

Contact Information

National Cancer Center Research Institute

Fundamental Innovative Oncology Core (FIOC)
Office of Research Coordination

E-mail: fioc-renkei@ml.res.ncc.go.jp
URL: https://www.ncc.go.jp/en/ri/fioc/about/020/

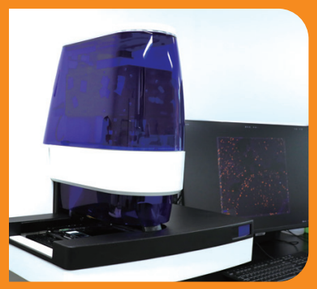
Team FIOC : From Bench to Bedside and Back again!





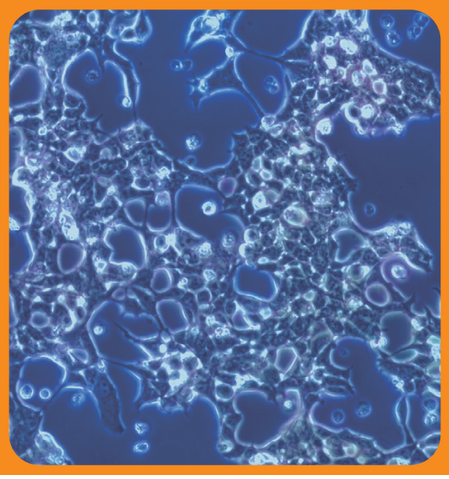
FIOC

Fundamental Innovative Oncology Core











NCCJ National Cancer Center Japan | Research Institute

Team FIOC : From Bench to Bedside and Back again!

Message from the FIOC Director



Hidetoshi Kassai

National Cancer Center Research Institute
Fundamental Innovative Oncology Core
Director

Innovative concepts, technologies, and new therapeutic leads emerge from basic research driven by the creativity of researchers. Many discoveries that transform medicine and drug development were not necessarily made with a specific application in mind. Rather, they arose from the pursuit of fundamental principles and phenomena underlying biological processes and disease. It is one of our most important missions to develop such discoveries into robust scientific knowledge supported by reproducible and reliable evidence, and ultimately to translate them into benefits for medicine and society.

At the same time, the life sciences are becoming increasingly large-scale and technologically sophisticated, taking on many of the characteristics of “big science.” Today’s research often requires advanced instrumentation, specialized analytical technologies, diverse biological resources, and the capacity to generate and interpret large volumes of data. The range of technologies and analyses that can be undertaken by any individual researcher or laboratory is therefore necessarily limited. Moreover, translating the outcomes of basic research into drug development and clinical applications requires high-quality data generated through standardized procedures and rigorous quality control. It is therefore essential to bring together research support functions with complementary expertise and develop them as an integrated research infrastructure.

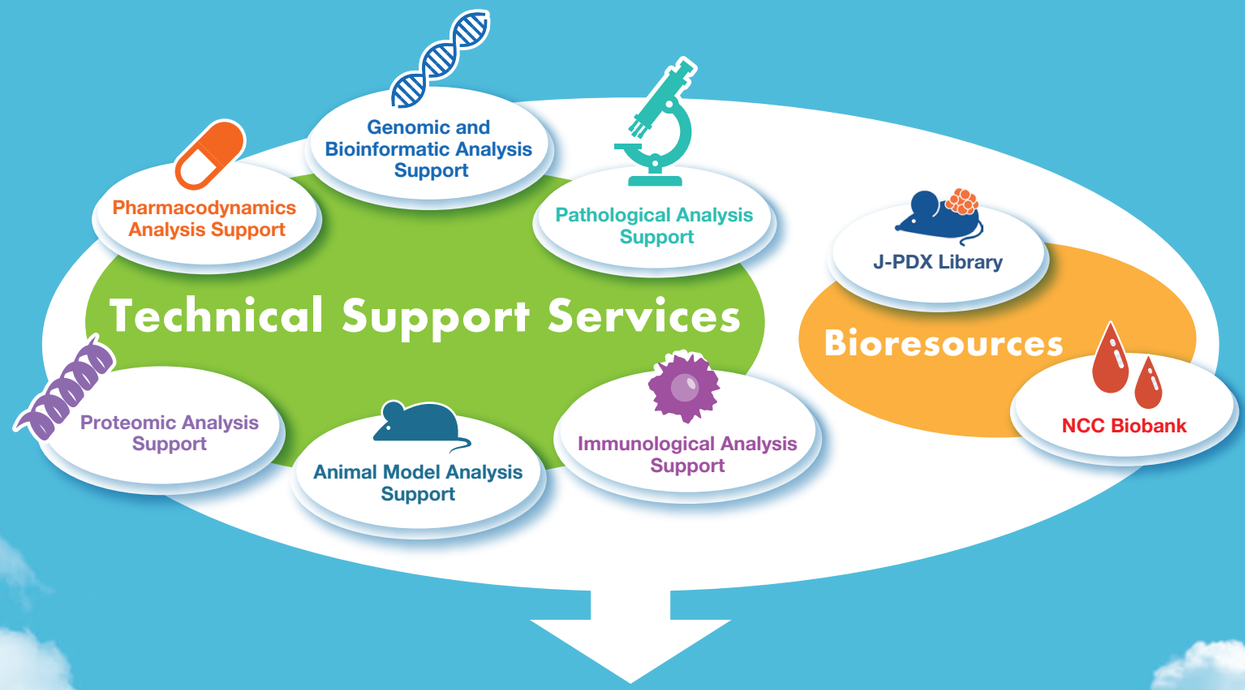
The Fundamental Innovative Oncology Core (FIOC) at the National Cancer Center Research Institute provides specialized research support in genomics, proteomics, bioinformatics, immunological analysis, pathological analysis, pharmacological evaluation, and animal model development. FIOC also maintains a broad range of biological resources, including the NCC Biobank and the J-PDX Library. By coordinating these technologies and resources, we provide a flexible, integrated research infrastructure tailored to the needs of each research project.

Through its diverse technical expertise and quality-controlled biological resources, FIOC seeks to develop original ideas arising from basic research into robust scientific outcomes and to advance them toward drug discovery, clinical research, and real-world implementation. We also promote reverse translational research by bringing questions arising in clinical practice back to the laboratory and returning the knowledge gained through basic research to medicine. In this way, we aim to foster a productive cycle in which basic and clinical research continually inform and advance one another.

We sincerely appreciate your understanding and support for the activities of FIOC.

FIOC Research Supports:

Our support integrates six technical services with NCC’s bioresource



Research Support and Collaboration

We offer comprehensive research support and collaborative research opportunities for both corporate and academic partners.

Research Support and Collaboration Workflow

Our standard workflow begins with consultation and proceeds through contract signing, initiation of research support, and finally, return of analytical results.

1. Contact the consultation desk (Office of Research Coordination)
2. Consultation or meeting with the relevant department (Consultation)
3. Start of research support
4. Delivery of analytical results
5. Signing of confidentiality or collaborative research agreements



Six Technical Support Services

01

Department of Clinical Genomics | Department of Bioinformatics | Department of Genome Research and Support

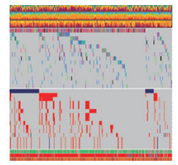
Genomic and Bioinformatic Analysis Support

Genomic analysis (wet and dry analysis)

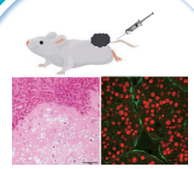
- Whole-exome and whole-genome sequencing
- Transcriptome analysis
- Methylation analysis

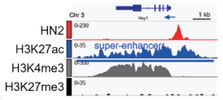
Secondary genomic data analysis

- Mutation signature analysis
- GSEA
- Survival analysis
- TMB, MSI, and HRD analysis
- Pathway and gene ontology analysis
- Clustering and dimensionality reduction analysis



02





Department of Pharmacology and Therapeutics

Pharmacological Analysis Support

Evaluation of efficacy & Model establishment

- Drug sensitivity testing for candidate compounds and investigational drugs using patient-derived xenograft (PDX) mice.
- Generation and establishment of novel PDX.

Wet and dry analysis (Utilizing mouse samples)

- Gene expression and epigenomic analysis (RNA-seq, ChIP-seq, ATAC-seq)
- Pathological analysis (morphological evaluation, immunohistochemistry)
- Protein expression analysis (Immunoblotting, ELISA)

03

Department of Pathological Analysis | Central Radioisotope Division

Pathological Analysis Support

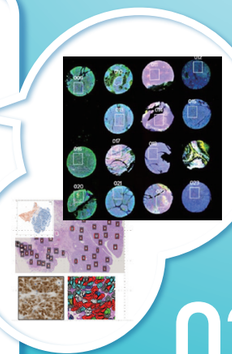
Histopathological and morphological evaluations, as well as specimen selection and provision

- Customized sample suggestions based on pathological and morphological evaluations (frozen or paraffin-embedded samples from the biobank)

Tissue microarray preparation

- Evaluation across numerous specimens or multiple organs on a single slide

IHC and FISH | **Spatial transcriptomics analysis (Xenium, GeoMx)** | **Confocal microscopy analysis**



04

Department of Immune Medicine | Department of Immunogenomic Medicine

Immunological Analysis Support

Immune cell analysis

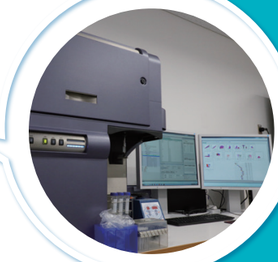
- Flow cytometry analysis
- Protein expression analysis via multiplexed immunohistochemistry

Immunogenomic analysis

- Immune-related gene expression profiling
- Single-cell gene expression analysis

Immune functional analysis

- *In vitro* T-cell proliferation analysis
- *Ex vivo* immune function assessment
- Tumor immune microenvironment analysis



05



Department of Proteomics

Proteomics Analysis Support

Advanced proteomics analysis using mass spectrometry

- Protein quantification (e.g. Culture cell, Frozen tissue, FFPE and Plasma)
- Analysis of protein modifications (e.g. phosphorylation, methylation, and acetylation)
- Analysis of protein complex (e.g. immunoprecipitation and proximity labeling)

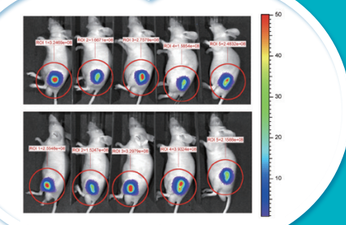
06

Department of Translational Oncolog | Department of Cancer Model Development

Animal Model Analysis Support

Cancer research through animal model development and analysis

- *In vivo* imaging (bioluminescence, fluorescence, X-ray)
- Cancer cell line-derived xenograft model development
- Gene-edited mouse model creation
- Developmental engineering techniques (e.g. *in vitro* fertilization, strain preservation)
- Patient-derived cancer cell line creation
- Organoid models derived from mouse tissue



Bioresource

https://www.ncc.go.jp/en/ri/jimu/020/020/020/

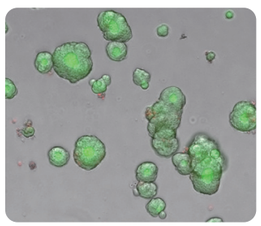
FIOC collaborates with NCC Hospital and Hospital East to establish high-quality bioresources, a variety of cancer PDX models, as well as bio-banked blood and tissue samples. These resources are available to support research across both academia and industry.

J-PDX Library

https://j-pdx.ncc.go.jp/en/

The J-PDX Library, built from patient-derived tumors from NCC Hospital and Hospital East, includes over 600 cross-cancer PDX models as of September 2024, accompanied by clinical data and genomic analysis results.

Patient-derived cell lines and organoids



The FIOC has established numerous cancer cell lines and peritoneal metastasis cell lines from gastric, pancreatic, and ovarian cancers linked to clinical data and organoids from cancer patients.

NCC Biobank



Samples provided by the patients, including blood and tumor tissues, along with associated clinical information, were available through our collaborative NCC Hospitals and Hospital East.

Omics Core

Department of Clinical Genomics



Department Head
Kouya Shiraishi

Genome and transcriptome analysis in collaboration with the NCC Biobank

The Department of Clinical Genomics provides technical support for genome analysis using clinical samples collected by clinicians and basic researchers (both within and outside our center, including hospitals and research institutions). In collaboration with the Department of Biobank and Tissue Resources, we performed genome and transcriptome analyses (both wet and dry) using available clinical samples as a one-stop service. Our contributions include research on the transmission of cervical cancer from mother to child (Arakawa et al., NEJM 2021). Our department supports a wide range of projects ranging from clinical research to collaborative research with companies. Please feel free to contact us if you have any requests or interest in support.

https://www.ncc.go.jp/en/ri/department/clinical_genomics/

Department of Proteomics



Department Head
Shungo Adachi

Daily analysis of 50 clinical samples and 10,000 types of proteins

The Department of Proteomics provides support for protein analysis to researchers both within and outside our center, including protein analysis using mass spectrometry. With the ASTRAL system, we can identify and quantify approximately 10,000 proteins in 50 samples per day. In addition to quantification, we also study protein complexes and modifications. Even analyses not routinely conducted by our department can be considered as part of collaborative research. We welcome researchers interested in proteomic analysis to consult with us, even if they have no prior experience.

https://www.ncc.go.jp/en/ri/division/proteomics/

Department of Bioinformatics



Department Head
Mamoru Kato

Bioinformatics from basic to applied research

The Department of Bioinformatics covers a wide range of fields, from basic to applied research. "Bioinformatics" is an emerging interdisciplinary field that combines biology and informatics, primarily conducting biological research through computational data analysis. In the Department of Bioinformatics, we conducted a bioinformatics analysis of the data produced by experimental laboratories in collaborative research. Focusing on cancer, our research spans the application of bioinformatics, with continuous consideration of clinical applicability. Our past collaborative research achievements include a comprehensive whole-genome analysis of liver and bile duct cancers (International Cancer Genome Consortium). For those interested in collaborative research, please contact the Office of Research Coordination.

https://www.ncc.go.jp/en/ri/department/bioinformatics/

Department of Immunogenomic Medicine



Department Head
Shohei Koyama

Detection of immunological changes in the tumor microenvironment

The Department of Immunogenomic Medicine performs comprehensive immunogenomic and data analyses using clinical samples gathered through collaborations with our center's departments and research laboratories, as well as various external medical institutions and academia. We investigate the effects of different treatments on immunological changes in the tumor microenvironment and systemic immune cells. Additionally, we conduct *in vivo* functional analysis of immune-related molecules identified from clinical samples using mouse models. We are responsible for supporting the above activities.

https://www.ncc.go.jp/en/ri/department_of_Immuno_genomic_medicine/

Omics Core

Department of Genome Research and Support



Department Head
Toshihide Ueno

Your Partner for Genome Data Analysis and Bioinformatics Research Support

The Department of Genome Research and Support provides comprehensive bioinformatics support for cancer research and a wide range of life science studies by analyzing the large-scale genomic data generated by next-generation sequencing (NGS).
Drawing on many years of expertise in genome analysis, we work closely with researchers to provide continuous support throughout the research process, from study design and data analysis to interpretation of the results.
In addition to analytical support, we are actively engaged in the development of novel analytical methods and computational platforms. We provide analysis results in visually intuitive reports, helping researchers gain new biological insights from their data and ultimately contributing to advances in biomedical research and healthcare.
We also welcome consultations during the planning stage of research projects and provide advice on analytical strategies, data analysis, and result interpretation.
Please feel free to contact us to discuss your research needs.

https://www.ncc.go.jp/en/ri/department/genome_research_support/index.html

Department of Cancer Model Development



Department Head
Hidetoshi Kassai

Accelerating research through rapid production of gene-mutated mice

The Department of Cancer Model Development conducts essential animal-based experiments and analyses in cancer research and drug development.
The Cancer Model Development Division maintains and manages animal experimental facilities considering animal welfare while supporting model animal production.
Specifically, we created genetically mutated mice using genome editing and supported research both within and outside of our center based on these developments.
We also offer essential techniques for cancer research, such as *in vitro* fertilization, strain preservation in genetically mutated mice, and tissue sample preparation.
We look forward to consultations and requests.

https://www.ncc.go.jp/en/ri/department/cancer_model_development/

Drug Discovery and Disease Model Core

Department of Translational Oncology



Department Head
Fumitaka Takeshita

Testing the novel cancer therapies in mouse models using *in vivo* imaging

The translational oncology department is involved in the development of nucleic acid drugs. In particular, we are focused on creating a drug delivery system to deliver nucleic acid drugs to cancer cells and are building an evaluation system using *in vivo* imaging to create various cancer model mice.
Additionally, we develop various therapeutic modalities, such as new molecular-targeted cancer drugs, antibody drugs, and extracellular vesicles.
Our department supports experimental infrastructure, including the development of cancer model mice using *in vivo* imaging, and cell line establishment.

https://www.ncc.go.jp/en/ri/department/translational_oncology/

Department of Pharmacology and Therapeutics



Department Head
Miwa Tanaka

Supporting cancer drug development with PDX models.

The Department of Pharmacology and Therapeutics conducts and supports preclinical research aimed at understanding mechanisms of tumorigenesis and developing novel cancer therapeutics using patient-derived xenograft (PDX) mice and genetically engineered mouse models. Specifically, we perform drug sensitivity testing for candidate compounds and investigational drugs using these models. Furthermore, by integrating gene expression, epigenomic, and pathological analyses, it elucidates pharmacological mechanisms of action and explores biomarkers. To ensure the reliability and reproducibility of the test data, support for bridging to external CRO is also provided.

https://www.ncc.go.jp/en/ri/department/pharmacology_therapeutics/

Pathology and Immunology Core

Department of Analytical Pathology



Department Head
Yasushi Yatabe

Planning cancer research based on pathological morphology

The Department of Analytical Pathology works with the Biobank to support collaborative research on morphological evaluation across tumor types, providing samples that meet specified search criteria, including frozen specimens and paraffin blocks. Using morphologic analysis, we advise on tumor cell localization, diagnosis, and spatial distribution within tissue.
We also provide molecular pathology support, including tissue array preparation, and evaluate the expression of biomarkers and molecular targets identified through basic research.

https://www.ncc.go.jp/en/ri/department/analytical_pathology/

Department of Immune Medicine



Department Head
Kazunori Aoki

Connecting immunological analysis with therapeutic development in patients with cancer

The Department of Immune Medicine, in collaboration with pharmaceutical companies and academia, both inside and outside our center, provides technical support for immunological analysis in translational research. Specifically, we conduct analyses of peripheral blood and cancer tissues as ancillary studies for clinical trials led by pharmaceutical companies and academia, engaging in collaborative research on biomarker discovery and elucidation of the immune mechanisms of new drugs. We also support academia in the development of novel immunotherapies using animal models and clinical specimens, contributing as an immune profile analysis team for AMED Practical Research for Innovative Cancer Control projects. Our division supports the development of new drugs through immunological analyses.

https://www.ncc.go.jp/en/ri/department/immune_medicine/

Research Support Core

Central Radioisotope Division



Chief
Motohiro Yamauchi

Supporting Cancer Research Using Radiation and Radioisotopes

The Central Radioisotope Division provides access to 23 unsealed radioisotopes (RIs) and a cesium-137 (Cs-137) gamma-ray irradiator. The facility is also licensed to use therapeutic radionuclides, including lutetium-177 (Lu-177), astatine-211 (At-211), and actinium-225 (Ac-225), which are increasingly used in targeted radionuclide therapy.
By the end of fiscal year 2025, the facility was equipped with small-animal positron emission tomography/computed tomography (PET/CT) and single-photon emission computed tomography/computed tomography (SPECT/CT) systems, as well as individually ventilated cages for mice. We are currently establishing a research support system for studies involving PET/CT and SPECT/CT imaging. Please feel free to contact us if you are planning or interested in conducting research using radiation or radioisotopes.

https://www.ncc.go.jp/en/ri/division/radioisotope/

Coordination

Office of Research Coordination



Chief
Tatsuya Yoshida

Connecting FIOC technical support and bioresources with researchers

The Office of Research Coordination serves as a gateway connecting FIOC with companies and academia to support development research by utilizing technical support and bioresources from FIOC. In cooperation with FIOC researchers, we strive to provide analytical technology and bioresources that match current needs by investigating the latest technologies, development trends, and tracking support achievements. FIOC has made numerous achievements in technical support and collaborative research, and we can provide research support by integrating multiple technical support services and bioresources. Direct consultations from companies and academia have led to successful collaborative research; therefore, please feel free to consult the Office of Research Coordination.

https://www.ncc.go.jp/en/ri/division/research_coordination/

Research Achievements Supported by FIOC (2024)

Secondhand smoke shown to induce genetic mutations in lung cancer

Journal of Thoracic Oncology

Department of Clinical Genomics/
Department of Biobank and Tissue Resources

https://www.ncc.go.jp/jp/information/pr_release/2024/0416/index.html

Discovery of novel therapeutic target genes in lung adenocarcinoma through integrated whole-genome sequencing, contributing to the advancement of precision medicine for lung cancer

Molecular Cancer

Department of Clinical Genomics/ Department of Proteomics/
Department of Biobank and Tissue Resources

https://www.ncc.go.jp/jp/information/pr_release/2024/0702/index.html

Multi-omics analysis reveals the molecular mechanisms of lung adenocarcinoma

Molecular Cancer

Department of Clinical Genomics/
Department of Biobank and Tissue Resources

https://www.ncc.go.jp/jp/information/pr_release/2024/0913/index.html

Genetic ancestry identified as a risk factor for lung cancer harboring EGFR mutations, which are more common among never-smokers

Journal of Thoracic Oncology

Department of Clinical Genomics/
Department of Biobank and Tissue Resources

https://www.ncc.go.jp/jp/information/pr_release/2024/1223/index.html

Research Achievements Supported by FIOC (2025~)

Development of a novel informatics platform for cataloging genomic alterations associated with disease etiology and therapeutic targets

Nature Communications

Department of Biobank and Tissue Resources

https://www.ncc.go.jp/jp/information/pr_release/2025/0109/index.html

Genetic factors involving BRCA2 and TP53 identified in a subset of young-onset lung adenocarcinoma

Journal of Thoracic Oncology

Department of Clinical Genomics

https://www.ncc.go.jp/jp/information/pr_release/2025/0709/index.html

Gut microbiota influence the immune microenvironment of tumors distant from the intestine via dendritic cells — Identification of novel gut bacteria associated with the efficacy of immune checkpoint inhibitors

Nature

Department of Immunogenomic Medicine

https://www.ncc.go.jp/jp/information/pr_release/2025/0715/index.html

Elucidating the significance of alterations in CMTR2, a gene involved in RNA modification

Nature Communications

Department of Clinical Genomics/
Department of Biobank and Tissue Resources

https://www.ncc.go.jp/jp/information/pr_release/2025/1114/index.html

Elucidating the mechanisms underlying the immunosuppressive microenvironment in pancreatic cancer — Interactions between cancer-associated fibroblasts and bone marrow-derived suppressor cells

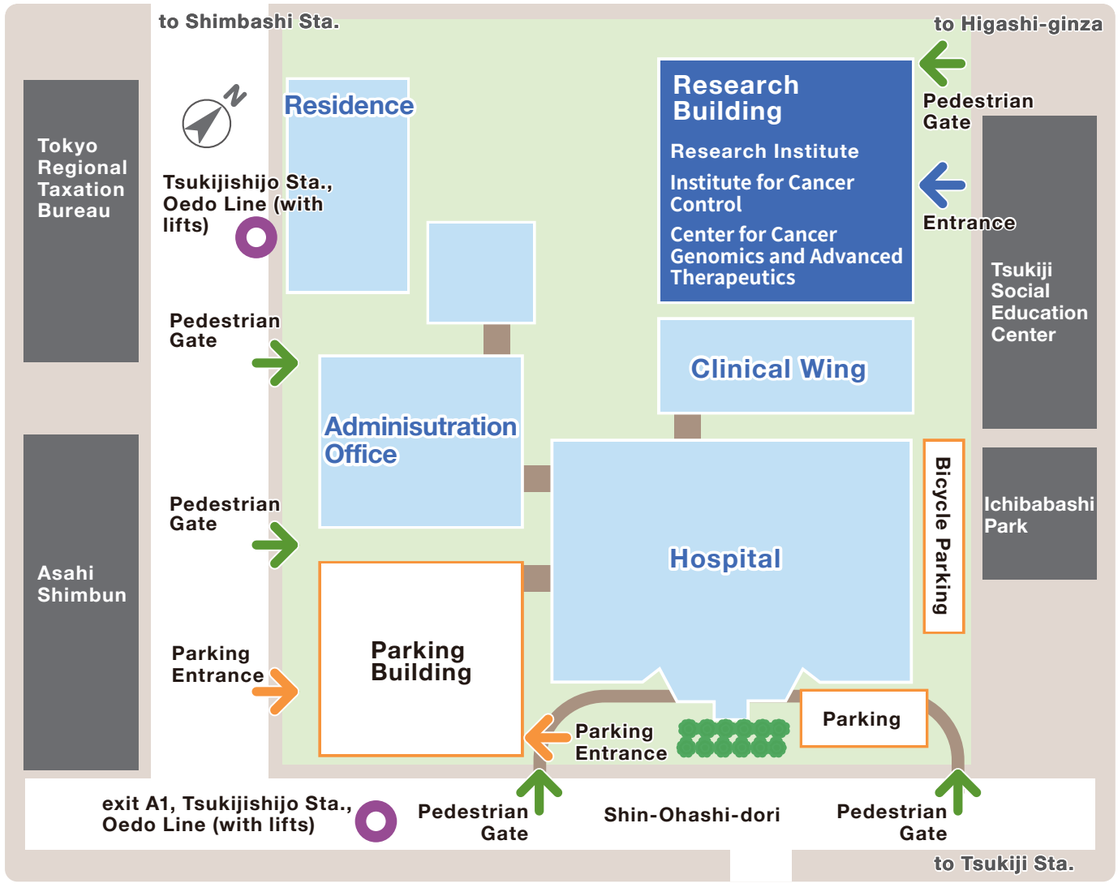
Cancer Letters

Department of Immune Medicine

https://www.ncc.go.jp/jp/information/researchtopics/2026/0423/index.html

ACCESS & MAP

Tsukiji Campus



MAP



Train

Oedo Line "Tsukijishijo Station" 1 minute walk from Exit A1 or A3
Hibiya Line "Tsukiji Station" 5 minute walk from Exit 2
Hibiya Line "Higashi-ginza Station" 5 minute walk from Exit6
Asakusa Line "Higashi-ginza Station" 5 minute walk from Exit 6

Toei Bus

5 min walk from "Tsukiji San-chome" bus stop
3 min walk from "National Cancer Center" bus stop

Parking

For 394 (free of charge up to 30 minutes)

MEMO