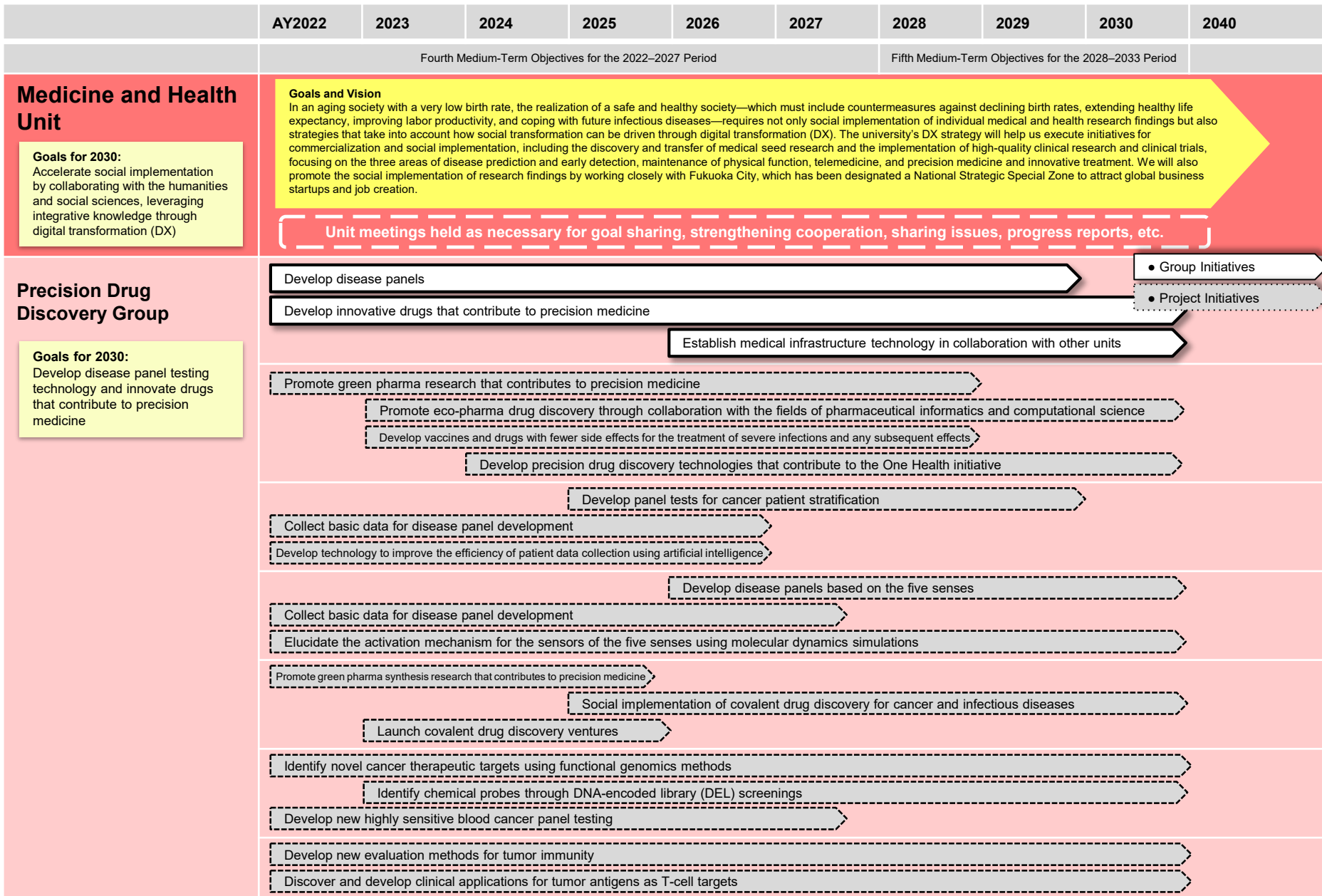


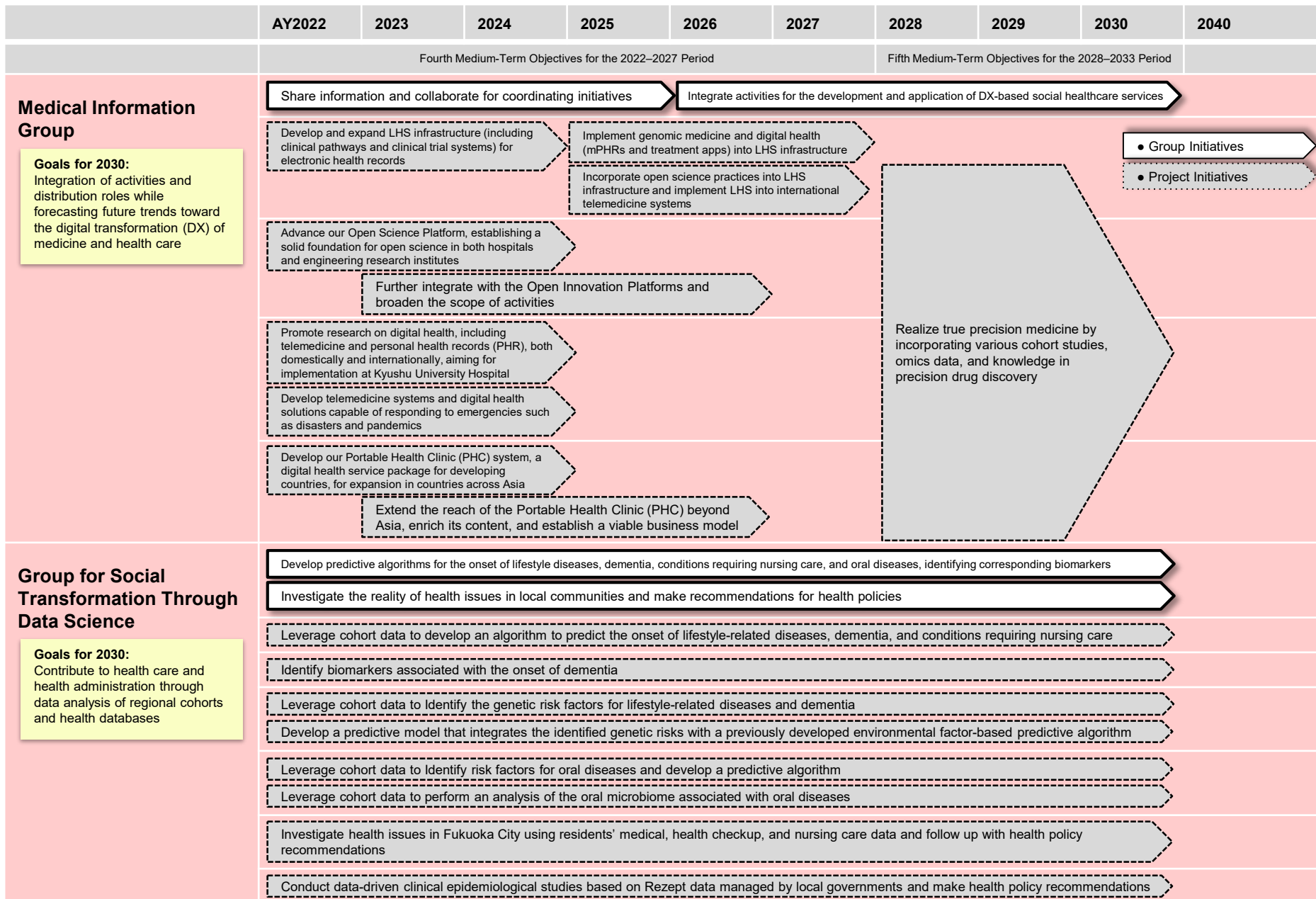
Roadmap for the Medicine and Health Unit Integrated Initiative for Designing Future Society



Roadmap for the Medicine and Health Unit Integrated Initiative for Designing Future Society

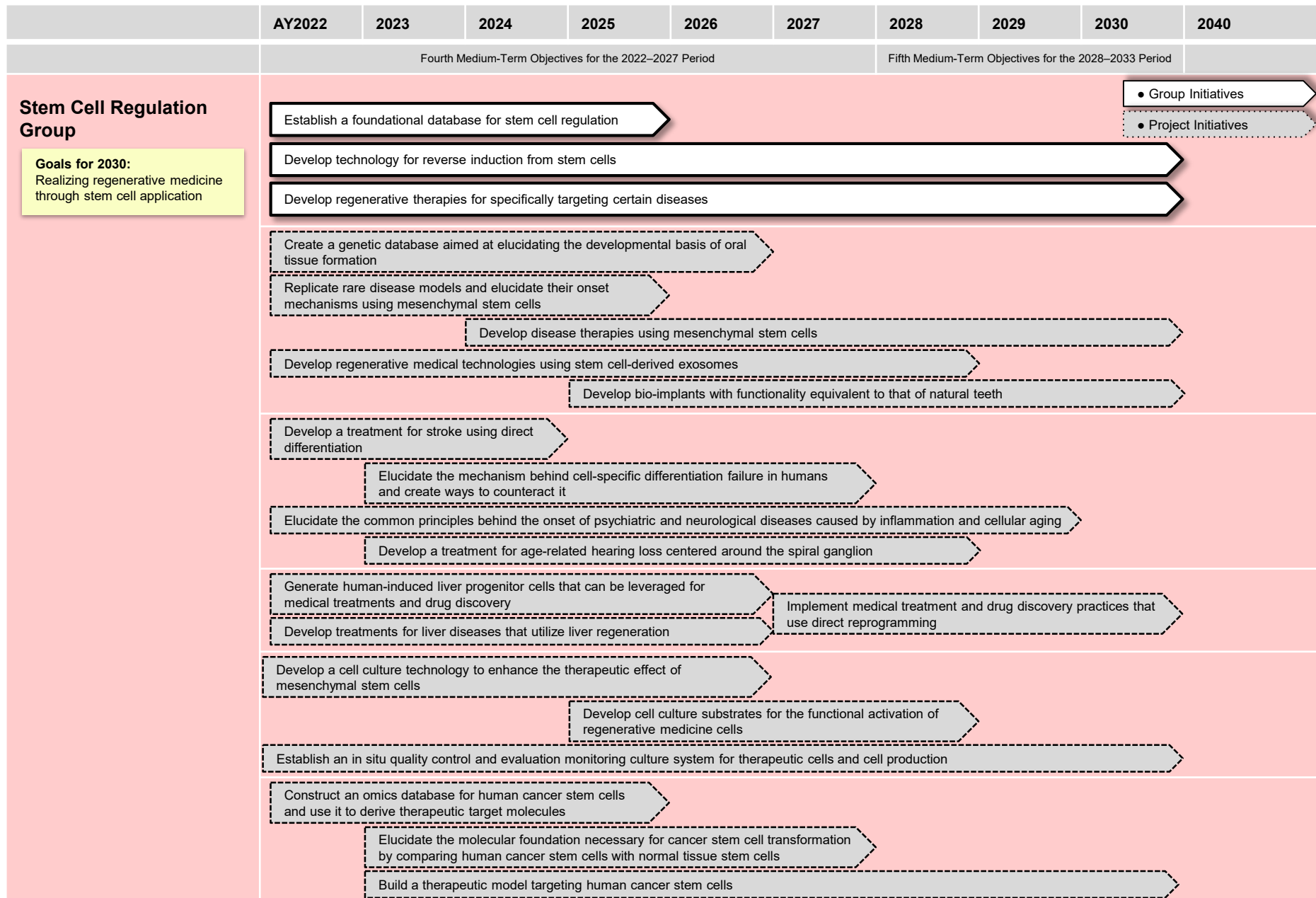
	AY2022	2023	2024	2025	2026	2027	2028	2029	2030	2040
	Fourth Medium-Term Objectives for the 2022–2027 Period						Fifth Medium-Term Objectives for the 2028–2033 Period			
High Depth Omics Group	<p>We will transform science, industry, and society by expanding pan-omics, which integrates measurement science, data science, computational science, and mathematical science, across all academic fields.</p> <p>Promote joint collaborative research aimed at elucidating the mechanisms of biological defense systems and diseases triggered by the failure of those systems based on multilevel biological information obtained from omics data.</p> <p>Form a research network between four domestic research centers to realize in-depth omics research that acquires and integrates big data from single-cell omics and single molecular structures.</p> <p>Promote the use of the three cryogenic electron microscopes on Maidashi Campus (one at the Medical Institute of Bioregulation and two at the Faculty of Pharmaceutical Sciences) to researchers both in and outside of Kyushu University for the structural analysis of protein-supramolecular complexes.</p> <p>Promote genomics, provide essential computational resources, and support the infrastructure for omics data analysis. Facilitate the resolution of computational challenges in medical and biological research.</p> <p>Support the establishment of essential computational resources and environments for omics data analysis, and as part of the activities of the Research Institute for Information Technology, facilitate problem-solving within research groups of the Section of Medical Biology.</p>									
<p>Goals for 2030: Disease prediction and early detection through the development of single-cell multi-omics analysis technology, among other methods</p>	<p>• Group Initiatives</p>									

Roadmap for the Medicine and Health Unit Integrated Initiative for Designing Future Society



- Group Initiatives
- Project Initiatives

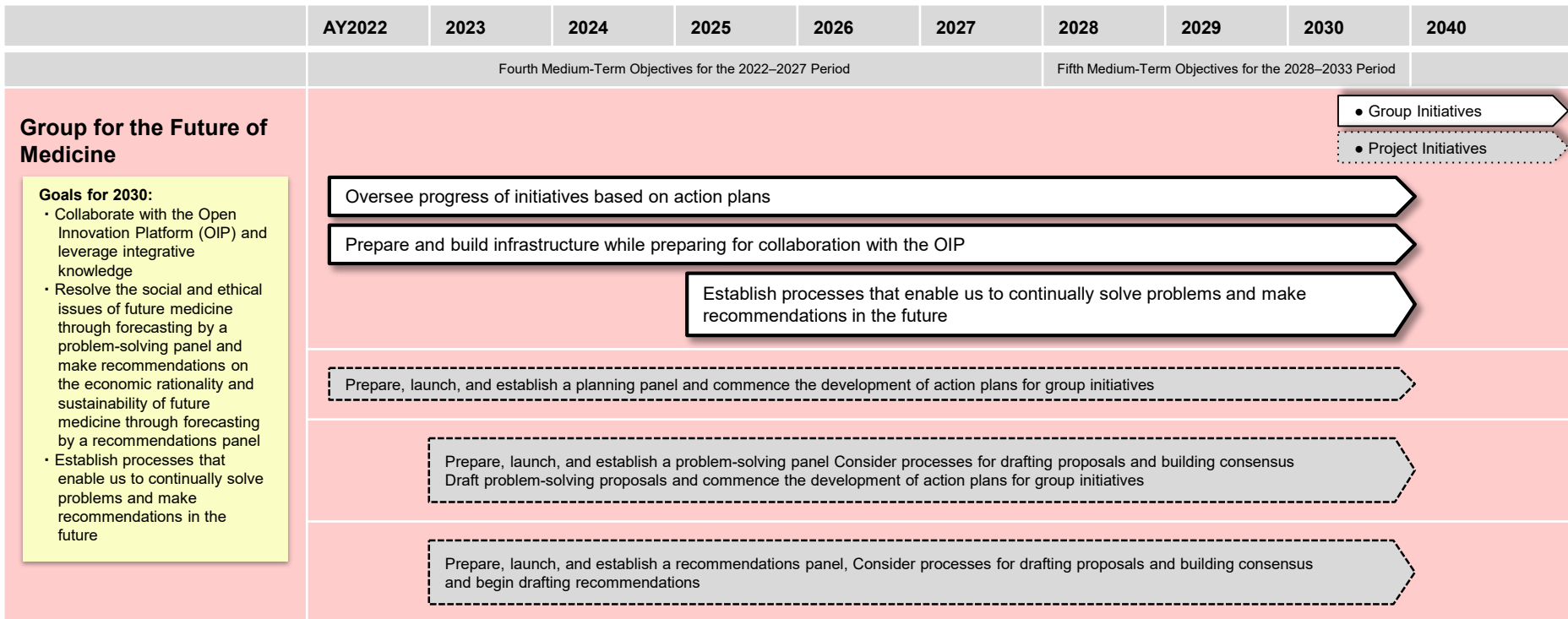
Roadmap for the Medicine and Health Unit Integrated Initiative for Designing Future Society



Roadmap for the Medicine and Health Unit Integrated Initiative for Designing Future Society

	AY2022	2023	2024	2025	2026	2027	2028	2029	2030	2040	
	Fourth Medium-Term Objectives for the 2022–2027 Period						Fifth Medium-Term Objectives for the 2028–2033 Period				
<p>Neuroscience Group</p> <p>Goals for 2030: Development of a prediction system for the onset of neurological and psychiatric disorders in a society with longevity and the establishment of a personalized treatment system</p> <p>Identification of pathogenic mechanisms and responsible circuits for developmental disorders and psychiatric disorders</p> <p>Understanding individuality and diversity in brain function and creating an inclusive society</p> <p>Elucidation of the principles of brain computation and integration with AI</p> <p>Establishment of breakthrough technology targeting brain immunity for the formation and maintenance of healthy brains</p>	Progress management of initiatives based on the implementation plan										
	<ul style="list-style-type: none"> ● Group Initiatives ● Project Initiatives 										
	Development of a system for predicting the onset of multifactorial diseases in the field of neurological diseases										
	Conceptualization of personalized treatment and treatment optimization strategies in multifactorial diseases in the field of neurological diseases										
	Toward the implementation of personalized treatment and treatment optimization strategies in multifactorial diseases in the field of neurological diseases										
	Development of a system for predicting the onset of multifactorial diseases in the field of psychiatric disorders										
	Conceptualization of personalized treatment and treatment optimization strategies in multifactorial diseases in the field of psychiatric disorders										
	Toward the implementation of personalized treatment and treatment optimization strategies in multifactorial diseases in the field of psychiatric disorders										
	Advance understanding of the molecular basis of neuropsychiatric disorders by using human disease model cells such as human blood-derived microglia-like (IMG) cells.										
	Development of a prediction system for the onset of multifactorial diseases in the field of stress-related diseases										
Conceptualization of personalized treatment and treatment optimization strategies in multifactorial diseases in the field of stress-related diseases											
Toward the implementation of personalized treatment and treatment optimization strategies in multifactorial diseases in the field of stress-related diseases											
Multi-scale understanding of the developmental process of normal brain circuits using transparency techniques and optical microscope connectomics											
Comprehensive analysis of the process of circuit development using models of developmental disorders and psychiatric disorders to identify the responsible circuits											
Functional classification of organ sensation and neural circuits responsible for gut-brain correlation using in vivo imaging											
In vitro reconstructive systems and mathematical principles of neural circuit development, memory and learning processes											
Accelerate multifaceted research centered on high-depth omics analysis technology to gain an integrated understanding of the mechanisms of normal brain formation and maintenance, with brain immunity as a starting point.											
Integrated understanding of the pathogenesis of central nervous system diseases through brain immunity											

Roadmap for the Medicine and Health Unit Integrated Initiative for Designing Future Society



Unit Name: Medicine and Health

Unit Leader Name: Koichi Akaishi

Group Leader Name: Motohiro Nishida

Group Name	Goal	Project Manager			Action Item 1	Action Item 2	Action Item 3	Action Item 4	Action Item 5	Collaborations (e.g., Other groups, other units, DDIn2)	Project URL
		Affiliation	Position	Name							
Precision Drug Discovery	<u>Group-wide:</u> Goal for 2030: Develop disease panel testing technology and innovate drugs that contribute to precision medicine.				Develop disease panels (Initiative Period: 2022–2029)	Develop innovative drugs that contribute to precision medicine (Initiative Period: 2022–2030)	Establish medical infrastructure technology in collaboration with other units (Initiative Period: 2026–2030)	—	—	Collaborate with the OIP to promote intellectual property creation and technology transfers from our research findings	
	<u>Precision Drug Discovery (Evaluation) Project:</u> Goal for 2030: Develop innovative drugs that contribute to precision medicine	<u>Faculty of Pharmaceutical Sciences</u>	Professor	Motohiro Nishida	Promote green pharma research that contributes to precision medicine (Initiative Period: 2022–2028)	Promote eco-pharma drug discovery through collaboration with the fields of pharmaceutical informatics and computational science (Initiative Period: 2023–2030)	Develop vaccines and drugs with fewer side effects for the treatment of severe infections and any subsequent effects (Initiative Period: 2023–2028)	Develop precision drug discovery technologies that contribute to the One Health initiative (Initiative Period: 2024–2030)		Collaborate with the OIP to promote intellectual property creation and technology transfers from our research findings	https://www.phar.kyushu-u.ac.jp/green-pharma/(Japanese) https://physiology.phar.kyushu-u.ac.jp/(Japanese) https://bunseki.phar.kyushu-u.ac.jp/index-e.html
	<u>Cancer Stratification Project:</u> Goal for 2030: Develop patient stratification panels for reducing the side effects of chemotherapy	<u>Faculty of Pharmaceutical Sciences</u>	Professor	Satoru Koyanagi	Develop panel tests for the stratification of cancer patients (Initiative Period: 2025–2029)	Collect basic data for disease panel development (Initiative Period: 2022–2026)	Develop technology to improve the efficiency of patient data collection using artificial intelligence (Initiative Period: 2022–2026)	—	—	Promote clinical data analysis in collaboration with the hospital's Department of Pharmacy	https://global.phar.kyushu-u.ac.jp/
	<u>Disease Panel Development Project:</u> Goal for 2030: Develop predictive panels for pre-disease conditions	<u>Faculty of Dental Science</u>	Professor	Noriatsu Shigemura	Develop disease panels based on the five senses (Initiative Period: 2026–2030)	Collect basic data for disease panel development (Initiative Period: 2022–2027)	Elucidate the activation mechanism for the sensors of the five senses using molecular dynamics simulations (Initiative Period: 2022–2030)				https://www.rdctos.kyushu-u.ac.jp/en/ https://www.dent.kyushu-u.ac.jp/sosiki/a06/index(eng).html
	<u>Precision Drug Discovery (Synthesis) Project:</u> Goal for 2030: License covalent drugs to pharmaceutical companies for enabling the treatment of infectious diseases and cancer	<u>Faculty of Pharmaceutical Sciences</u>	Professor	Akio Ojita	Promote green pharma synthesis research that contributes to precision medicine (Initiative Period: 2022–2025)	Social implementation of covalent drug discovery for cancer and infectious diseases (Initiative Period: 2025–2030)	Launch covalent drug discovery ventures (Initiative Period: 2023–2025)			Drive the commercialization of covalent drug discovery in collaboration with Fukuoka Biocommunity	https://bunseki.phar.kyushu-u.ac.jp/index-e.html
	<u>Functional Genomics Drug Discovery Project:</u> Goal for 2030: Establish a pathway for identifying chemical probes from functional genomics	<u>Faculty of Medical Sciences</u>	Professor	Takahiro Maeda	Identify novel cancer therapeutic targets using functional genomics methods (Initiative Period: 2022–2030)	Identify chemical probes through DNA-encoded library (DEL) screenings (Initiative Period: 2023–2030)	Develop new highly sensitive blood cancer panel testing (Initiative Period: 2022–2027)			Implement a blood cancer biobank and genetic panel tests in collaboration with Kyushu University Hospital's Center for Cellular and Molecular Medicine	https://precision.kyushu-u.ac.jp/en/
	<u>Personalized Tumor Immunotherapy Project:</u> Goal for 2030: Develop novel personalized cancer therapies by activating tumor immunity tailored to each type of cancer	<u>Faculty of Medical Sciences</u>	Professor	Shinichi Mizuno	Develop new evaluation methods for tumor immunity (Initiative Period: 2022–2030)	Discover and develop clinical applications for tumor antigens as T-cell targets (Initiative Period: 2022–2030)					https://www.shs.med.kyushu-u.ac.jp/EN/index.html

Medicine and Health

Precision Medicine Initiative (PMI): Promoting Precision Drug Discovery

Regional collaboration with Kyushu/West Japan PMI centered on research for academic drug discovery and development of disease panel testing at Kyushu University

Collaborate with world-leading centers and pharmaceutical companies

2022

2025

2028

2030

Future Initiatives

Develop Disease Panel Testing



Utilize new information technologies grounded in data analysis

On-site collaboration at Maidashi Hospital Campus

Academic drug discovery



Uniting the university to rapidly bring new therapeutics to market!

Greenpharma research (medicine)

Expand appropriate use of approved drugs

AI-based drug discovery and new drug creation through in silico prediction

Technology development for disease panel testing

Protect intellectual property of research findings and support commercialization

Contribute to precision medicine and innovative treatments

Create center for precision drug discovery

Faculty of Pharmaceutical Sciences



This facility will consolidate drug development technologies at Kyushu University and be able to organically combine and utilize big data and disease panel testing analysis

Apply cancer genome medicine to preventive treatments

Liquid biopsies
Utilize CHIP panel tests, etc.

Promote comprehensive precision drug development

Reverse precision drug discovery using medical big data

Precision drug discovery pharmacists

Train experts in precision drug discovery and the development of disease panel testing

List of Group Initiatives

January 16, 2024

Unit Name: Medicine and Health

Unit Leader Name: Koichi Akaishi

Group Leader Name: Yasuyuki Ohkawa

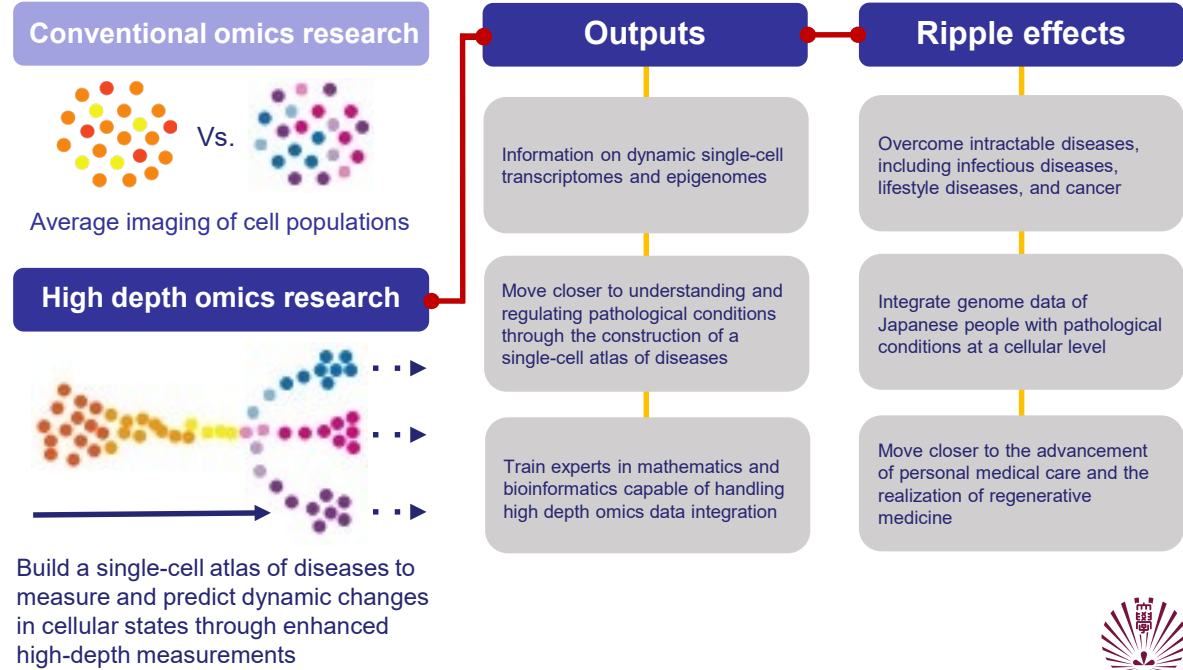
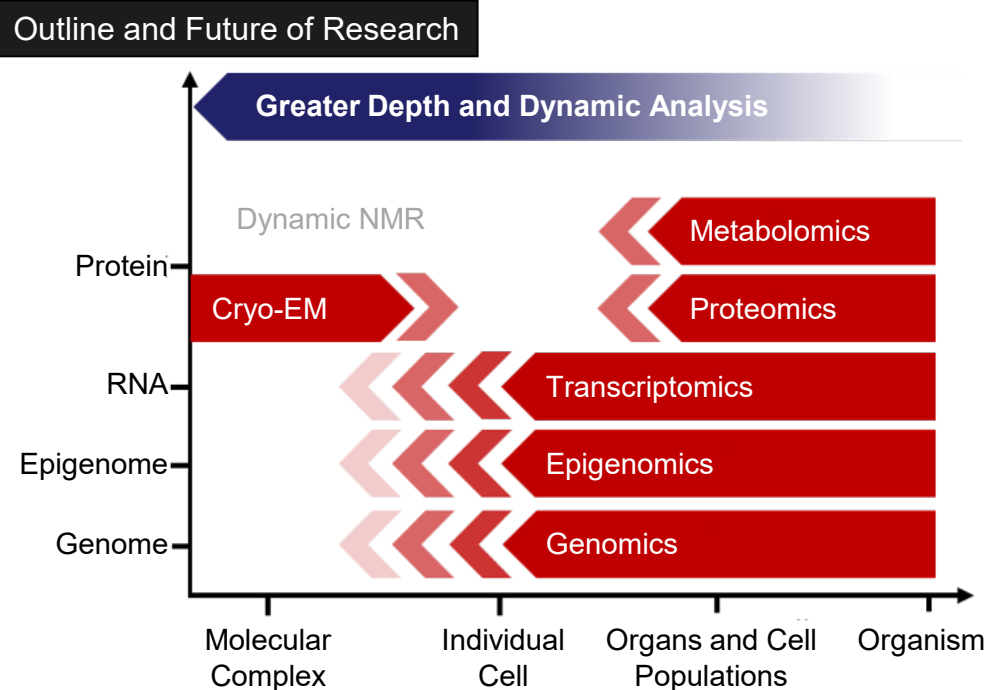
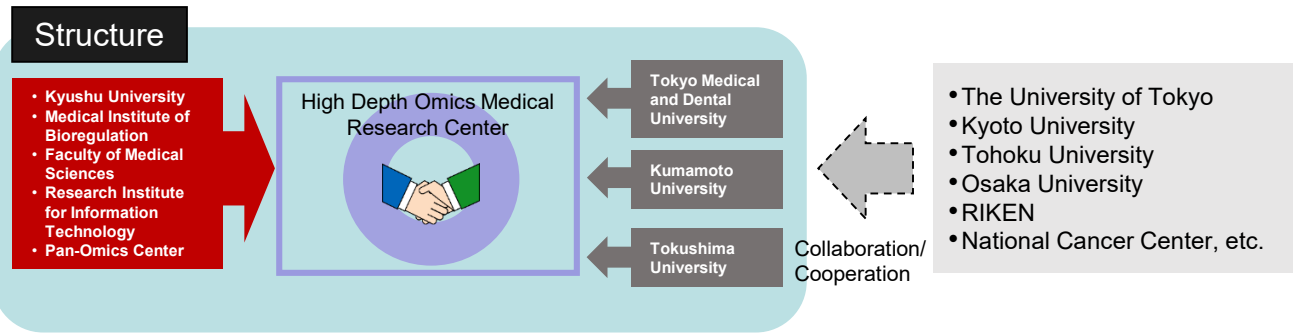
Group Name	Goal	Project Manager			Action Item 1	Action Item 2	Action Item 3	Action Item 4	Action Item 5	Collaborations (e.g., Other groups, other units, DDIn2)	Project URL
		Affiliation	Position	Name							
High Depth Omics	<p><u>Group-wide:</u></p> <p>Goal for 2030: Disease prediction and early detection through the development of single-cell multi-omics analysis technology, among other methods</p>				—	—	—	—	—		
	<p><u>High Depth Omics-Related Project:</u></p> <p>Jointly promote one of the aforementioned projects as a group.</p>	<p><u>Medical Institute of Bioregulation</u></p>	<p>Professor</p>	<p>Yasuyuki Ohkawa</p>	<p>We will transform science, industry, and society by expanding pan-omics, which integrates measurement science, data science, computational science, and mathematical science, across all academic fields. In accordance with the general budget request for FY2020, steps have been taken for the organization of the Pan-Omics Data-Driven Research Innovation Center as a universal omics measurement and computational science center.</p> <p>(Initiative Period: 2019–2024)</p>	<p>Promote joint collaborative research aimed at elucidating the mechanisms of biological defense systems and diseases that are triggered by the failure of those systems based on multilevel biological information obtained from omics data. In accordance with the budget request for FY2022, steps have been taken for the organization of the Research Center for the Multi-Stratified Host Defense System.</p> <p>(Initiative Period: 2022–2027)</p>	<p>Form a research network between four domestic research centers to realize in-depth omics research that acquires and integrates big data from single-cell omics and single molecular structures. In accordance with the budget request for FY2022, steps have been taken for the organization of the Research Center for the Multi-Stratified Host Defense System.</p> <p>(Initiative Period: 2022–2027)</p>		<p>Use genome editing technology in collaboration with the Environmental and Food Unit to develop intervention approaches for diseases Drive innovation focused on the commercialization and licensing of our unique omics technology in collaboration with the Think Tank Unit</p>	<p>http://clam.cc.kyushu-u.ac.jp/en/ https://www.bioreg.kyushu-u.ac.jp/mib/activities_collabo_.html (Japanese) https://www.bioreg.kyushu-u.ac.jp/mib/activities_collabo_HighDepthOmics_j.html (Japanese)</p>	
		<p><u>Medical Institute of Bioregulation</u></p>	<p>Distinguished Professor</p>	<p>Daisuke Kohda</p>	<p>Promote the use of the three cryogenic electron microscopes on Maidashi Campus (one at the Medical Institute of Bioregulation and two at the Faculty of Pharmaceutical Sciences) to researchers both in and outside of Kyushu University for the structural analysis of protein-supramolecular complexes.</p>						<p>http://vsb.bmr.kyushu-u.ac.jp/VSB/en/index.html</p>
		<p><u>Medical Institute of Bioregulation</u></p>	<p>Professor</p>	<p>Masao Nagasaki</p>	<p>Promote genomics, provide essential computational resources, and support the infrastructure for omics data analysis. Facilitate the resolution of computational challenges in medical and biological research.</p>						<p>https://naqasakilab.csml.org/</p>
		<p><u>Medical Institute of Bioregulation</u></p>	<p>Professor</p>	<p>Takeshi Bamba</p>	<p>Promote joint collaborative research aimed at elucidating the mechanisms of biological defense systems and diseases that are triggered by the failure of those systems based on multilevel biological information obtained from omics data. In accordance with the budget request for FY2022, steps have been taken for the organization of the Research Center for the Multi-Stratified Host Defense System.</p> <p>(Initiative Period: 2022–2027)</p>						<p>http://bamba-lab.com/ (Japanese)</p>
		<p><u>Research Institute for Information Technology</u></p>	<p>Associate Professor</p>	<p>Takeshi Nanri</p>	<p>Support the establishment of essential computational resources and environments for omics data analysis, and as part of the activities of the Research Institute for Information Technology, facilitate problem-solving within research groups of the Section of Medical Biology.</p>						<p>https://hyoka.ofc.kyushu-u.ac.jp/search/details/K000018/english.html</p>

Medicine and Health

Understanding life phenomena and disease onset through high-depth omics research

Objectives This project aims to forge a network of core centers across Japan to develop technologies, train personnel, and create a research platform for world-leading research in high depth omics

- Action Items**
- Develop world-leading single-cell omics analysis technologies, establish a domestic network of research centers, integrate the strengths of each center's research methods, and construct and provide a disease single-cell atlas for a dynamic understanding of life phenomena and disease onset
 - Share acquired technologies among participating centers and establish a research platform for their practical application
 - Utilize the benefits of the network to foster human resources through hosting joint symposiums, exchanging and dispatching researchers, and conducting technical workshops, among other activities. In particular, train researchers at each center who are able to undertake integrated analyses of high depth omics data and strategically promote the development of human resources in the fields of mathematics and bioinformatics
 - As a research center for high depth omics, make globally available the technologies, facilities, and databases that are developed



List of Group Initiatives

February 14, 2023

Unit Name: Medicine and Health

Unit Leader Name: Koichi Akaishi

Group Leader Name: Naoki Nakashima

Group Name	Goal	Project Manager			Action Item 1	Action Item 2	Action Item 3	Action Item 4	Action Item 5	Collaborations (e.g., Other groups, other units, DDIn2)	Project URL
		Affiliation	Position	Name							
Medical Information Group	<p><u>Group-wide:</u></p> <p>Goal for 2030: Integrate activities and distribution roles while forecasting future trends toward the digital transformation (DX) of medicine and health care</p>				Share information and collaborate for coordinating initiatives (Initiative Period: 2022–2025)	Integrate activities for the development and application of DX-based social healthcare services (Initiative Period: 2026–2030)	–	–	–	Collaborate with the Healthcare DX Innovation Division of the Data-Driven Innovation Initiative	
	<p><u>LHS Infrastructure Creation Project:</u></p> <p>Goal by 2030: Expand and develop small-scale LHS infrastructure across the university</p>	<p><u>Medical Information Center, Kyushu University Hospital</u></p>	Professor	Naoki Nakashima	Develop and expand LHS infrastructure (including clinical pathways and clinical trial systems) for electronic health records (Initiative Period: 2022–2024)	Implement genomic medicine and digital health (PHRs and treatment apps) into LHS infrastructure (Initiative Period: 2025–2027)	Incorporate open science practices into LHS infrastructure and implement LHS into international telemedicine systems (Initiative Period: 2025–2027)	Realize true precision medicine by incorporating various cohort studies, omics data, and knowledge in precision drug discovery (Initiative Period: 2028–2030)	–	Aim to establish a foundation that considers ELSI (Ethical, Legal, and Social Implications) in collaboration with the Future of Medicine Group (yet to be implemented)	<p>https://e-path.jp (Japanese)</p>
	Lecturer		Takanori Yamashita	<p>https://cos3.med.kyushu-u.ac.jp/ (Japanese)</p>							
	<p><u>Open Science Project:</u></p> <p>Goal by 2030: Introduce open science practices to efficiently create scientific services tailored to meet specific needs.</p>	<p><u>Department of Applied Chemistry, Faculty of Engineering</u></p>	Professor	Yoshiki Katayama	Advance our Open Science Platform, establishing a solid foundation for open science in both the Kyushu University Hospital and Faculty of Engineering (Initiative Period: 2022–2024)	Further integrate with the Open Innovation Platforms and broaden the scope of activities (Initiative Period: 2023–2026)	Integrate into the aforementioned LHS Infrastructure Creation Project	–	–	Continue to make progress with positioning ourselves as an OIP	<p>https://www.chem.kyushu-u.ac.jp/~cstm/healthtech/</p> <p>https://www.chem.kyushu-u.ac.jp/~cstm/laboratory/laboratory_336.php (Japanese)</p>
	<p><u>Telemedicine DX Project:</u></p> <p>Goal by 2030: Promote digital transformation (DX) using international telemedicine and digital health</p>	<p><u>Telemedicine Development Center of Asia, Kyushu University Hospital</u></p>	Associate Professor	Tomohiko Moriyama	Promote research on digital health, including telemedicine and personal health records (PHR), both domestically and internationally, aiming for implementation at Kyushu University Hospital (Initiative Period: 2022–2024)	Develop telemedicine systems and digital health solutions capable of responding to emergencies such as disasters and pandemics (Initiative Period: 2022–2024)	Integrate into the aforementioned LHS Infrastructure Creation Project	–	–	Continue to make progress in collaboration with the Research Institute for Information Technology, the Graduate School of Information Science and Electrical Engineering, and the QAOS	<p>https://www.temdec.med.kyushu-u.ac.jp/eng/</p> <p>https://portablehealth.clinic/</p>
	<p><u>Developing Country Medical DX Project:</u></p> <p>Goal by 2030: Deploy healthcare services globally using digital health to promote digital transformation (DX)</p>	<p><u>Faculty of Information Science and Electrical Engineering</u></p>	Associate Professor	Ashir Ahmed	Develop our Portable Health Clinic (PHC) system, a digital health service package for developing countries, for expansion in countries across Asia (Initiative Period: 2022–2024)	Extend the reach of the Portable Health Clinic (PHC) beyond Asia, enrich its content, and establish a viable business model (Initiative Period: 2023–2026)	Integrate into the aforementioned LHS Infrastructure Creation Project	–	–	Continue to make progress in collaboration with Kyushu University Hospital's International Medical Department and the QAOS as well as the Grameen Group of Bangladesh and other partners across Asia and Africa	<p>https://portablehealth.clinic/</p>

Open medical science grounded in Learning Health System (LHS)

Implement LHS for data-driven clinical research and education and accumulate knowledge across multiple fields

2022

2025

2027

2030

Future Initiatives

Electronic Medical Record LHS

- 4 hospitals, 8 diseases
- Distributed Clinical Trials (in cooperation with ARO)

Japan-style open science platform

(Hospital and Engineering Cooperation)

Development of telemedicine education, medical checkups and medical services with a focus on Asia (TEMDEC, Portable Health Clinic)

Disease-specific LHS foundation

- 10 hospitals, 100 diseases
- Genome Medicine Infrastructure Collaboration
- Digital Health Collaboration

Collaboration with open innovation platforms

(Collaboration among all universities, businesses, and government)

Deployment to domestic and international telemedicine and disaster medical systems (TEMDEC, Portable Health Clinic, QAOS, emergency medicine)

Integrated LHS infrastructure construction

- Integration with Phenome, Genome and Exposome
- AI development with National Medical Information Platform
- Strengthening Partnerships with Patients and Citizens by Mobile Health
- Establishing a system for utilizing data in pharmaceutical applications and its utilization in both corporate and academic settings
- Establishing the Foundation for Expanding Japanese Technology and Talent Overseas
- Technological Development for Constructing and Integrating These in the LHS for Unified Management

Establish Comprehensive LHS Center



Strategically manage and leverage the comprehensive collection of data derived from the health and medical data science initiatives at Kyushu University

Restructuring the whole activities of the Medicine and Health Unit

Toward Next Generation Data Health Research

- Delegation of Information Sovereignty to Patients and Citizens
- Realization of DX (Digital Transformation) using Digital Health in Japan's Super-Aged Society and Enhancement of Well-Being
- Resilient Healthcare Information System Unshakeable Even in Emergencies (Disasters, Pandemics, etc.)
- Global Contribution and Industrial Promotion through Development in Developing Countries
- Cultivation of Professionals Well-Versed in Digital Health, Global Health, LHS, and ELSI (Ethics, Legal, Social Issues)



List of Group Initiatives

July 20, 2022

Unit Name: Medicine and Health

Unit Leader Name: Koichi Akashi

Group Leader Name: Toshiharu Ninomiya

Group Name	Goal	Project Manager			Action Item 1	Action Item 2	Action Item 3	Action Item 4	Action Item 5	Collaborations (e.g., Other groups, other units, DDIn2)	Project URL
		Affiliation	Position	Name							
Group for Social Transformation Through Data Science	<p><u>Group-wide:</u></p> <p>Goal for 2030: Contribute to health care and health administration through data analysis of regional cohorts and health databases</p>				<p>Develop predictive algorithms for the onset of lifestyle diseases, dementia, conditions requiring nursing care, and oral diseases, identifying corresponding biomarkers</p> <p>(Initiative Period: 2022–2030)</p>	<p>Investigate the reality of health issues in local communities and make recommendations for health policies</p> <p>(Initiative Period: 2022–2030)</p>	–	–	–	<p>Collaborations include the following:</p>	
	<p><u>A: Disease Prediction Algorithm Development Project</u></p> <p>Goal for 2030: Develop algorithms to predict the onset of situations requiring nursing care, dementia, and lifestyle diseases</p>	<p><u>Department of Hygiene and Public Health, Faculty of Medical Sciences</u></p>	<p><u>Associate Professor</u></p>	<p><u>Jun Hata</u></p>	<p>Leverage cohort data to develop an algorithm to predict the onset of lifestyle-related diseases, dementia, and conditions requiring nursing care</p> <p>(Initiative Period: 2022–2030)</p>					<p>We have started analyzing follow-up data of participants in the Hisayama Study and the Japan Prospective Studies Collaboration for Aging and Dementia (JPSC-AD study)</p>	<p>https://www.hisayama.med.kyushu-u.ac.jp/en/</p> <p>https://www.eph.med.kyushu-u.ac.jp/jpsc/en/</p>
	<p><u>B: Dementia Biomarker Discovery Project</u></p> <p>Goal for 2030: Identify biomarkers associated with the onset of dementia</p>	<p><u>Department of Psychiatry, Kyushu University Hospital</u> <u>Department of Neurology, Kyushu University Hospital</u></p>	<p><u>Lecturer</u></p>	<p><u>Tomoyuki Ohara</u></p>	<p>Identify biomarkers associated with the onset of dementia</p> <p>(Initiative Period: 2022–2030)</p>					<p>We are preparing to measure biomarkers using stored specimens from participants in the Hisayama Study and the Japan Prospective Studies Collaboration for Aging and Dementia (JPSC-AD study)</p>	<p>https://www.hisayama.med.kyushu-u.ac.jp/en/</p> <p>https://www.eph.med.kyushu-u.ac.jp/jpsc/en/</p>
	<p><u>C: Genomic Epidemiology Project</u></p> <p>Goal for 2030: Identify genetic risk factors for lifestyle diseases and dementia</p>	<p><u>Department of Ophthalmic Pathophysiology and Imaging, Graduate School of Medicine</u></p>	<p><u>Lecturer</u></p>	<p><u>Masato Akiyama</u></p>	<p>Leverage cohort data to identify the genetic risk factors for lifestyle-related diseases and dementia</p> <p>(Initiative Period: 2022–2030)</p>	<p>Develop a predictive model that integrates the identified genetic risks with a previously developed environmental factor-based predictive algorithm</p> <p>(Initiative Period: 2022–2030)</p>				<p>We have performed SNP genotyping using DNA samples from participants in the Japan Prospective Studies Collaboration for Aging and Dementia (JPSC-AD study) and the Hisayama Study</p>	<p>https://www.hisayama.med.kyushu-u.ac.jp/en/</p> <p>https://www.eph.med.kyushu-u.ac.jp/jpsc/en/</p>
	<p><u>D: Oral Disease Prevention Project</u></p> <p>Goal by 2030: Develop an algorithm to predict the onset of oral diseases</p>	<p><u>Section of Preventive and Public Health Dentistry, Faculty of Dental Science</u></p>	<p><u>Associate Professor</u></p>	<p><u>Toru Takeshita</u></p>	<p>Leverage cohort data to identify risk factors for oral diseases and develop a predictive algorithm</p> <p>(Initiative Period: 2022–2030)</p>	<p>Leverage cohort data to perform an analysis of the oral microbiome associated with oral diseases</p> <p>(Initiative Period: 2022–2030)</p>				<p>We have organized cohort data related to oral diseases. We have started analyzing oral microbiota</p>	<p>http://www.prevent-dent-kyushu-u.com/course01.html</p> <p>https://kaken.nii.ac.jp/en/grant/KAKENHI-PROJECT-22H03303/</p>
	<p><u>E: EBPM Project 1</u></p> <p>Goal by 2030: Practice evidence-based policy making (EBPM), considering the circumstances of health issues using health data from local governments and making recommendations for health policies</p>	<p><u>Center for Cohort Studies, Faculty of Medical Sciences (Ongoing since October 2022)</u></p>	<p><u>Associate Professor</u></p>	<p><u>Takanori Honda</u></p>	<p>Investigate health issues in Fukuoka City using residents' medical, health checkup, and nursing care data and follow up with health policy recommendations</p> <p>(Initiative Period: 2022–2030)</p>					<p>We have received and started preparing residents' medical, health checkup, and nursing care data provided by Fukuoka City</p>	<p>https://100.city.fukuoka.lg.jp/actions/2767</p>
	<p><u>F: EBPM Project 2</u></p> <p>Goal by 2030: Practice evidence-based policy making (EBPM), conduct data-driven clinical epidemiological research using health data from local governments</p>	<p><u>School of Healthcare Administration, Faculty of Medical Sciences</u></p>	<p><u>Associate Professor</u></p>	<p><u>Haruhisa Fukuda</u></p>	<p>Conduct data-driven clinical epidemiological studies based on Rezept data managed by local governments and make health policy recommendations</p> <p>(Initiative Period: 2022–2030)</p>					<p>We have launched The Longevity Improvement & Fair Evidence (LIFE) Study, using prescription data from multiple local governments</p>	<p>https://life.hcam.med.kyushu-u.ac.jp/</p>

Social transformation through data science

Contribute to healthcare and health administration through data analysis utilizing cohorts and databases of medical, health screening, and nursing care information from local governments

2022

2023

2025

2030

Future Initiatives

Planning and data maintenance

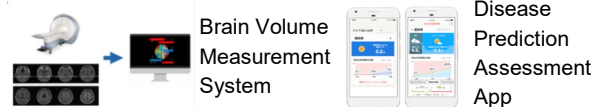
- Research planning
- Consolidate cohort data
- Integrate cohort data with imaging data, omics, etc.
- Acquire and construct databases for medical, health examination, and nursing care data from regional local governments

Promote regional cohort studies

- Explore risk factors for the onset of oral diseases, situations requiring nursing care, dementia, and lifestyle diseases using cohort data, imaging information, and omics
- Identify biomarkers for the onset of dementia
- Analyze oral bacterial flora
- Identify genetic risk factors for lifestyle diseases and dementia

Data analysis utilizing healthcare, health screening, and nursing care databases from local governments and businesses

- Consider the circumstances of health problems in regional communities
- Conduct data-driven research on clinical epidemiology leveraging local government data
- Extend research on healthcare economic evaluation



Develop algorithms to predict the onset of oral diseases, situations requiring nursing care, dementia, and lifestyle diseases

Engage in evidence-based policy making and providing health policy recommendations for local governments and businesses

Social transformation leveraging data science

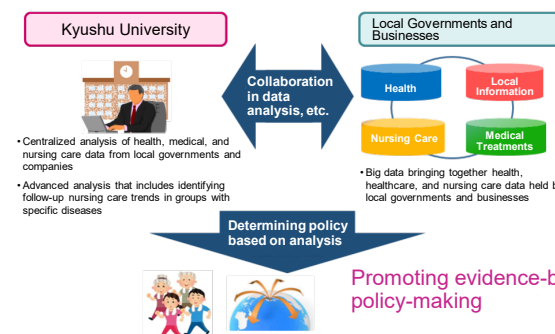
- Develop IT tools for the application of evidence-based preventive medicine in practice
- Conduct personalized medicine
- Achieving healthcare through the utilization of Personal Health Records (PHR) and digital transformation (DX)
- Train experts in data science



Faculty of Medical Sciences
Center for Cohort Studies

Consolidated management of regional, disease, and environmental cohorts within Kyushu University

- Cohort data and clinical information for approx. 70,000 people
- Genome data for approx. 40,000 people
- Dataset comprising approx. 10,000 head MRI imaging scans
- Autopsy data, oral/gut microflora data, etc.



List of Group Initiatives

February 14, 2023

Unit Name: Medicine and Health

Unit Leader Name: Koichi Akaishi

Group Leader Name: Satoshi Fukumoto

Group Name	Goal	Project Manager			Action Item 1	Action Item 2	Action Item 3	Action Item 4	Action Item 5	Collaborations (e.g., Other groups, other units, DDIn2)	Project URL
		Affiliation	Position	Name							
Stem Cell Regulation	<p><u>Group-wide:</u></p> <p>Goal for 2030: Realize regenerative medicine through stem cell application</p>				<p>Establish a foundational database for stem cell regulation (Initiative Period: 2022–2025)</p>	<p>Develop technology for reverse induction from stem cells (Initiative Period: 2022–2030)</p>	<p>Develop regenerative therapies for specifically targeting certain diseases (Initiative Period: 2022–2030)</p>				
	<p><u>Oral Tissue Reconstruction Project:</u></p> <p>Goal by 2030: Develop regenerative technologies for oral tissues</p>	<p><u>Faculty of Dental Science</u></p>	<p><u>Professor</u></p>	<p><u>Satoshi Fukumoto</u></p>	<p>Create a genetic database aimed at elucidating the developmental basis of oral tissue formation (Initiative Period: 2022–2026)</p>	<p>Replicate rare disease models and elucidate their onset mechanisms using mesenchymal stem cells (Initiative Period: 2022–2025)</p>	<p>Develop disease therapies using mesenchymal stem cells (Initiative Period: 2024–2030)</p>	<p>Develop regenerative medical technologies using stem cell-derived exosomes (Initiative Period: 2022–2028)</p>	<p>Develop bio-implants with functionality equivalent to that of natural teeth (Initiative Period: 2025–2030)</p>		
	<p><u>Neurological Disease Regeneration Project:</u></p> <p>Goal by 2030: Establish regenerative therapies targeting neurological diseases</p>	<p><u>Faculty of Medical Sciences</u></p>	<p><u>Professor</u></p>	<p><u>Kinichi Nakashima</u></p>	<p>Develop a treatment for stroke using direct differentiation (Initiative Period: 2022–2024)</p>	<p>Elucidate the mechanism behind cell-specific differentiation failure in humans and create ways to counteract it (Initiative Period: 2023–2027)</p>	<p>Elucidate the common principles behind the onset of psychiatric and neurological diseases caused by inflammation and cellular aging (Initiative Period: 2022–2029)</p>	<p>Develop a treatment for age-related hearing loss centered around the spiral ganglion (Initiative Period: 2023–2028)</p>		<p>https://www.lab.med.kyushu-u.ac.jp/scb/ (Japanese)</p>	
	<p><u>Liver Reconstruction Project:</u></p> <p>Goal by 2030: Establish regenerative technologies targeting the liver</p>	<p><u>Medical Institute of Bioregulation</u></p>	<p><u>Professor</u></p>	<p><u>Atsushi Suzuki</u></p>	<p>Generate human-induced liver progenitor cells that can be leveraged for medical treatments and drug discovery (Initiative Period: 2022–2026)</p>	<p>Develop treatments for liver diseases that utilize liver regeneration (Initiative Period: 2022–2026)</p>	<p>Implement medical treatment and drug discovery practices that use direct reprogramming (Initiative Period: 2027–2030)</p>			<p>https://www.bioreg.kyushu-u.ac.jp/labo/orgreg/top.html (Japanese)</p>	
	<p><u>High-Quality Stem Cell Creation Project:</u></p> <p>Goal by 2030: Develop quality control and stable supply techniques for stem cells used in regeneration</p>	<p><u>Institute for Materials Chemistry and Engineering</u></p>	<p><u>Professor</u></p>	<p><u>Satoru Kidoaki</u></p>	<p>Develop a cell culture technology to enhance the therapeutic effect of mesenchymal stem cells (Initiative Period: 2013–2026)</p>	<p>Develop cell culture substrates for the functional activation of regenerative medicine cells (Initiative Period: 2025–2028)</p>	<p>Establish an in situ quality control and evaluation monitoring culture system for therapeutic cells and cell production (Initiative Period: 2013–2030)</p>				
	<p><u>Cancer Stem Cell Regulation Project:</u></p> <p>Goal by 2030: Develop novel therapeutic strategies based on the characteristics of human cancer stem cells</p>	<p><u>Hospital</u></p>	<p><u>Lecturer</u></p>	<p><u>Yoshikane Kikushige</u></p>	<p>Construct an omics database for human cancer stem cells and use it to derive therapeutic target molecules (Initiative Period: 2022–2025)</p>	<p>Elucidate the molecular foundation necessary for cancer stem cell transformation by comparing human cancer stem cells with normal tissue stem cells (Initiative Period: 2023–2027)</p>	<p>Build a therapeutic model targeting human cancer stem cells (Initiative Period: 2023–2030)</p>				

Medicine and Health

Stem Cell Regulation

- Understand the traits of tissue stem cells needed for regenerative medicine and create methods of regulation
- Clarify pathogenic mechanisms and create disease models needed to develop treatments for specific diseases (rare diseases, etc.)
- Build the technological infrastructure for organ regeneration
- Develop technologies for the stable supply of stem cells used in regenerative medicine and create methods for quality control

2022

2023

2025

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Future Initiatives

Implementation planning

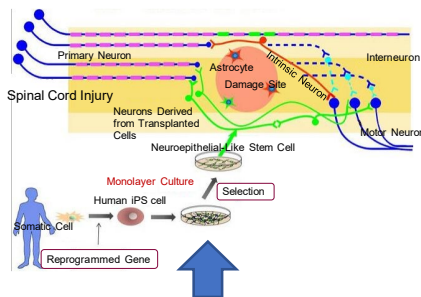


Build databases

Comprehensive genetic screening
Proteome analysis
Understand spatiotemporal molecular expressions

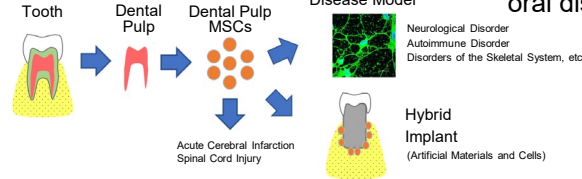
Develop cellular construction technologies for organ regeneration

Artificial induction of tissue cells using cellular reprogramming, etc.
Develop technologies for organ regeneration through the three-dimensional construction of tissue cells



Develop technologies for the stable supply of tissue stem cells

Modeling for specific diseases



Targeting neurological disorders, liver diseases, oral diseases, and malignant tumors

Develop disease regeneration and treatment technologies

Develop regenerative and restorative technologies through applying the stem cells of specific diseases, etc.

Optimization of cells and application to diseases

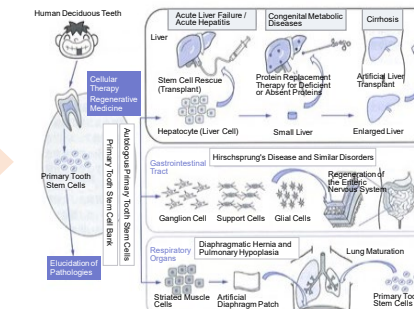


Fig. 11 Development of novel therapeutics using deciduous tooth stem cells

Develop technologies for the quality control of tissue stem cells

Realize new systems for diagnosis and treatment

Realize treatments for organ regeneration and launch onto the market

List of Group Initiatives

September 27, 2023

Unit Name: Medicine and Health

Unit Leader Name: Koichi Akashi

Group Leader's Name: Noriko Isobe

Group Name	Goal	Project Manager			Action Item 1	Action Item 2	Action Item 3	Action Item 4	Action Item 5	Collaborations (e.g., Other groups, other units, DDIn2)	Project URL
		Affiliation	Position	Name							
Neuroscience Group	<p><u>Group-wide:</u></p> <p>Goal by 2030: Establishment of a prediction system for the onset of neurological and psychiatric diseases in a society with a long life expectancy and establishment of a personalized treatment system Establishment of innovative technologies targeting brain immunity for the formation and maintenance of a healthy brain Identification of pathogenic mechanisms and responsible circuits for developmental disorders and psychiatric diseases Understanding of individuality and diversity of brain functions and realization of an inclusive society Elucidation of the principles of brain computation and integration with AI</p>				Progress management of initiatives based on the implementation plan (Initiative period: 2023-2030)						
	<p><u>Project for the Promotion of Personalized Therapy (Neurological Diseases):</u></p> <p>Goal by 2030: Establishment of a prediction system for the onset of neurological diseases in a society with a long life expectancy and the foundation for a personalized treatment system</p>	Graduate School of Medicine Neurology	Professor	Noriko Isobe	Development of a system for predicting the onset of multifactorial diseases in the field of neurological diseases (Initiative period: 2023 - 2030)	Conceptualization of personalized treatment and treatment optimization strategies for multifactorial diseases in the field of neurological diseases (Initiative period: 2024 - 2030)	Toward the implementation of personalized treatment and treatment optimization strategies in multifactorial diseases in the field of neurological diseases (Initiative period: 2025-2030)			Collaborate with the Precision Medicine Initiative G and the Social Transformation Data Science G as appropriate.	
	<p><u>Project for the Promotion of Personalized Treatment (Mental Disorders):</u></p> <p>Goal by 2030: Establishment of a prediction system for the onset of mental disorders in a society with a long life expectancy and the foundation for a personalized treatment system</p>	Graduate School of Medicine Psychopathological Medicine	Associate Professor	Takahiro Kato	Development of a system for predicting the onset of multifactorial diseases in the field of psychiatric disorders (Initiative period: 2023 - 2030)	Conceptualization of Personalized Treatment and Treatment Optimization Strategies for Multifactorial Disorders in the Field of Mental Disorders (Initiative period: 2024 - 2030)	Toward implementation of personalized treatment and treatment optimization strategies in multifactorial diseases in the field of psychiatric disorders (Initiative period: 2024 - 2030)	Advance understanding of the molecular basis of neuropsychiatric disorders by using human disease model cells such as human blood-derived microglia-like (IMG) cells (Initiative period: 2025 - 2030)		Collaborate with the Precision Medicine Initiative G and the Social Transformation Data Science G as appropriate.	
	<p><u>Project for Promotion of Personalized Therapy (Stress-Related Diseases):</u></p> <p>Goal by 2030: Establishment of a prediction system for the onset of neurological and psychiatric disorders in a society with a long life expectancy and the establishment of a foundation for personalized treatment systems</p>	Graduate School of Medicine Psychosomatic Medicine	Professor	Nobuyuki Sudo	Development of a system for predicting the onset of multifactorial diseases in the field of stress-related diseases (Initiative period: 2023 - 2030)	Conceptualization of personalized treatment and treatment optimization strategies in multifactorial diseases in the field of stress-related diseases (Initiative period: 2024 - 2030)	Toward implementation of personalized treatment and treatment optimization strategies in multifactorial diseases in the field of stress-related diseases (Initiative period: 2024 - 2030)			Collaborate with the Precision Medicine Initiative G and the Social Transformation Data Science G as appropriate.	
	<p><u>Neural Circuit Elucidation Project :</u></p> <p>Goal by 2030: Elucidation of brain circuit development and its disruption</p>	Graduate School of Medicine Department of Disease Informatics	Professor	Takeru Imai	Multi-scale understanding of the developmental process of normal brain circuits using transparency techniques and optical microscope connectomics (Initiative period: 2023-2030)	Comprehensive analysis of the process of circuit development using models of developmental disorders and psychiatric disorders to identify the responsible circuits (Initiative period: 2024 - 2030)	Functional classification of organ sensation using in vivo imaging and elucidation of neural circuits responsible for gut-brain correlation (Initiative period: 2024 - 2030)	Elucidation of in vitro reconstructive systems and mathematical principles of neural circuit development and memory and learning processes (Initiative period: 2025 - 2030)			
	<p><u>High Depth Omics & Brain Immunity Project :</u></p> <p>Goal by 2030: Establishment of breakthrough technology targeting brain immunity for the formation and maintenance of a healthy brain</p>	Institute of Bioregulatory Medicine	Professor	Takahiro Masuda	Accelerate multifaceted research centered on high depth omics analysis technology to gain an integrated understanding of the mechanisms of normal brain formation and maintenance with brain immunity as a starting point. (Initiative period: 2023 - 2030)	Integrated understanding of the pathogenic mechanism of central nervous system diseases with brain immunity as a starting point (Initiative period: 2024 - 2030)					

Medical & Health Neuroscience

- In an aging and increasingly complex society, there is a growing demand to address and elucidate the pathophysiology of neurodegenerative diseases, psychiatric disorders, developmental disorders, and stress-related disorders.
- Aiming to establish innovative technologies and therapies targeting brain immunity, practice personalized medicine, and social implementation in order to maintain a healthy brain.
- Elucidate the process of neural circuit development and circuit development in neurological and psychiatric disorders through AI and mathematical approaches, etc., to further realize an inclusive society.

2023

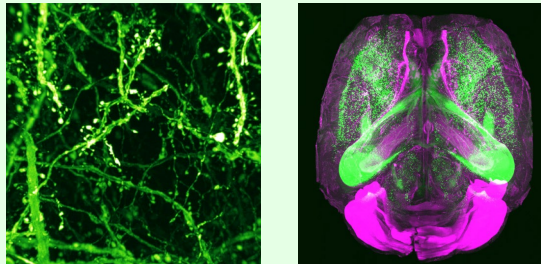
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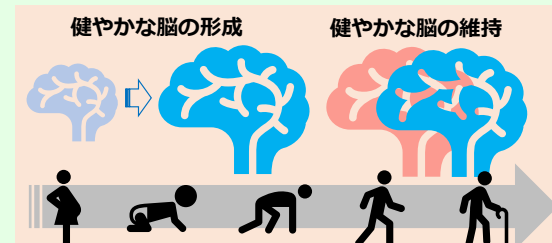
2030

Future Initiatives

Elucidating Circuit Changes and Their Underlying Basis in Normal Brain Development and Mental Disorders Through Multi-Scale Analysis of Brain Circuits



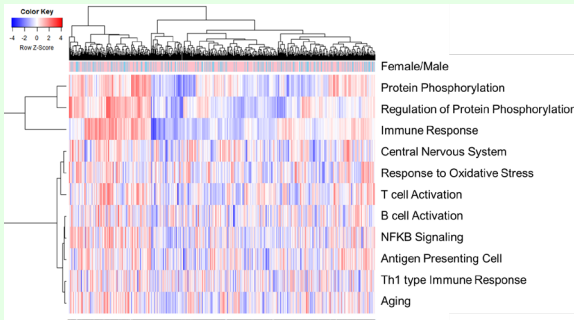
Comprehensive Understanding of Normal Brain Formation and Maintenance Mechanisms, as well as Central Nervous System Disorders, through High-Depth Omics Analysis



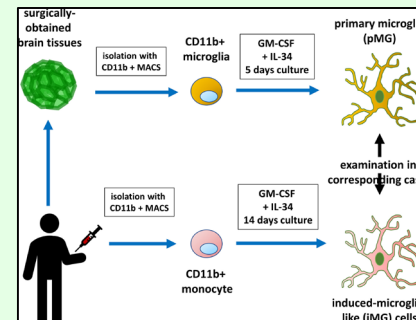
Prepare for starting projects

- Planning
- Kick-off and start-up

Establishing Individualized Treatment Approaches Utilizing Polygenic Risk Score (PRS)



Pathophysiological Understanding and Therapeutic Innovation for Psychoneurological Disorders Using Human Model Cells Such as iMG



- Establishment of groundbreaking technologies focused on brain immunity for the formation and maintenance of a healthy brain
- Practice and social implementation of personalized medicine in multifactorial diseases in the field of psychiatric and neurological disorders
- Understanding the individuality and diversity of brain function
- Realization of an inclusive society

List of Group Initiatives

February 14, 2023

Unit Name: Medicine and Health

Unit Leader Name: Koichi Akaiishi

Group Leader Name: Junko Ayuzawa

Group Name	Goal	Project Manager			Action Item 1	Action Item 2	Action Item 3	Action Item 4	Action Item 5	Collaborations (e.g., Other groups, other units, DDIn2)	Project URL
		Affiliation	Position	Name							
Future of Medicine	<p><u>Group-wide:</u></p> <p>Goal for 2030: ★ Collaborate with the Open Innovation Platform (OIP) and leverage integrative knowledge ★ Resolve the social and ethical issues of future medicine through forecasting by a problem-solving panel and make recommendations on the economic rationality and sustainability of future medicine through forecasting by a recommendations panel ★ Establish processes that enable us to continually solve problems and make recommendations in the future</p>				<p>Oversee progress of initiatives based on action plans</p> <p>(Initiative Period: 2022–2030)</p>	<p>• Prepare and build infrastructure while preparing for collaboration with the OIP</p> <p>(Initiative Period: 2022–2030)</p>	<p>Establish processes that enable us to continually solve problems and make recommendations in the future</p> <p>(Initiative Period: 2025–2030)</p>	–	–	<p>Promote collaboration between each of the groups within this unit, the Integrated Initiative for Designing Future Society, and the Data-Driven Innovation Initiative, as well as with collaborative platforms and the OIP.</p>	
	<p><u>A Planning Panel Project:</u></p> <p>Goal for 2030: Develop an action plan</p>	<p>Faculty of Medical Sciences School of Healthcare Administration</p>	<p>Associate Professor</p>	<p>Junko Ayuzawa</p>	<p>• Prepare, launch, and establish a planning panel • Commence the development of action plans for group initiatives</p> <p>(Initiative Period: 2022–2030)</p>					<p>Promote collaboration between each of the groups within this unit, the Integrated Initiative for Designing Future Society, and the Data-Driven Innovation Initiative, as well as with collaborative platforms and the OIP.</p>	
		<p>Faculty of Medical Sciences</p>	<p>Professor</p>	<p>Noriko Isobe</p>	<p>• Prepare, launch, and establish a planning panel • Commence the development of action plans for group initiatives</p> <p>(Initiative Period: 2022–2030)</p>					<p>Promote collaboration between each of the groups within this unit, the Integrated Initiative for Designing Future Society, and the Data-Driven Innovation Initiative, as well as with collaborative platforms and the OIP.</p>	
		<p>Faculty of Medical Sciences</p>	<p>Professor</p>	<p>Hiroaki Niino</p>	<p>• Prepare, launch, and establish a planning panel • Commence the development of action plans for group initiatives</p> <p>(Initiative Period: 2022–2030)</p>					<p>Promote collaboration between each of the groups within this unit, the Integrated Initiative for Designing Future Society, and the Data-Driven Innovation Initiative, as well as with collaborative platforms and the OIP.</p>	
		<p>Hospital</p>	<p>Assistant Professor</p>	<p>Kuriko Kudo</p>	<p>• Prepare, launch, and establish a planning panel • Commence the development of action plans for group initiatives</p> <p>(Initiative Period: 2022–2030)</p>					<p>Promote collaboration between each of the groups within this unit, the Integrated Initiative for Designing Future Society, and the Data-Driven Innovation Initiative, as well as with collaborative platforms and the OIP.</p>	
	<p><u>B Problem-Solving Panel Project:</u></p> <p>Goal for 2030: Construct processes to enable ongoing problem solving</p>	<p>Faculty of Medical Sciences School of Healthcare Administration</p>	<p>Associate Professor</p>	<p>Junko Ayuzawa</p>	<p>• Prepare, launch, and establish a problem-solving panel • Consider processes for drafting proposals and building consensus • Draft problem-solving proposals • Commence the development of action plans for group initiatives</p> <p>(Initiative Period: 2023–2030)</p>			–	–	<p>Promote collaboration between each of the groups within this unit, the Integrated Initiative for Designing Future Society, and the Data-Driven Innovation Initiative, as well as with collaborative platforms and the OIP.</p>	
	<p><u>C Recommendations Panel Project:</u></p> <p>Goal for 2030: Construct processes to enable ongoing recommendations</p>	<p>Faculty of Engineering, Center for Molecular Systems Center of Future Chemistry</p>	<p>Associate Professor</p>	<p>Akihiro Kishimura</p>	<p>• Prepare, launch, and establish a recommendations panel • Consider processes for drafting proposals and building consensus • Begin drafting recommendations</p> <p>(Initiative Period: 2023–2030)</p>					<p>Promote collaboration between each of the groups within this unit, the Integrated Initiative for Designing Future Society, and the Data-Driven Innovation Initiative, as well as with collaborative platforms and the OIP.</p>	

Medicine and Health

Future medicine

- Ongoing collaboration with the Open Innovation Platform (OIP) and the aggregation of integrative knowledge
- Utilization of forecast-oriented problem-solving panels for the purpose of addressing societal and ethical challenges in future healthcare and recommendations on economic rationality and sustainability in future healthcare through backcast-based proposition panels
- Establish processes that enable us to continually solve problems and make recommendations in the futureZ

2022

Implementation planning

- Kick-off and launch of planning panel

2023

Laying the groundwork

- Prepare for collaboration with OIP
- Prepare and launch problem-solving panel
- Prepare and launch recommendations panel

2025

Further development

- Enhance collaboration with OIP
- Develop problem-solving panel
- Develop recommendations panel
- Evaluate the process of issue resolution, offering recommendations, and consensus-building
- ➔ **Identify problems and draft solutions**
- **Draft recommendations**

2030

Problem solving and recommendations

Future Initiatives

- On-going collaboration with OIP
- Accumulate integrative knowledge

Construct processes to enable on-going problem solving and recommendations

- Timely solutions for various issues
- Recommendations that meet the needs of the times

Realizing an ideal society

Medical Campus Collaborative Platform
 Kyushu University Collaborative Platform for Medicine, Humanities, and Social Sciences
 Kyushu University Regional Collaboration Platform

Open Innovation Platform

Planning Panel

Problem-Solving Panel

Recommendation Panel

Integrated Initiative for Designing Future Society

Data-Driven Innovation Initiative

Collaboration

Problem solving recommendations