

# AICHI CANCER CENTER

Hospital and Research Institute



NAGOYA, JAPAN



# M I S S I O N

**The mission of Aichi Cancer Center is to provide  
patients suffering from cancer  
with compassionate care and the best treatment based on  
evidence and leading-edge cancer research.**

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# Message from the President

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Aichi Cancer Center was established in 1964, as the first comprehensive prefectural cancer center combining a Hospital and a Research Institute and we will celebrate the 50th anniversary in 2014. Our Center has devoted long time to promote cancer prevention, diagnosis, treatment and research as one of the members of the leading cancer centers in Japan with the Cancer Institute and the National Cancer Center. In 2007 our Central Hospital was nominated as a prefectural strategic foothold to cooperate for cancer treatment. By the cooperation with the other 20 local foothold hospitals, any patient at any place in Aichi prefecture will be able to receive appropriate cancer diagnosis and treatment. In 2009 our Central Hospital passed through the 6th version Hospital Accreditation of Japan Council for Quality Health Care. In 2012 the Research Institute was evaluated as a highly active, outstanding and international level institute by the external review committee. In 2013 the Chemotherapy Center Building with 60 chairs and beds for outpatient chemotherapy was completed.

In the Research Institute, a relatively wide range of cancer research has been conducted, and its research activity has contributed significantly to promotion of cancer research in Japan. During the past decade, translational researches to apply accomplishments in basic biological research for development of novel diagnosis, treatment and prevention of cancer have been emphasized, and new molecular diagnosis of hematologic and solid tumors has been applied for patients in this Hospital.

Our Center has also provided in-depth training opportunities for new generations of physicians and surgeons specializing in clinical oncology and researchers in this field of cancer research.

Now baby-boom generation has reached to the range of cancer age, and an aging society will expand the needs for medicine, nursing and hospital beds. Under this situation, more efficient use of the limited medical resources are essential and prevention and early detection becomes more and more important since early treatment improves the chance of complete cure. Additionally, promotion of a tailor-made treatment and a home medical care is required to improve the quality of life of cancer patients.

All the staff members of Aichi Cancer Center are always trying to be a best partner of the patients to fight against cancer with an ultimate goal for the eradication of cancer.



Taira Kinoshita, M.D., Ph. D.  
President, Aichi Cancer Center

## History

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January, 1961 The Governor of Aichi Prefecture approached the Aichi Cancer Control Committee as to how prevention and treatment of malignant neoplasms could best be implemented. In June, the Committee answered the Governor's inquiry by stating the necessity of establishing a Comprehensive Cancer Center.

December, 1964 Initiation of patient services. The Hospital had 333 beds.

April, 1965 Initiation of research activity at the Research Institute.

March, 1968 The present Emperor and Empress (Prince and Princess at the time) visited the Center

February, 1992 Completion of the new Hospital building (500 beds).

May, 1994 Completion of the International Conference Center and the new Outpatient Building.

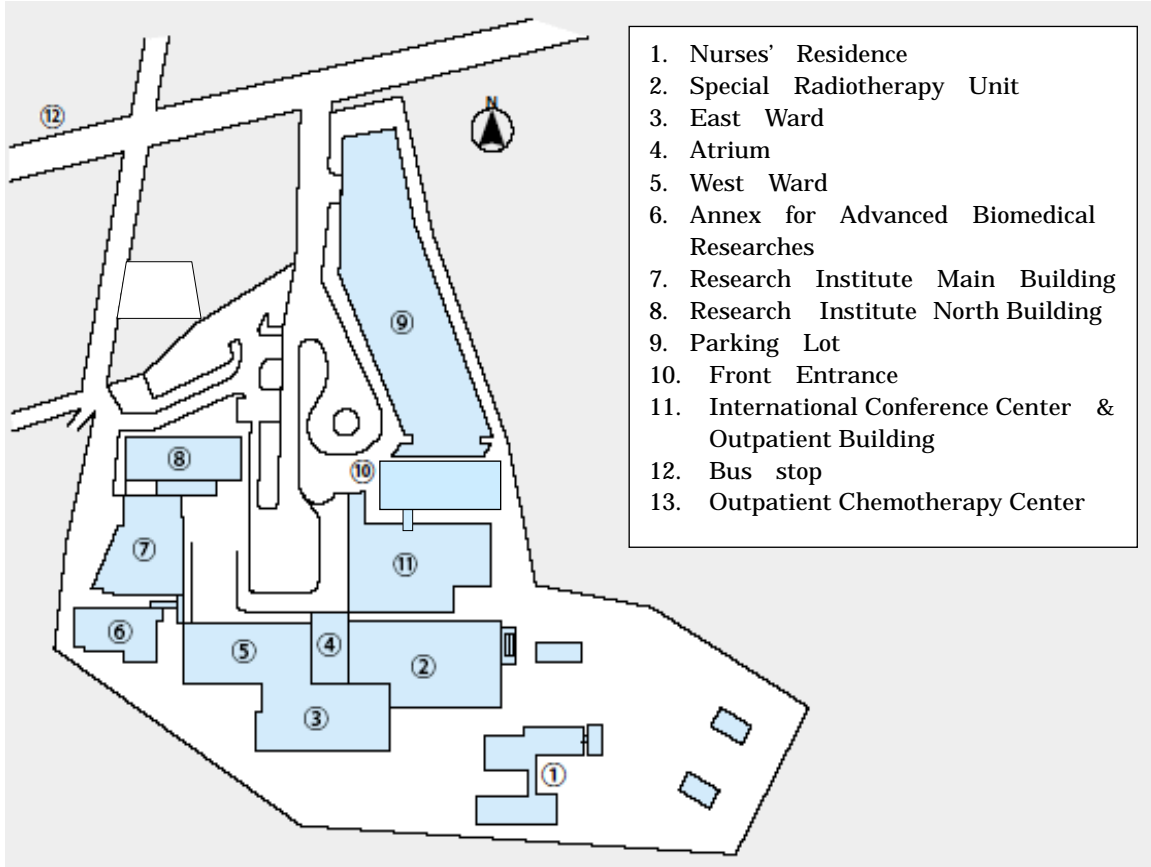
January, 2002 Completion of the new Research Institute Building.

April, 2005 Aichi Prefectural Hospital, Okazaki, joined as a member of this Center, and was named as Aichi Cancer Center Aichi Hospital.

October, 2010 Owari Clinic, Ichinomiya, joined as a member of this Center.

July 2013 Completion of the Outpatient Chemotherapy Center

# Facilities



# Organization

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## President T.Kinoshita

### Administration Office

Director	Division of Management Strategy	M.Tuzi
H.Kasuya	Division of Administration	H.Minafuzi

### Hospital

Director	Department of Gastroenterology	K.Yamao
M.Shinoda	Department of Endoscopy	Y.Niwa
	Department of Thoracic Oncology	T.Hida
	Department of Hematology and Cell Therapy	T.Kinoshita
Vice Director	Department of Clinical Oncology	K.Muro
Y.Niwa	Department of Clinical Laboratories	Y.Yatabe
	Department of Pathology and Molecular Diagnostics	Y.Yatabe
Y.Hasegawa	Department of Transfusion	T.Kinoshita
	Department of Head and Neck Surgery	Y.Hasegawa
H.Iwata	Department of Plastic and Reconstructive Surgery	I.Hyodo
	Department of Thoracic Surgery	Y.Sakao
T.Takagi	Department of Breast Oncology	H.Iwata
	Department of Gastrointestinal surgery	Y.Shimizu
	Department of Orthopedic Surgery	H.Sugiura
	Department of Urology	N.Hayashi
	Department of Gynecologic Oncology	T.Nakanishi
	Department of Anesthesiology	J.Nakada
	Department of intensive care	K.Hatano
	Department of Diagnostic and Interventional Radiology	Y.Inaba
	Department of Radiation Oncology	T.Kodaira
	Department of Outpatient Service	Y.Horio
	Department of Cardiology	K.Hatano
	Department of Palliative Care	Y.Komori
	Department of Nursing	H.Takagi
	Department of Pharmacy	A.Mizutani
	Department of Nutritional Management	Y.Niwa
	Department of Medical Safety Management	Y.Hasegawa
	Department of Medical Record Administration	H.Iwata
	Department of Patient and Family Support Services	Y.Horio

### Research Institute

Director	Division of Epidemiology and Prevention	H.Tanaka
T.Kinoshita	Division of Oncological Pathology	E.Kondo
	Division of Molecular Oncology	Y.Sekido
Vice Director	Division of Molecular Medicine	M.Seto
M.Seto	Division of Immunology	K.Kuzushima
	Division of Virology	T.Tsurumi
	Division of Molecular Pathology	M.Aoki
	Division of Biochemistry	M.Inagaki
	Central Service Unit	H.Kumimoto

# Activities in the Hospital

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## **Department of Gastroenterology**

The primary concern of our Department is detection and diagnosis of gastrointestinal and pancreatobiliary malignancies and endoscopic treatment of these malignancies. Chemotherapy for unresectable cancers in digestive organs is also our mission. We are conducting clinical and molecular studies of gastrointestinal and pancreatobiliary malignancies.

## **Department of Endoscopy**

Gastrointestinal endoscopy is an essential part of modern clinical gastroenterology, and our department plays an important role in the diagnosis and treatment of patients with diverse gastrointestinal(GI) diseases. Diagnostic endoscopy includes gastro-duodenoscopy, and endoscopic ultrasonography.

Therapeutic endoscopy includes endoscopic retrograde cholangiopancreatography(ERCP), polypectomy, endoscopic mucosal resection (EMR), and endoscopic submucosal dissection (ESD). For the precise diagnosis of tumor borders and depth of invasion of superficial GI tract malignancies, we use narrow band imaging (NBI), flexible spectral imaging color enhancement (FICE), and magnification endoscopy. We perform an average of 5,500 EGD, 2,600 colonoscopies, 200 balloon dilations of operated esophagus, 300 polypectomies, and 200 EMR and ESD procedures per-year, in the esophagus, stomach, and colo-rectum. In addition to endoscopic procedures, we also perform chemotherapy and chemoradiation therapy for the patients with GI tract malignancies. We thus play an important role in the process of disease diagnosis and the patient's treatment strategy.

## **Department of Thoracic Oncology**

The particular goals of our department are to provide the highest quality of care to our patients and to advance the treatment and prevention of lung cancer, mediastinal tumor and mesothelioma through innovative clinical and laboratory research. We discuss diagnosis and treatment options for patients with thoracic malignancies at chest conferences every Monday evening with thoracic surgeons, pathologists, and radiation oncologists.

Clinical trials are based on work with the Japanese Clinical Oncology Group (JCOG) and the West Japan Oncology Group (WJOG), some being carried out under contract with pharmaceutical companies.

## **Department of Hematology and Cell Therapy**

New Patients (about 150 per year) with hematological malignancies (leukemia, lymphoma, myeloma) are treated with a curative intent while maintaining a good quality of life. Chemo (radio)therapy is selected where appropriate and for high risk patients high dose chemo(radio)therapy with stem cell transplantation (allogeneic stem cell transplantation from unrelated or related donors, autologous peripheral blood stem cell transplantation) are extensively applied. We focus on clinical studies for the development of more effective procedures in the field of combination chemotherapy and transplantation. Clinical trials are actively pursued for the development of new anti-cancer drugs, providing leadership in Japan in collaboration with the Aichi Cancer Center Research Institute experts in chemotherapy, immunology, virology and transplantation.

## **Department of Clinical Oncology**

The clinical subjects treated in the Department of Clinical Oncology are mainly cases of gastrointestinal cancer such as esophageal, gastric, and colorectal cancer, but we also treat patients with other carcinoma of unknown primary(CUP), germ cell tumor(GCT), head & neck cancer, and sarcoma and so on. Although it has been thought efficacy of chemotherapy against gastrointestinal cancers is insufficient, we are trying to investigate and establish new strategies of chemotherapy or chemoradiotherapy. We treat many patients practically (50-60 patients at out-patient clinic in a day, about 60 hospitalized patients, and the average hospital stay is 12 days) and participate in various clinical studies to develop a new or standard treatment prospectively. The most appropriate treatment for all patients is determined in case conferences consisting of medical, surgical, radiation oncologists, and diagnostic radiologists.

## Department of Clinical Laboratories

The Department of Clinical Laboratories is committed to provide a wide range of diagnostic laboratory services for hospital inpatients and also to a large number of outpatients. The clinical laboratories are divided into several major sections: biochemistry, hematology, microbiology, molecular diagnostics and cytopathology, as well as functional tests, such as electrocardiography, diagnostic ultrasonography, and respiratory examination. The mission of our department is to provide reliable, timely, and informative services through physicians for the benefit of the patient. To achieve this mission, we also try to develop and improve laboratory technology and services through applied research.

### [Major equipment for testing]

Flow cytometer:

FASCanto ,Becton Dickinson

Hematology analyzer:

Coulter LH700 series, Coulter

Automatic enzyme immunoassay system:

ARCHITECT i2000SR, Abbott laboratories

LUMIPULSE G1200,Fujirebio

Automatic chemical analysis system:

LABOSPEC 008,Hitachi

DNA sequencer:

Genetic analyzer3500,Applied Biosystems

Liquid-based cytology system

PrepsStain Slide Processor for Sure Path, Becton Dickonson



## Department of Pathology and Molecular Diagnostics

The Department of Pathology and Molecular Diagnostics aims to achieve the highest standards in clinical practice and research. The department provides three major services, including pathologic, cytologic and molecular diagnosis, in a wide variety of areas, with the most modern available technologies and highly trained faculties who are recognized nationally and internationally for their expertise. The department recognizes the critical role of Pathology as a discipline that touches all of

medicine and research, and our goal is to foster collaborative study to develop novel therapeutic strategies with members of Aichi Cancer Research Institute and throughout the world. Indeed, a great deal of effort placed on this area enabled Aichi Cancer Center designated by Ministry of Health, Labor and Welfare as one of the nation's 14 special facilities to provide "Highly Advanced Molecular Diagnosis of Solid Cancer", since September 2000. Currently, the molecular diagnoses using advanced techniques have been approved by the National Health Insurance system, and we are providing practical information for treatment of choice, such as EGFR, KRAS and ALK mutations in lung cancer, HER2 amplification in breast and gastric cancer, KRAS mutation in pancreatic cancer, and many gene alternations of soft tissue sarcoma. We also collaboratively work with domestic clinical study groups, such as JCOG and WJOG, as well as international collaborators.

## Department of Transfusion

The mission of our department is control of quality and provision of education regarding transfusion of blood cell components and the testing of blood compatibility for transfusion and transplantation. Peripheral blood stem cells for allogeneic or autologous transplantation and cell therapy are extensively harvested in our laboratory using a continuous blood cell separator.

## Department of Head and Neck Surgery

Head and neck cancers include epithelial malignancies of the upper aerodigestive tract and glandular neoplasms of salivary and thyroid origin. Treatment of head and neck cancer involves not only issues of survival, but also concerns about preserving forms and functions such as speaking and swallowing.

To meet these diverse needs, our department cooperates with various medical professionals, including specialists in plastic surgical reconstruction, radiation oncology, medical oncology,

neurosurgery, maxillofacial surgery, and swallowing and voice therapy. Our research focuses on chemosensitivity and molecular targeting, voice restoration and preservation, and sentinel node navigation surgery, all of which have significant potential to improve control of disease, while maintaining patient quality of life.

### **Department of Plastic and Reconstructive Surgery**

Plastic surgery concerns with the correction or restoration of form and function. Our department specializes in the treatment of reconstructive surgery after cancer ablation. We keep in mind to recover or maintain patient's quality of life.

We think a purpose of head and neck reconstruction is optimization of function and low morbidity. In order to accomplish this, we select proper free flap and perform secure microsurgical technique.

Breast reconstruction involves the use of implants or autogenous tissue. We actively perform muscle sparing transverse rectus abdominis myocutaneous flap or deep inferior epigastric perforator flap to reduce donor site morbidity.

### **Department of Thoracic Surgery**

We serve patients with thoracic malignancies including primary lung cancers, metastatic lung tumors, mediastinal tumors. About 200 patients with primary lung cancer are operated on annually. Recently, Video-Assisted Thoracoscopic Surgery (VATS) is routinely applied for early stage lung cancer as a standard radical surgery. However, patients with lung cancer sometimes recur even after complete resection. To improve treatment outcome, multi-disciplinary strategies combining surgery with chemo- and/or radiotherapy are sought in collaboration with the Departments of Thoracic Oncology, Radiation Oncology, and Pathology and Molecular Diagnostics. We are also active for clinical trials as a member of collaborative oncology groups such as JCOG (Japan Clinical Oncology Group) and WJOG (West Japan Oncology Group). The research programs in our Department include development of individualized therapy of lung cancer through molecular analysis of the resected tumor specimens to maximize treatment effect while minimizing adverse reaction of the therapy. We have been interested in clinical application of mutational analysis of the driver oncogenes such as epidermal growth factor receptor (EGFR) gene or ALK gene to individualize treatment in order to obtain maximal benefit with minimal toxicities.

### **Department of Breast Oncology**

We serve patients with breast cancer which is one of major cancers all over the world including Japan. Currently, the incidence of breast cancer has been increased according to life style change from Japanese to Western. The important issues to decrease the mortality rate are early diagnosis and adequate therapy for primary breast cancer patients.

We make effort to diagnose early using special technologies such as vacuum-assisted core needle biopsy (Mammotome) and MRI for breast cancer without mass. Sentinel node navigation surgery using combination methods with radioisotope and dye has been standard treatment for early breast cancer without lymph node metastasis from 10 years ago. We already experienced more than 3,000 patients treated with sentinel node biopsy (SLNB). Currently, we are challenging the re-SLNB for breast cancer patients with local recurrence at conservative breast and SLNB after neoadjuvant chemotherapy for primary breast cancer patients. Furthermore, we started the immediate reconstruction (Expander or TRAM flap or other methods) for early breast cancer with wide ductal spread two years ago. Patients can choose the surgical procedure according to cancer condition and patient's preference.

We perform systemic therapies such as neoadjuvant and adjuvant treatment for early breast cancer patients based on global guidelines and consensus of specialists obtained by multidisciplinary conference in our hospital. Current data is shown the excellent results in our hospital. Disease free survival rate is 98.6% for early breast cancer patients without lymph node metastasis (median follow up : 5.6 years)

However, unfortunately some patients were occurred distant metastases at liver, lung, bone, other organs. Aim of treatment for metastatic breast cancer is long survival with good quality of life. We make effort to choose the best selection among many drugs according to cancer condition, molecular subtype and patient's preference. For that reason, we attend many clinical trials including global registration study. We can use the new drug without approval by health assurance for some eligible patients.



Finally, we make effort to improve outcome of primary and metastatic breast cancer patients by six staff, several residents and all co-medical specialists in our hospital.

### **Department of Gastrointestinal Surgery**

Our department consists of four groups, and each group has experts of surgical oncology.

The Esophageal Surgery Group performs approximately 60 operations per year. For the complete cure of locally advanced esophageal cancer, we combine esophagectomy with pre-operative chemotherapy in a safe manner.

The Gastric Surgery Group deals with 220 new patients every year and actively participates in national clinical studies to establish and revise standard treatments for gastric malignancies. Also we strive to offer minimally invasive surgery.

Likewise, the Colorectal Surgery Group annually operates about 250 primary cases. We perform not only laparoscopic resection for early stage, but also extend resection for advanced or locally recurrent colorectal cancer.

More than 150 operations are performed by the Hepatobiliary and Pancreatic Surgery Group every year. We make every effort to improve the outcome of liver, bile duct, and pancreas cancer. Especially, the treatment results of pancreatic cancer and liver metastasis from colorectal cancer are outstanding.

### **Department of Orthopaedic Surgery**

We specialize in the diagnosis and treatment of bone and soft tissue sarcomas as well as metastatic bone tumors. Malignant bone and soft tissue tumors are aggressive tumors, and it is important to remove them widely in order to prevent further local recurrences. The recurrence rate is less than 9% in our department. 5-year overall survival rates of soft tissue sarcoma are 100% in Stage I, 100% in stage II, 73.3% in stage III, and 0% in stage IV. Those of bone sarcoma are 100% in Stage I, 88.2% in stage II, 66.7% in stage III, and 12.5% in stage IV. Moreover, we provide dose intensive treatment for patients with osteosarcomas, Ewing's sarcomas or rhabdomyosarcomas with a good survival rate.

### **Department of Urology**

We are specialized for diagnosis and treatment of cancers of the genitourinary and male reproductive system, encompassing the kidney, adrenal glands, bladder, prostate and testes. With the definite increase of aged population in Japan, we are especially interested in early diagnosis and QOL-oriented treatment of prostate and bladder cancers. Basic research is focused on the regulatory mechanisms of abnormal prostatic growth and molecular diagnosis of bladder cancer.

### **Department of Gynecologic Oncology**

Our Department is the most comprehensive gynecologic oncology center in the Tokai area. We are committed to providing world-class options in technology and treatment for patients with gynecologic malignancies of the uterine cervix and endometrium, ovary and vulva. About 120 new cases of gynecologic malignancies are operated every year. Efforts are directed at improving treatment results by combining surgery with other methods including intensive chemotherapy and radiotherapy. For instance, for advanced cervical cancer, a clinical trial of chemo-radiation therapy using 5-FU and Nedaplatin is ongoing in partnership with the staff of the Department of Radiation Oncology. To improve the treatment for gynecologic cancer, the research program in our department emphasizes three major areas: #1) molecular analysis of mechanisms of progression of CIN lesions; #2) presentation of optimal combination chemotherapy, and salvage chemotherapy for chemoresistant ovarian cancer; #3) development of a new strategy for abdominal dissemination of ovarian and endometrial cancers.

### **Department of Anesthesiology**

More than 2600 operations for various kinds of malignant disease are performed annually. We are responsible for perioperative management of these patients in the OR as well as in the ICU. Another important task is to treat cancer patients with acute and chronic pain, alleviation of which is essential for maintaining quality of life.

## **Department of Intensive Care**

Department of intensive care at our center was established in April 2009.

The Unit is now a 21 bed, state-of-the-art facility in the 4th East Ward of the hospital, including 4 beds in the intensive care unit (ICU) and 17 beds in the high care unit (HCU).

A total of 953 patients have been treated last year.

Our medical system manages 24-hour acute dysfunction in patients with respiratory, circulatory, or metabolic disease.

Especially, a respiratory support team (RST) composed of physician and special co-medical staff has been organized to achieve the optimal results for patients with respirator in April 2011. RST recommends to assist in making decisions regarding long-term respiratory management.

Our medical staff is aiming to achieve ZERO mortality rate in the ICU and HCU.

## **Department of Diagnostic and Interventional Radiology**

Our department has major responsibilities in imaging diagnoses and image guided percutaneous treatments. Current diagnostic systems such as CT, MRI, US, mammography and unified CT/angiography (Interventional CT-system) provide high diagnostic quality. Concerning image guided percutaneous treatments, we perform all kinds of interventions involving biopsy, drainage, embolization, ablation, and regional chemotherapy for better management of cancer patients. Especially, we have introduced many techniques and regimens in the treatment of hepatic cancer.

## **Department of Radiation Oncology**

We have three linear accelerators (linac), 192Iridium high dose rate remote-after-loading system (RALS), and low dose rate radiation sources (125I and 198Au grain) for a brachytherapy treatment. Features of our Department are conformal radiotherapy as an external beam therapy, chemoradiotherapy. The conformal radiotherapy developed by expresident Dr.Takahashi was a first in the world and has been used in many cases for radical treatment. Chemoradiotherapy is being applied for most cases of locally advanced head and neck cancer, cervical cancer and esophageal cancer. Alternating chemotherapy(5FU and Nedaplatin or Cisplatin) and radiation therapy is standard therapy for locally advanced cervical cancer. Definitive radiotherapy for head and neck cancer, prostate cancer is modern type of IMRT by helical tomotherapy or volumetric modulated arc therapy(VMAT),supported with image-guided radiotherapy(IGRT).

## **Department of Outpatient Services**

Our Department is responsible for maintaining high quality and efficient cancer specific clinics inside Aichi Cancer Center Hospital to provide comprehensive and specified medical care services, including radiation treatment, diagnostic imaging, infusion therapy, cancer specific clinics and support services. Sections of Ophthalmology, Dermatology, and Neurosurgery have been assigned to the Department of Outpatient services.

The Section of Ophthalmology is committed to treatment of ocular, orbital and ocular adnexal malignancies, as well as providing comprehensive ophthalmic care for cancer patients in cooperation with Nagoya University Hospital and Nagoya Medical Center. The Ophthalmology clinic is open every Friday.

The Section of Dermatology provides clinical services for the diagnostic evaluation of skin cancer and interdisciplinary management of various diseases affecting skin and connective tissues. The Dermatology clinic is only open every Wednesday. Therefore, patients with skin cancer will be sent to another tertiary care hospital, such as Nagoya University Hospital for the treatment.

The Neurosurgery clinic is open every Tuesday and Wednesday. Our neurosurgeons have devoted to provide the highest quality, the most advanced care for patients with benign or malignant tumors affecting the nervous system. Although there are no ward beds for neurosurgical diseases in this hospital, there is close affiliation with the Department of Neurosurgery at Nagoya University Hospital. Therefore, for the treatment of patients who develop a neurosurgical or neurological emergency and/or patients with neurosurgical indications, all the patients will be transferred to Nagoya University Hospital or the affiliated hospitals, and receive the highest quality, state-of-the-art care.

## Department of Cardiology

There are many cancer patients with heart troubles. And, many life-threatening diseases are being in heart diseases. And also, heart diseases associate with cancer are special and complicated. Therefore, in patient with cancer, medical treatment of heart disease is very important but very difficult.

Our department is responsible for solution of heart problems related to cancer by superior cardiovascular skills.

## Department of Palliative Care

Our Department assists Cancer patients suffering from various types of physical and psychological pain so as to enable them to cope successfully with their illness. Though we do not have a hospice ward at Aichi Cancer Center Hospital, all the staffs are united in carrying out the hospice program led by the Palliative Care Team to support patients who do not have any chance of cure so that they may spend their remaining time in peace. A psycho-oncologist joined our department in April 2006 to provide in-depth counseling and support aimed at relieving patients' mental and spiritual anxiety. We believe that the hopes of patients and their families take priority over all other things. We not only advise patients about options such as home care and admission to a hospice, but also offer counseling related to financial problems and interpersonal relationship issues.

## Department of Nursing

Our department is dedicated to providing a cancer-nursing service with the highest possible level of quality based on the mission of the Aichi Cancer Center. Through the collaboration of physicians and other medical staff, we help patients to cope with cancer and increase their quality of life. Although the duration of time of living with cancer can vary depending on the cancer type, we continue to make every effort to support patients and their families at any stage of the disease.

## Department of Pharmacy

Our Department is dedicated to provide high quality pharmacy services that result in optimal medication. We also provide admixture of anti-cancer drugs for patients undergoing chemotherapy. Our pharmacists provide to take medicine guidance to inpatients in wards, where we work closely with physicians and nurses to prevent, identify and resolve medication-related problems. Our Department is also responsible for providing drug information that facilitates optimal and safe drug use.



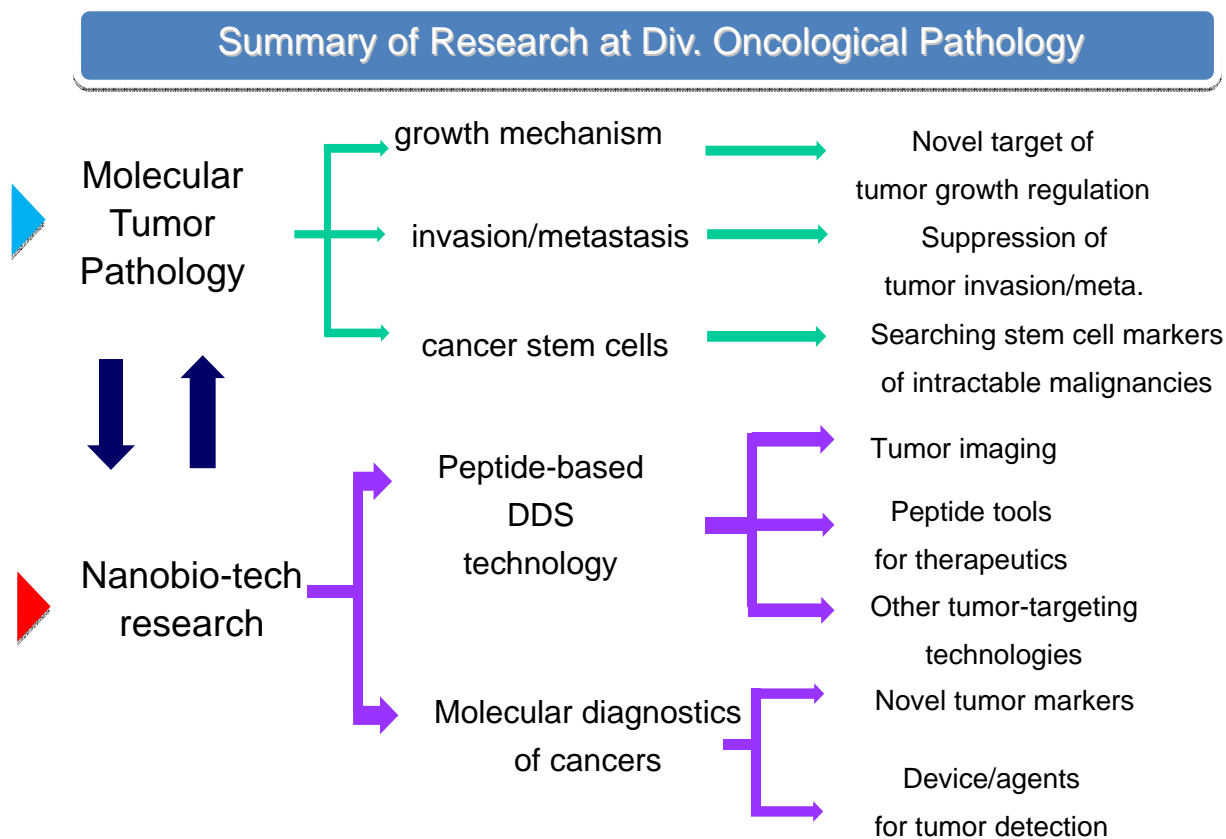
# Activities in the Research Institute

## Division of Epidemiology and Prevention

Our research activities consist of the following four subjects: 1) Descriptive epidemiologic study on cancer incidence and mortality with special reference to improvement of Aichi Prefectural Cancer Registry; 2) Development of hospital-based epidemiologic research program at Aichi Cancer Center (HERPACC) on risk and protective factors including gene-environment interaction for main sites of cancer; 3) Comparative study of population-based cancer survival among Asian countries; 4) Ethnoepidemiologic and molecular epidemiologic studies on environmental and host-specific factors for main sites of cancers in the Asian Pacific regions.

## Division of Oncological Pathology

The aim for our research at the Division of Oncological Pathology is to disclose the pathogenesis of human malignancies of diverse origins through molecular analyses based on data obtained by morphological and patho-biological examination of cancer tissues and human cancer cells. Our present interest is mainly focused on acquiring novel pathological findings of human intractable malignancies, including tumors of diverse origins. We are working both on a basic pathological research and also development of advanced medical technologies aiming practical applications in the clinic. As a pathological research, we are focusing on identification of key molecules regulating tumor metastasis and invasion. We are also pioneering new fields in trials to develop novel therapeutic and diagnostic technologies using functional peptides as a drug delivery tool (DDS tool). Another important responsibility of our division is to conduct autopsies. Postmortem examinations give us valuable information on the behavior of neoplasms and their response to therapy, assessing the effectiveness or failure of current therapies to clarify pathogenesis in cancer patients. Thus, our present overall aim is to promote comprehensive pathological research which can make real contributions to current tumor medicine.



### **Division of Molecular Oncology**

Our goal is to determine the genetic lesions giving rise to human solid cancers and use this information for prevention, diagnosis, and treatment of these diseases. Currently, we are focusing on lung cancer, malignant mesothelioma, colon cancer, and brain tumor. These studies also provide an opportunity to dissect biochemical and pathological pathways of malignant phenotypes including dysregulated cell growth, differentiation, invasion, and metastasis. Human cancers arise because of genetic mutations in oncogenes and tumor suppressor genes, and so we are studying candidate genes, conducting systematic molecular analyses of biochemical pathways, and pursuing global approaches such as next-generation sequencing technologies. Epigenetic changes with DNA methylation and histone modification also identify this as an important mechanism of inactivation of tumor suppressor genes.

Understanding the functions of the genes mutated and the signaling pathways disrupted will provide a foundation for a translational research approach to human malignancies from bench to bedside.

### **Division of Molecular Medicine**

Research in this division is aimed at generating a better understanding of the genetic and molecular bases of human cancer, with the eventual application of the acquired knowledge in the field of medical oncology. In cooperation with medical oncologists and pathologists at the Aichi Cancer Center Hospital, we have been focusing on hematological malignancies, with special attention on genetic alterations including chromosome translocation, and genome amplification and loss. These alterations are correlated with clinicopathological features, and special attention is being made to find clinically relevant genetic alterations. The relevance of the genetic alteration is being studied by the use of *in vitro* and *in vivo* experimental models.

### **Division of Immunology**

We have been pursuing identification of target proteins and epitopes recognized by cytotoxic T lymphocytes (CTL) specific to tumor-associated, minor histocompatibility or viral antigens. Recent activities also include elucidation of the intracellular processing pathway to yield such CTL epitopes and peptide vaccination as clinical translation of the CTL epitope identification.

Our goal is to establish robust and safe immuno-therapy to treat cancer patients applying scientific achievements. To this end, we have started a preclinical study of T cell receptor gene transfer to patients' peripheral T lymphocytes. Animal models of immuno-therapy for lung cancer are also designed and conducted.

### **Division of Virology**

Approximately 15% of all human cancers have a viral etiology, but only seven viruses have actually been unequivocally implicated in neoplastic development. Among these the Epstein-Barr virus (EBV) is the primary object of our own studies. EBV is a ubiquitous gamma herpesvirus associated with several malignant diseases, including Burkitt's lymphoma, nasopharyngeal lymphoma, a subset of Hodgkin's lymphomas, some gastric cancers, and B cell lymphomas in immunosuppressed patients. Our research aims are to elucidate the molecular mechanisms of viral proliferation and oncogenesis of EBV as part of the world-wide effort to combat virus-infected cancers. Currently, our research interest is concentrated on the following issues: 1) Mechanism for the maintenance of EBV latency; 2) Analysis of the N-terminal domain of EBV DNA polymerase; 3) Anatomy of EBV replication factory; 4) Identification of EBV miRNA target genes and their roles in EBV carcinogenesis.

### **Division of Molecular Pathology**

The incidence of colon cancer is increasing steadily in Japan; the disease is predicted to become the most common cancer as of 2020. Accumulating evidence suggests that in addition to genetic and epigenetic changes in the genome of cancer cells, non-cancer stromal cells play essential roles in support of their progression. Our research aims to identify novel molecular targets for prevention and/or therapy of colon cancer through analyses of the intestinal tumor progression in genetically engineered mouse models. We are currently focused on the following subjects: (1) Genetic dissection of the signaling pathways that play pivotal roles in colon carcinogenesis; (2) Elucidating

the complex tumor-stroma interactions that promote invasion and metastasis of colon cancer; (3) Identification of novel metastasis suppressor genes in colon cancer; and (4) Understanding the mechanisms of cancer cachexia.

### **Division of Biochemistry**

Cells need to respond to environmental signals to proliferate in a coordinated fashion during development and differentiation. Mutations in genes functioning in cell cycle control and maintenance of tissue architecture lead to uncontrolled proliferation, genetic instability, and invasion (metastasis) by cancer cells. However, the precise mechanisms remain largely unknown.

Our research aim is to elucidate how the cell cycle (including cell cycle checkpoints) and tissue architecture (including the intracellular cytoskeletal network) are controlled. Our attention is focused on 3 specific areas: (1) Identification and functional analysis of protein kinases involved in cell cycle checkpoints; (2) Roles of centrosomes and primary cilia in cell cycle control; (3) Biological links between aneuploidy and tumorigenesis, senescence, or aging.

### **Central Service Unit**

The Division of Central Laboratory and Radiation Biology, which fulfils many functions as the Central Service Unit, has responsibilities for the maintenance and operation of various instruments for molecular and biochemical research. In addition to such background support for all of the investigations carried out in this institute, we perform the following research projects, that is, analysis of mitochondrial polymorphisms in human cancers.



# Aichi Cancer Center International Symposia

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When the Aichi Cancer Center celebrated its 30th Anniversary in 1994, the first international Symposium was held inviting several distinguished guest speakers from abroad as well as from Japan.

Since then, Symposia have been held almost every year. The topics so far have been as follows;

1. "From Prevention to Treatment", December 1994.
2. "Role of DNA Transactions in Carcinogenesis", December 1995
3. "Recent Advances in Hepatobiliary-Pancreatic Cancer", December 1996.
4. "The Cutting Edge of Lung Cancer Research", January 1998.
5. "Role of Carbohydrate-mediated Cell Recognition and Adhesion in the Progression and Metastasis of Malignant Cells", November 1998.
6. "Recent Advances in the Surgical Treatment for Colorectal Cancer", December 1999.
7. "Cancer Diagnostics with the Power of Molecular Knowledge", January 2001.
8. "Prospects for Conquering Stomach Cancer in the 21st century", February 2002 .
9. "Molecular Pathology and Immunotherapy of Hematological Malignancies: New Perspectives ", February 2003.
10. "Diagnostic & therapeutic advances in radiology", February 2004.
11. "Forefront of Cancer Prevention Strategy in Asia", February 2005.
12. "Perspective of Oncological Strategy for Gastrointestinal Cancer, January 2007.
13. "Perspective of Prevention and Tailored Diagnosis / Treatment for Breast Cancer", February 2008.
14. "Pancreatobiliary Cancer Update-Prevention, Diagnosis and Treatment, January 2009.
15. "New Molecular Target Therapy and Signal Transduction", March 2010.



# Statistics

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## Organization

### Number of staff

Organization Type of profession	Total	Administration Office	Hospital	Research Institute
Total staff	666	27	588	51
Administrative staff	29	26	3	
Physicians	116	1	85	30
Senior researchers	12			12
Radiological technicians	24		24	
Assistant radiological technicians	2		2	
Pharmacists	23		23	
Clinical laboratory technicians	28		28	
Clinical Engineers	2		2	
Nurses	392		392	
Assistant nurses	4		4	
Dieticians	3		3	
Other meal service workers	17		17	
Clinical trial coordinators	5		5	
Research assistants	9			9

As of April.1.2013

## Hospital

### Patients

Item	2010 fiscal year	2011 fiscal year	2012 fiscal year
1)Outpatients			
Number of new patients.	5,557	5,481	5,548
Number of total patient visits.	149,769	149,626	150,654
Average number of patient visits per day.	616.3	613.8	614.9
Average visiting frequency of patient	27.0	27.3	27.2
2)Inpatients			
Number of inpatients.	9,624	9,518	9,150
Number of discharged patients.	9,594	9,611	9,456
Number of deceased patients.	455	470	395
Average number of inpatients per day.	422.9	409.9	410.0
Average patient stay in hospital	15.1	14.7	14.8



### Resident training

The resident system was started in April 1986 to train physicians in the diagnosis and treatment of cancer patients

	2010 fiscal year	2011 fiscal year	2012 fiscal year
Number of residents	38	38	42

### Research resident training

The research residency system was started in April, 2001 to train young researchers in the field of basic and applied cancer researches at our research institute.

	2010 fiscal year	2011 fiscal year	2012 fiscal year
Number of research residents	9	13	11

### Training of technical personnel for medical treatments

The shortage of specialized technical personnel for the treatment of cancer is an obstacle in the promotion of cancer control programs. To solve this problem, since 1966, full scale training has been provided.

The accomplishment of this Center in this area has gained an international reputation and applicants for this training course now come from various countries as well as from all over Japan.

	1966 ~ 2012 fiscal years	2010 fiscal year	2011 fiscal year	2012 fiscal year
Total	5,292	85	65	81
Physicians	3,346	70	42	51
Radiology technicians	224	0	1	0
Clinical laboratory technicians	575	4	3	7
Nurses	298	1	3	4
Others	849	10	16	19

### Budget for the Cancer Center

R e v e n u e			
Item	2010 fiscal year	2011 fiscal year	2012 fiscal year
Total	16,579,699	16,760,568	16,605,178
Revenues from medical Practices	14,746,204	15,049,007	14,837,708
Revenues from non-medical sources	1,833,495	1,711,561	1,767,470

E x p e n d i t u r e			
Item	2010 fiscal year	2011 fiscal year	2012 fiscal year
Total	16,005,110	16,138,252	16,081,180
Expenditure for medical practice	15,759,625	15,932,966	15,872,238
Expenditure from non-medical sources	239,485	200,286	203,942
Special losses	0	0	0
Reserve fund	6,000	5,000	5,000



## **AICHI CANCER CENTER**

**AICHI CANCER CENTER HOSPITAL AND RESEARCH INSTITUTE**

1-1 Kanakoden, Chikusa-ku Nagoya 464-8681, Japan

TEL81-52-762-6111 FAX81-52-764-2963

WEB SITE:<http://www.pref.aichi.jp/cancer-center/>