Published on *BSC-CNS* (https://www.bsc.es)

International Human Epigenome Consortium (IHEC) celebrates major coordinated paper release

IHEC scientists release collection of 41 publications in Cell, Cell Press-associated and other high-impact journals. BSC was involved in one of this papers, within the Blueprint project.

(via International Human Epigenome Consortium)

One of the great mysteries in biology is how the many different cell types that make up our bodies are derived from a single cell and from one DNA sequence, or genome. We have learned a lot from studying the human genome, but have only partially unveiled the processes underlying cell determination. The identity of each cell type is largely defined by an instructive layer of molecular annotations on top of the genome – the epigenome – which acts as a blueprint unique to each cell type and developmental stage. Unlike the genome the epigenome changes as cells develop and in response to changes in the environment. Defects in the factors that read, write and erase the epigenetic blueprint are involved in many diseases. The comprehensive analysis of the epigenomes of healthy and abnormal cells will facilitate new ways to diagnose and treat various diseases, and ultimately lead to improved health outcomes.

A collection of 41 coordinated papers now published by scientists from across the International Human Epigenome Consortium (IHEC) sheds light on these processes, taking global research in the field of epigenomics a major step forward. A set of 24 manuscripts has been released as a package in *Cell* and *Cell Press*-associated journals, and an additional 17 papers have been published in other high-impact journals.

These papers represent the most recent work of IHEC member projects from Canada, the European Union, Germany, Japan, Singapore, and the United States. The collection of publications showcases the achievements and scientific progress made by IHEC in core areas of current epigenetic investigations.

“This constitutes a major achievement for IHEC. The number of papers and variety of topics addressed by this creative team of scientists from around the globe not only reflects the dynamic nature of this consortium,

but is also evidence of the great strength that comes from bringing together complementary expertise, with the potential for far greater impact than an equivalent number of individual projects", said Dr. Eric Marcotte from the Canadian Institutes of Health Research (CIHR) and Chair of the IHEC Executive Committee.

"The collection of manuscripts impressively demonstrates how epigenetic information and analyses can help find answers to pressing questions related to the cellular mechanisms associated with complex human diseases", said Professor Hendrik (Henk) Stunnenberg from Radboud University, The Netherlands, former Chair of the IHEC International Scientific Steering Committee and coordinator of the EU-funded BLUEPRINT project.

In a Nutshell: Key Findings from the Collection of Papers

Key research findings presented in the collection can be collated into four broad categories with a *first* group of papers presenting a series of molecular and computational approaches to deconvolute distinct epigenomic signatures from tissues that contain a mix of different cell types.

A *second* group of publications highlights IHEC's significant efforts and investments to develop new computational tools for the access, distribution and sharing of epigenomic data via various channels to the community. The IHEC Data Portal is one example of the tools developed to bolster the more than 7,000 datasets and make them accessible for widespread usage in biology and medicine.

In a *third* category, datasets produced by IHEC members were used to investigate molecular mechanisms underlying different cellular processes in normal and abnormal cell development. These analyses may in future help doctors to target the right treatments to the right patients.

A *fourth* group of papers in the collection uses epigenomic information to characterize how genetic variants affect the expression of genes, and how these genes in turn contribute to disease.

"With epigenomics research constantly advancing, IHEC itself evolves. We anticipate shifting our focus towards a number of potential new directions. IHEC has already started to expand its activities from data generation to increased integrative analyses and comprehensive data assessment. This will certainly be the path forward for IHEC in the future", said Dr. Martin Hirst from the University of British Columbia, Canada, and Chair of the IHEC International Scientific Steering Committee.

Reference

- The full collection of IHEC papers is available at: www.cell.com/consortium/IHEC
- Read the BSC paper "The BLUEPRINT Data Analysis Portal".

Barcelona Supercomputing Center - Centro Nacional de Supercomputación

---