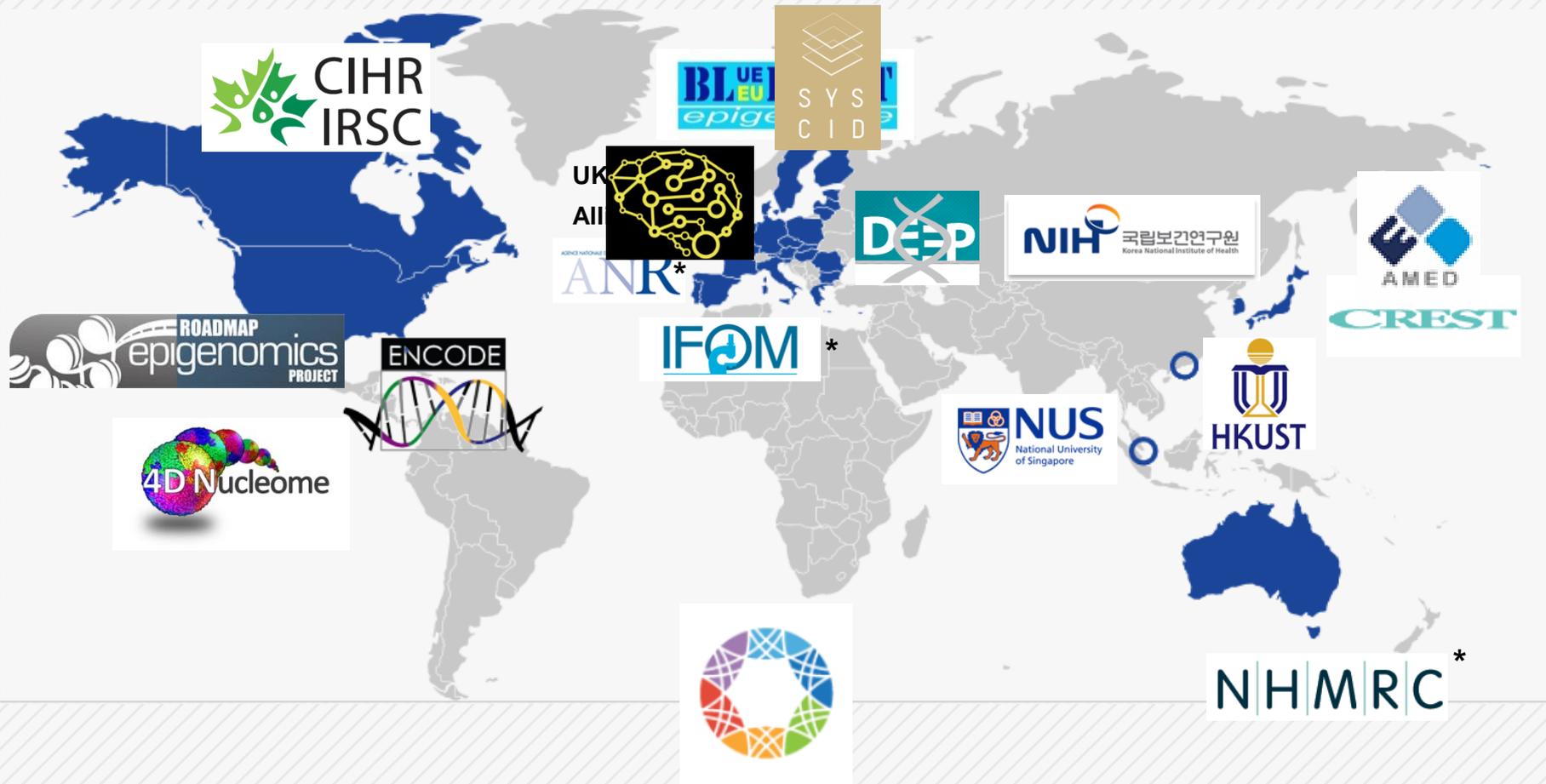
International Human Epigenome Consortium



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- Goals of the Consortium include:
 - Set minimum standards in epigenetic analysis (i.e., “gold standard”)
 - Maximize coverage of human cells/tissues
 - Reduce unnecessary duplication of tissues/cell types
 - Harmonize data collection methods and distribution to facilitate sharing and retrieval of results across countries
 - Initial focus on “healthy” human reference epigenomes, but expansion into disease areas over time

> \$175M USD Investment to Date

IHEC Membership (October 2011-2017)



Key Challenge in November 2013



-
- Member data being produced more quickly than anticipated
 - As initially conceived, an IHEC Data Coordination Centre (DCC) would provide centralized access and analysis for all IHEC data, for all members
 - No central resources developed, so Canadian proposal to move to a common track hub standard among regional/country DCCs
 - Developed as a result of requiring two Canadian DCCs to coordinate their national activities
 - Data Integration Workgroup convened Jan 2014, with a working portal launched in July 2014
-

Including data from other studies

Using IHEC Data Hubs, the Portal will enable external data integration

- Data will be integrated in the Portal interface, and usable in external tools

External Hubs

Available Data Hubs

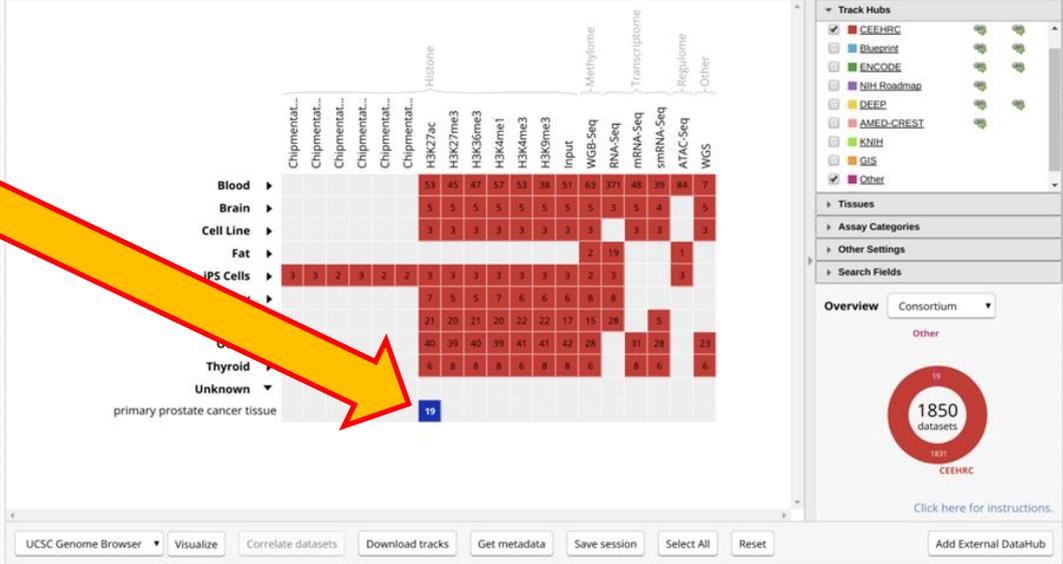
- Mathieu Lupien lab
CEEHRC Network Member Data
<https://datahub-3f167ocb.udes.genap.ca/hub.json>
- Additional Data Hub
Another hub with epigenomic data
<https://paste.ee/d/6AwO...>

Other Hubs

No other link. Add your own data hub by entering the URL below.

Data Grid

Assembly: Human (hg19) Build: 2016-11 Filter:



Selected datasets

<input checked="" type="checkbox"/>	Donor	Sample	Species	Assay	Consortium	EpiRR Record
<input checked="" type="checkbox"/>	CPCG0266	CPCG0266	human	H3K27ac	Other	UNKNOWN Metadata
<input checked="" type="checkbox"/>	CPCG0233	CPCG0233	human	H3K27ac	Other	UNKNOWN Metadata

Proposed integration of data access agreements

- o The epiMAP project
- o Access to controlled data: 7 Data Access Committees (DACs) in 8 jurisdictions



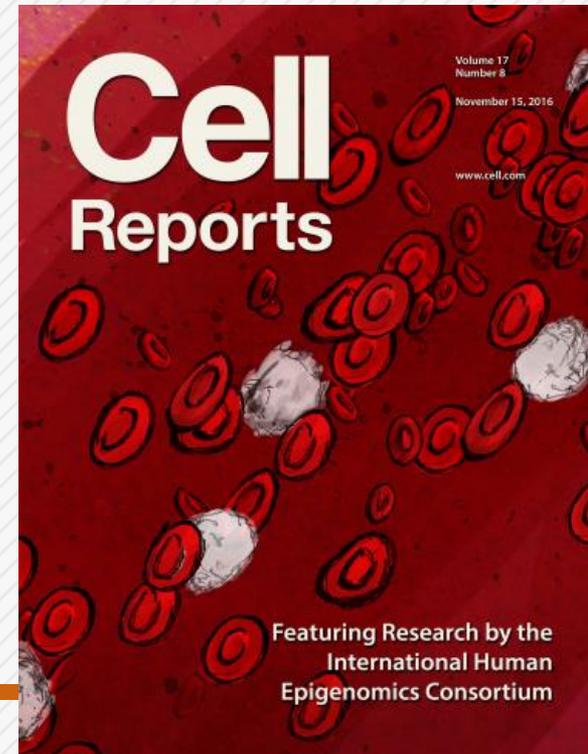
Table 1: Clauses Identified across IHEC Agreements

	#1	#2	#3	#4	#5	#6	#7
Constraints on Use							
Application Renewal							
Evidence of Competence							
Student Access							
Specific External Laws							
Specific Policies							
Jurisdiction							
External Access							
Acknowledgements							
Liability							
Report to Project							
Publication Delays							
Destruction of Data							
Ethics Review							
IT Practices							
Intellectual Property							
Unique Provisions							

Cell Paper Package



- Coordinated collection released on November 17, 2016
- 41 publications in *Cell*, *Cell Press* and other high-impact journals (*Nature*, *Science*, *Genome Biology*, etc.)





Format: Abstract

Send to

Cell. 2016 Nov 17;167(5):1145-1149. doi: 10.1016/j.cell.2016.11.007.

The International Human Epigenome Consortium: A Blueprint for Scientific Collaboration and Discovery.

Stunnenberg HG¹; International Human Epigenome Consortium²; Hirst M³.

- + Collaborators (228)
- + Author information

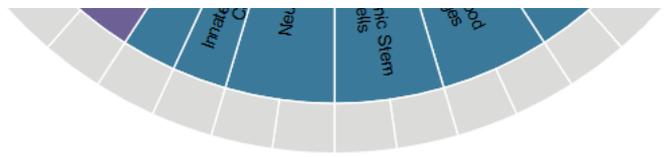
Erratum in
The International Human Epigenome Consortium: A Blueprint for Scientific Collaboration and Discovery. [Cell. 2016]

Abstract
The International Human Epigenome Consortium (IHEC) coordinates the generation of a catalog of high-resolution reference epigenomes of major primary human cell types. The studies now presented (see the Cell Press IHEC web portal at <http://www.cell.com/consortium/IHEC>) highlight the coordinated achievements of IHEC teams to gather and interpret comprehensive epigenomic datasets to gain insights in the epigenetic control of cell states relevant for human health and disease. PAPERCLIP.

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PMID: 27863232 DOI: 10.1016/j.cell.2016.11.007

[Indexed for MEDLINE]



Full text links

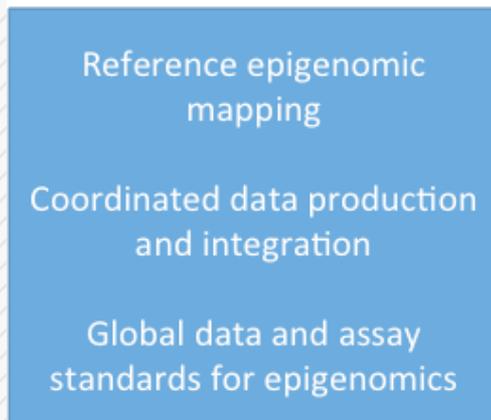
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- Similar articles**
- The International Human Epigenome Consortium Data Portal. [Cell Syst. 2016]
 - Integrative analysis of 111 reference human epigenomes. [Nature. 2015]
 - Epigenome data release: a participant-centered approach to privacy protection [Genome Biol. 2015]
 - Review** Multilayer-omics analyses of human cancers: exploration of bioma [Front Genet. 2014]
 - Review** Future potential of the Human Epigenome Project. [Expert Rev Mol Diagn. 2004]

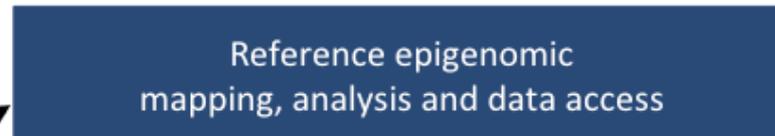
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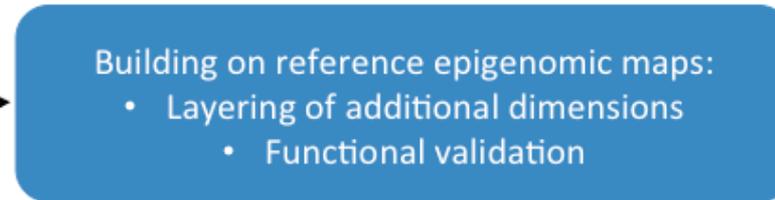
IHEC Phase I



IHEC Phase II



Current IHEC Work Groups



Theme-specific Work Group

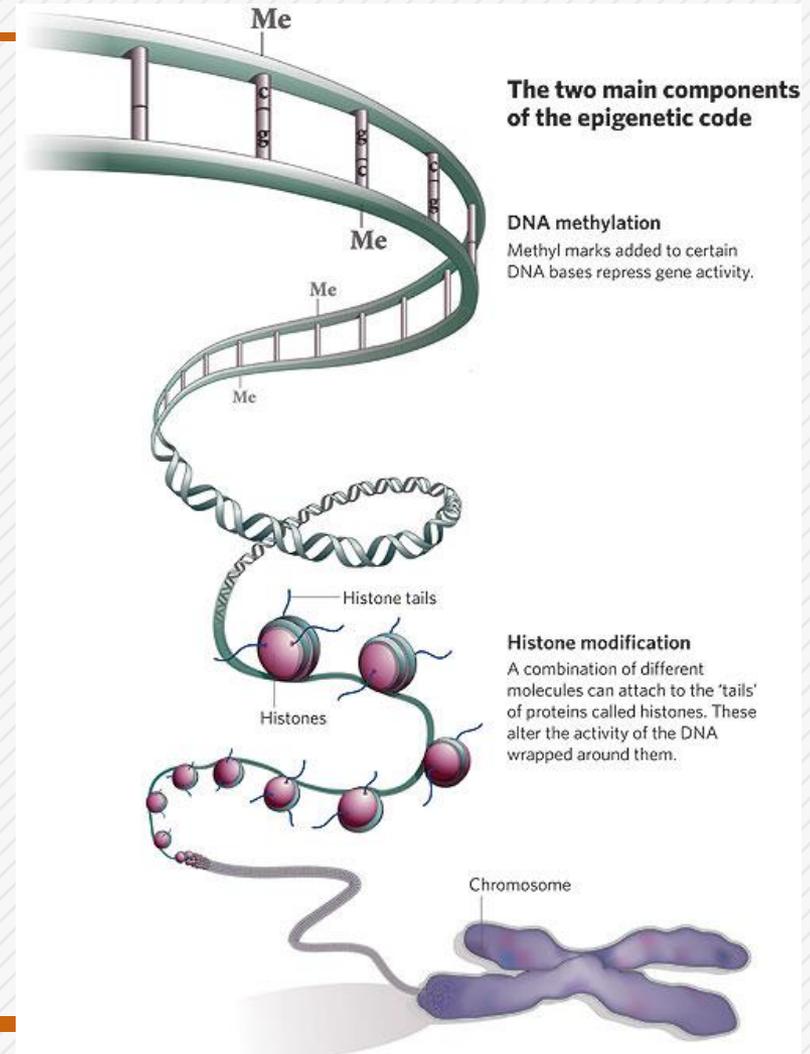


Theme-specific Work Group

Additional Slides

Why an epigenome initiative?

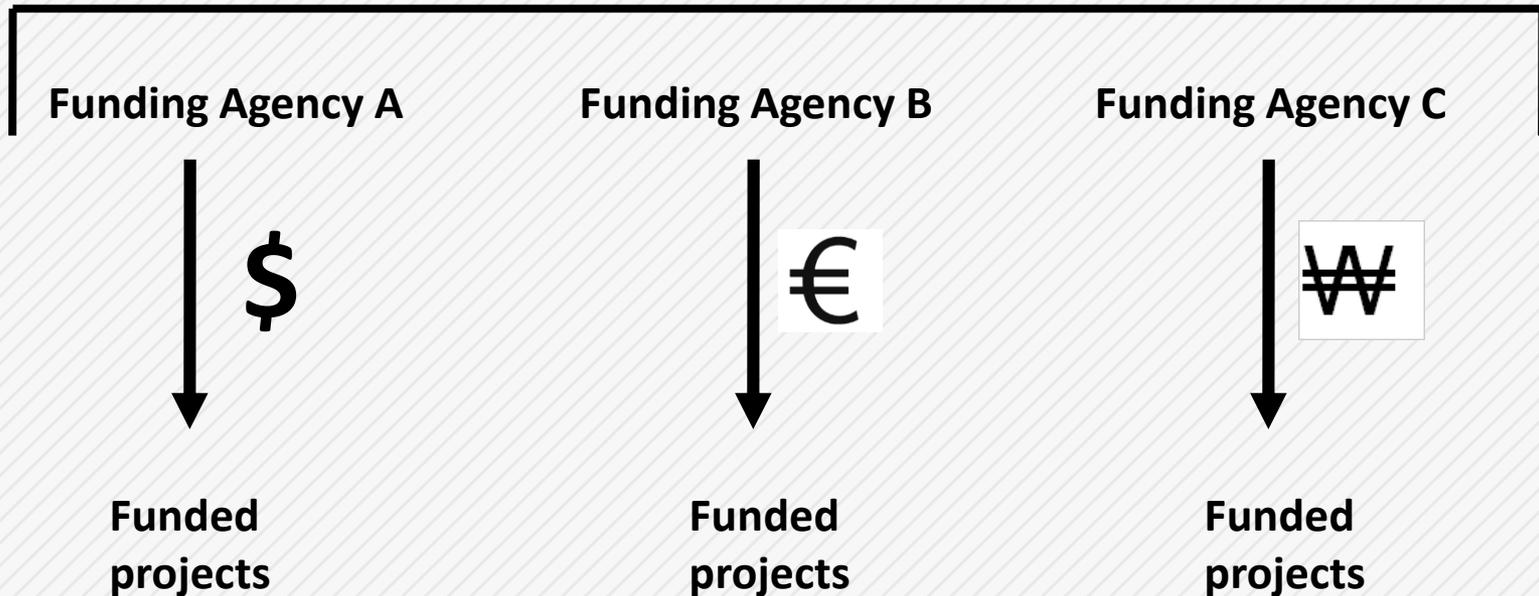
- Epigenetics is the study of reversible (and potentially heritable) changes in gene activity and expression that are not dependent on alterations in DNA sequence
 - DNA methylation
 - Histone modifications
 - Transcription factor binding
 - Nucleosome position
 - Non-coding RNAs
 - Higher order chromatin structure



Consortium Structure



Consortium Structure



Annual Meeting & Science Days

IHEC 2017

Please save the date:

12-14 October, Berlin/Germany

