Consortium

Hiroshima University Consortium for Industry-University Cooperation in Genome Editing Technology

One of the features of this program is that students are trained to conduct cutting-edge and practical research through collaboration with companies participating in the Program on Open Innovation Platform with Enterprises, Research Institutes, and Academia (adopted in 2016).

Development of innovative genome editing technologies for creating useful cells and living organisms

Akihiko Takami
General Manager, Technical Research Center
Mazda Motor Corporation

In collaboration with Hiroshima University and Tokyo Institute of Technology, Mazda is making efforts to research bio-based liquid fuels produced from renewable biomass as an alternative for fossil fuels, such as gasoline and diesel oil. The goal is to considerably reduce tailpipe CO₂ emissions in order to achieve a sustainable automobile society. We believe that genome editing technology will drive innovation in dramatically improving the productivity of biomass-derived liquid fuel, and we eagerly anticipate its further development.

Satoshi Hirakawa
Principal Investigator, Frontier Research Center
POLA CHEMICAL INDUSTRIES, INC.

Under the philosophy of “Sensitize the world to beauty”, the POLA Group aims to quickly apply genome editing technology to cosmetics and to advance dermatological research remarkably so that we can continuously provide various unique forms of value. By developing culture models of skin problems and studying the underlying mechanisms of these disorders, we should be able to identify the causes of skin problems that have not been revealed by previous studies, and to promote innovation in the field of cosmetics.

Hidetada Yamamura
General Manager, Social Innovation Center, Information and Communication Division
TOPPAN PRINTING CO., LTD.

TOPPAN PRINTING has cultivated information processing technology based on our own printing technology. Because a large amount of genetic information must be processed in genome editing, technologies for correctly and safely managing large amounts of data, as well as for data analysis using AI, are useful in this field. Therefore, we are currently conducting collaborative research with Hiroshima University on genome editing databases using AI. We hope that this research will contribute to the application of genome editing to a wide range of industries, creating innovative products and services, and solving various social problems.
Opening up the Future with Genome Editing

Greetings

In 2019, Hiroshima University will launch the Frontier Development Program for Genome Editing, an integrated Master’s-PhD course, with the aim of training PhD students to introduce innovations to society. Genome editing is a new biotechnology that makes it possible to rewrite the genome information of various living organisms at will, using an artificial DNA-cutting enzyme genome editing tool. Basic genome editing research has advanced considerably. As it is just a matter of time before we see the industrial and medical application of genome editing in the field of biofuel, breeding, and drug discovery, the ethical aspects of genome editing should be considered when scientists conduct cutting-edge R&D in this area of biotechnology.

Hiroshima University is one of Japan’s leading research institutions in the genome editing field and employs a number of leading researchers who have strong track records in the research field and are responsible for managing the Japanese Society for Genome Editing. In addition, in collaboration with various enterprises in the basic materials, energy, IT, and pharmaceutical industries, Hiroshima University has been conducting projects aimed at developing basic technology to utilize genome editing in industry within the framework of the Program on Open Innovation Platform with Enterprises, Research Institute and Academia (OPERA) led by the Japan Science and Technology Agency (JST). This academic-industrial collaboration is aimed at developing young researchers and providing them with support for career paths in research and development.

In our efforts to develop new industries, I hope that new students will join us at Hiroshima University, which provides a great environment for fostering distinguished PhD students, who will lead the world in genome editing technology.

Program overview

This program will establish the Life Science Course (5-year curriculum) and the Medical Course (4-year curriculum) in order to provide students with opportunities to acquire basic and applied knowledge and to learn techniques of genome editing. This program enables students to master genome editing technology and connect it directly to industry.

Specialized courses in genome editing

Collaborative research with enterprises participating in OPERA, internship, etc.

Courses in career development, data literacy, etc.

Course on ethics for genome editing

Life Science Course (5-year curriculum)

In the first and second years, students will learn basic and advanced genome editing techniques. From the third year, they will conduct research utilizing the knowledge they have acquired. Through basic courses on social implementation of technologies and internships, they will be trained to become experts able to work at the cutting edge of genome-editing technology.

Medical Course (4-year curriculum)

After systematically learning the basic and advanced genome editing technologies in the first and second years, students will conduct research for their doctoral thesis, utilizing knowledge that they have acquired. In addition, through internships at domestic and overseas partner institutes, they will be trained to be able to work at the cutting edge of genome editing in the medical field.

Because genome editing is the fundamental technology of life science, admission of students from a wide range of fields is expected.

- Doctoral Program for World-leading Innovative & Smart Education

Program provider

HIROSHIMA UNIVERSITY

The Frontier Development Program for Genome Editing is based on curricula led by world-class domestic and overseas genome editing researchers. Its purpose is to train specialists who can adapt to changes in industrial structures and social trends as new biological industries emerge.

We will establish the five-year Life Science Course to develop new industries and the four-year Medical Course to study diseases and develop genome editing-based therapies and drugs. In these courses, students will learn the basic and applied knowledge and technology of genome editing. A wide variety of curricula will be provided in advanced technologies, including training at the Center for IPS Cell Research and Application, Kyoto University, and Harvard University; collaborative research with Tokushima University, which has outstanding research achievements in the agricultural, fisheries, and livestock field; and education by enterprises participating in the Consortium for Industry-University Cooperation in Genome Editing Technology.

Genome editing will be the core of future industrial structure, and will contribute to the development of new industries that lead to economic growth. We hope that PhD students who finish this program will lead the world in their field and play important roles in its future development.