

Epigenomics

Development of Fundamental Technologies for Diagnosis and Therapy Based upon Epigenome Analysis



[Research and Development Objectives]

Creation of the basic technologies for disease analysis and elucidation of stem cell differentiation mechanisms by using epigenomic comparison toward the realization of treatments and regenerative medicine used to prevent, diagnose, and treat diseases

Program Supervisor (PS)

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For healthy life and development of novel strategies for disease prevention, diagnosis, and therapy, this R&D area focuses on discovery of new principles and establishment of fundamental medical technologies based on epigenome analyses accompanied by biological analyses.

Specifically, this R&D area invites proposals that identify epigenome alterations useful for identification of etiologies or those critically involved in development and progression of cancers or other chronic disorders, such as arteriosclerosis, diabetes, neurological diseases, and autoimmune diseases.

The findings should lead to identification of novel mechanisms for induction of epigenome alteration or maintenance of epigenomes or to innovative strategies for disease prevention, diagnosis, and therapy. This area also invites proposals that, by comparing epigenome profiles during stem cell differentiation, reveal mechanisms of cellular differentiation and establish technologies for robust directed differentiation of various cells to specific lineages. Furthermore, this area invites proposals that develop key technologies for more efficient analysis of methylomes and histone modifications, and for control of epigenomes.

In this R&D area, AMED cooperates with the International Human Epigenome Consortium (IHEC) through some proposals.

R&D Area Advisors

TAKAGI Toshihisa	Professor, Graduate School of Science, The University of Tokyo
TAKAHASHI Masayo	Project Leader, RIKEN Center for Biosystems Dynamics Research
TAJIMA Shoji	Professor Emeritus, Osaka University
CHIBA Tsutomu	Director, Kansai Electric Power Hospital
NISHIJIMA Kazumi	Fellow, Clinical Development Planning and Management, Mochida Pharmaceutical Co., Ltd.
FUKAMIZU Akiyoshi	Professor, Life Science Center Survival Dynamics, TARA, University of Tsukuba
MOTOHASHI Hozumi	Professor, Institute of Development, Aging and Cancer (IDAC), Tohoku University
MOROHASHI Ken-ichirou	Distinguished Professor, Faculty of Medical Sciences, Kyushu University
YOSHIDA Minoru	Group Director, RIKEN Center for Sustainable Resource Science

Started in 2011 ... 1st period

Elucidating epigenomeloops of cell differentiation using quantitative ChIP-Seq method

IGARASHI Kazuhiko

Professor, Tohoku University Graduate School of Medicine

Started in 2011 ... 1st period

Epigenome analysis of mental disorders using advanced technologies

KATO Tadafumi

Team Leader, RIKEN Brain Science Institute

Started in 2011 ... 1st period

Reference epigenome analysis in normal epithelial cells of human digestive system and development of analysis technology

KANAI Yae

Professor, Keio University School of Medicine

Started in 2011 ... 1st period

Study of the molecular mechanism in the pluripotency maintenance of stem cells and three-dimensional mapping of the epigenome structure

SHIRAKAWA Masahiro

Professor, Graduate School of Engineering, Kyoto University

Started in 2011 ... 1st period

Development of genomic technologies to explore human epigenetic regulation

SHIRAHIGE Katsuhiko

Professor/Director, The Institute of Molecular and Cellular Biosciences (IMCB), The University of Tokyo

Started in 2011 ... 1st period

Molecular mechanisms underlying direct reprogramming of fibroblasts to hepatocytes and applications thereof

SUZUKI Atsushi

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Started in 2011 ... 1st period

Mechanism of higher-order epigenome regulation and its medical significance

NAKAO Mitsuyoshi

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Started in 2011 ... 1st period

Epigenetic drug development to prevent pervasive developmental disorders

HAGIWARA Masatoshi

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Started in 2011 ... 1st period

New diagnostic and therapeutic tools targeting epigenetic modulation for lifestyle-related disease

FUJITA Toshiro

Emeritus Professor, Research Center for Advanced Science and Technology, The University of Tokyo

Started in 2012 ... 2nd period

Identification of factors to modify and resist epigenomic alteration induction

KANEDA Atsushi

Professor, Graduate School of Medicine, Chiba University

Started in 2012 ... 2nd period

Epigenome analysis of cells in the placenta and endometrium forming the fetal-maternal interface

SASAKI Hiroyuki

Distinguished Professor, Medical Institute of Bioregulation, Kyushu University

Started in 2012 ... 2nd period

Basic studies aimed for an epigenome-based therapy: proof of concept in brain function

SHINKAI Yoichi

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Started in 2012 ... 2nd period

Molecular regulation and analysis of the establishment of epigenome

NAKANO Toru

Professor, Graduate School of Frontier Biosciences, Osaka University

Started in 2012 ... 2nd period

Understanding the epigenetic modifications related to cancer development and regression

NAKAHATA Tatsutoshi

Professor, Center for iPS Cell Research and Application, Kyoto University

Started in 2013 ... 3rd period

Epigenome changes by environmental factors and diseases

ISHII Shunsuke

Deputy Director, RIKEN Center for Pioneering Research

Started in 2013 ... 3rd period

Analysis and application for regulation of cell function on linked mechanisms of enhancer dynamics and transcription regulation by epigenetic control

KOSEKI Haruhiko

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Started in 2013 ... 3rd period

Mechanism of transgenerational epigenetic regulation in germ cells

MATSUI Yasuhisa

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Started in 2013 ... 3rd period

Epigenetic analysis of the mechanisms of metabolic control and their disruption in type 2 diabetes and obesity

YAMAUCHI Toshimasa

Professor, Graduate School of Medicine, The University of Tokyo

Started in 2013 ... 3rd period

Regulation of immunological disorders by modification of epigenetics of T cells

YOSHIMURA Akihiko

Professor, Keio University School of Medicine

※ The names of the position, institution and organization are as of the end of the R&D pursuit area year.