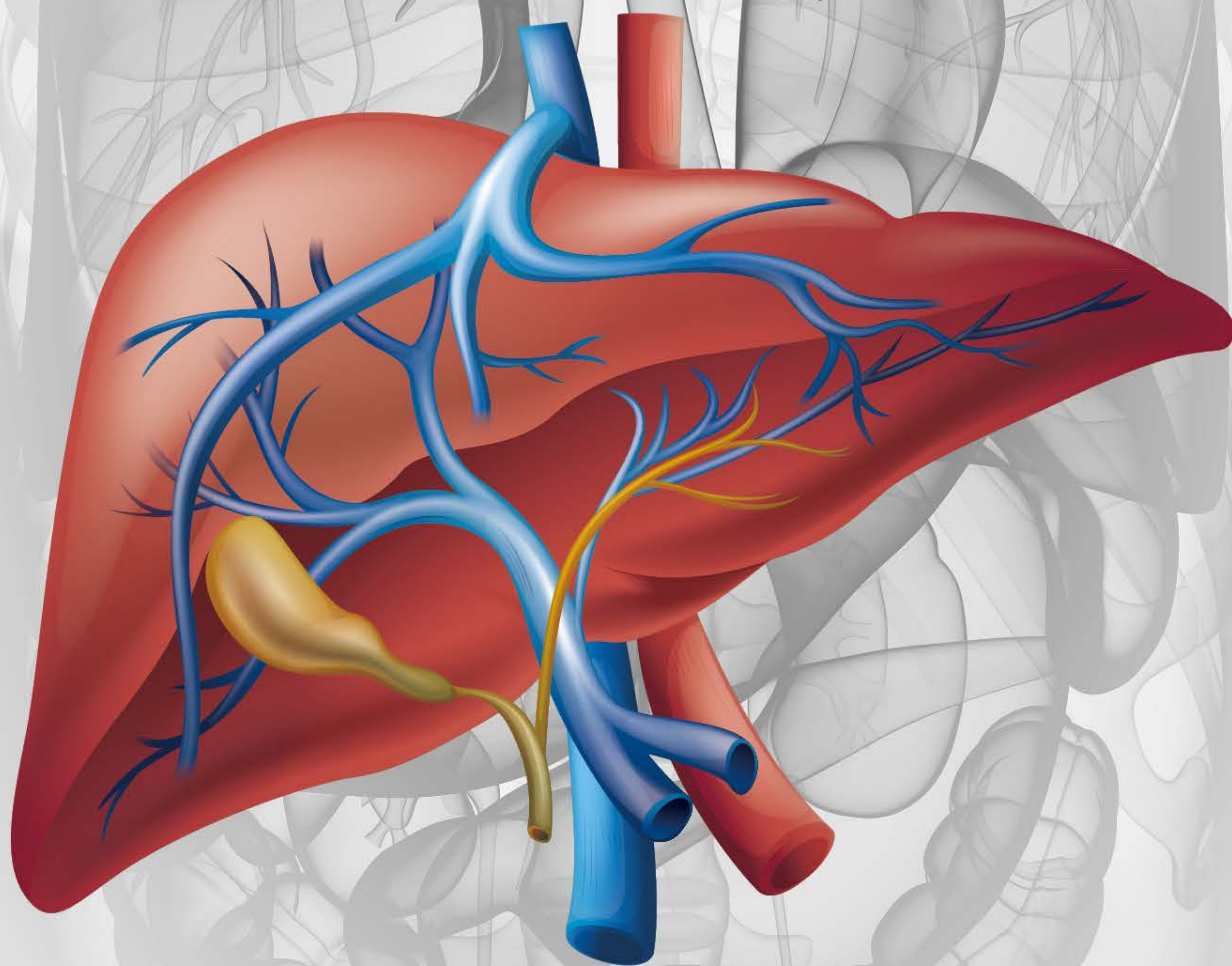


# Liver Cancer Treatment

Hub for conquering liver cancer

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The Liver Cancer Center of SMC offers a comprehensive and integrated management of liver cancer by a multidisciplinary team of highly-skilled experts in various medical specialties



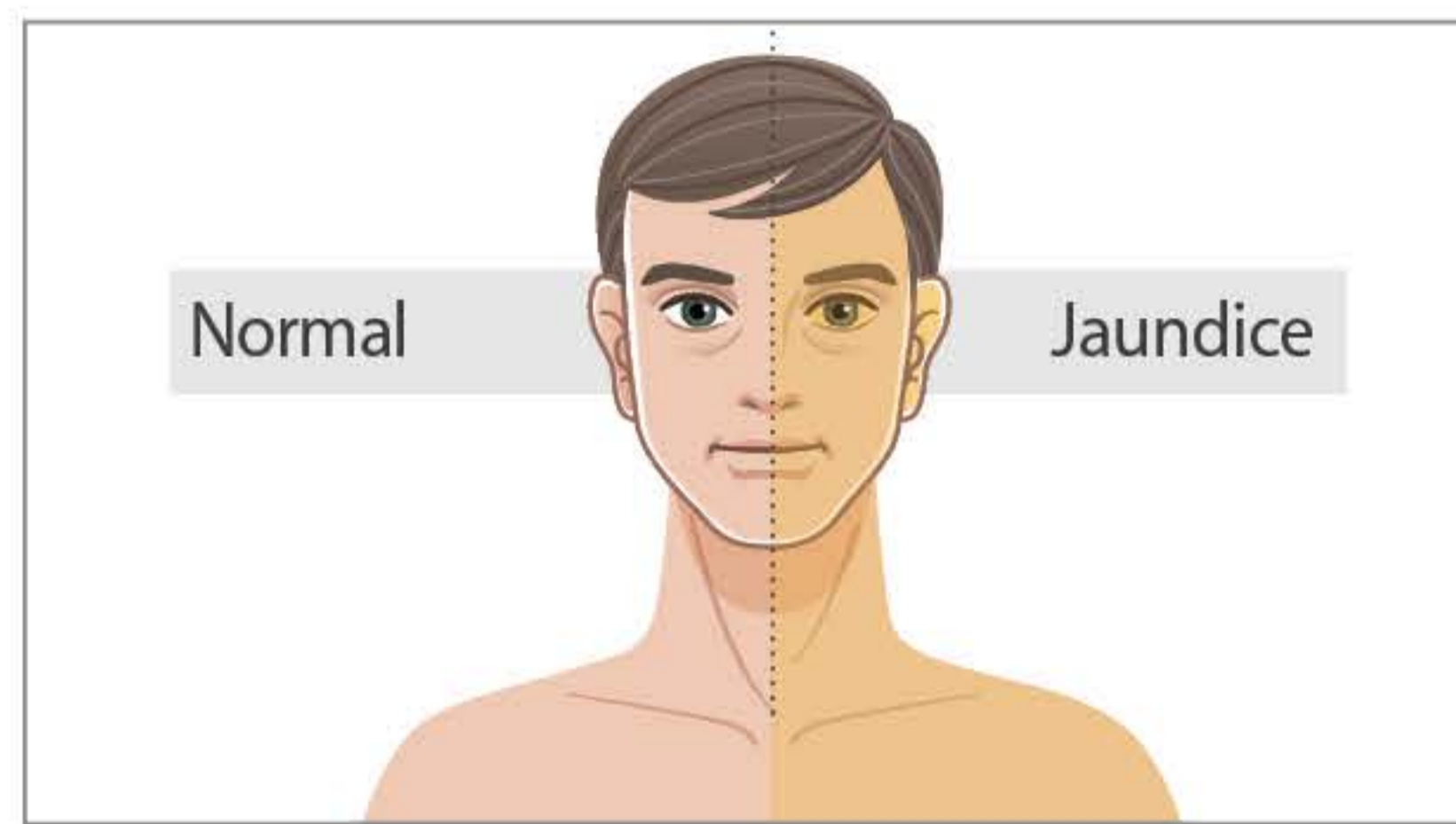


## What is liver cancer, and how is it diagnosed?

Liver cancer is a cancer that starts in the liver. Major risk factors include excessive alcohol intake, chronic hepatitis, non-alcoholic steatohepatitis and cirrhosis. Unlike most other types of cancer, the signs and symptoms of liver cancer tend not to be noticed until the cancer reaches an advanced stage. This is why liver cancer has a low survival rate.



- Upper abdominal pain
- Enlarged liver, felt as a mass in upper right abdomen



- Yellow discoloration of skin and the whites of eyes
- Nausea and vomiting



- General weakness and fatigue
- Weight loss (without trying)

### | Diagnosis of liver cancer |

Liver cancer can be diagnosed based on the results of imaging tests such as computed tomography (CT) or magnetic resonance imaging (MRI) scans. With liver MRI, benign and malignant tumors can be distinguished more accurately, and even a small cancer with a size of less than 1 cm may be diagnosed. At times, if the results of the imaging tests are uncertain, performing liver biopsy would be the only option to confirm liver cancer. **For liver cancer, early discovery is important, and therefore accurate reading of images by an experienced radiologist is very crucial.**



Blood Test



Ultrasonography



CT, MRI



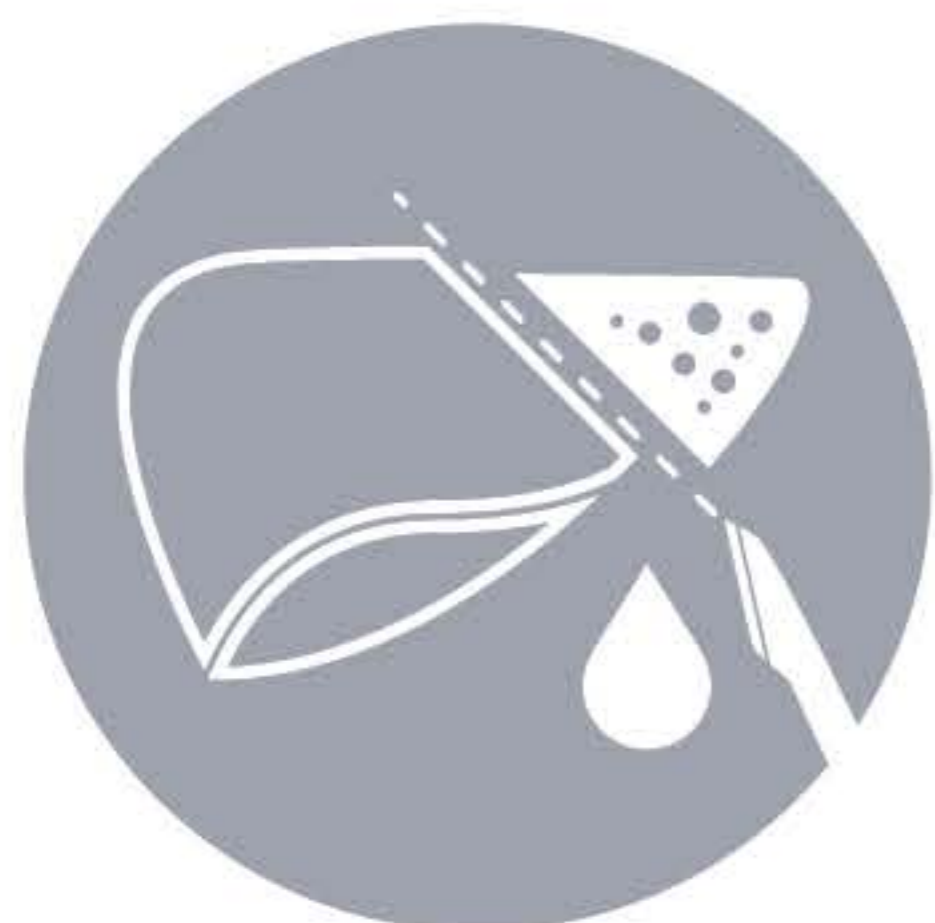
Liver Biopsy

## Treatment of liver cancer

The prognosis of patients with liver cancer is often affected by the liver function because most patients have coexistent chronic liver disease including chronic hepatitis and cirrhosis. In fact, it is the worsening of liver function rather than the cancer itself that is the most common cause of death among patients with liver cancer. **Therefore, it is very important not only to provide the most appropriate anti-cancer treatment among the available options but also to maintain liver function even after the treatment through comprehensive and integrative management of each patient's condition.**

## | Treatment methods performed in Samsung Medical Center |

### Liver resection Liver transplantation



- **Liver resection** : When the cancer is diagnosed at an early stage, surgical resection is an effective method for treating liver cancer. Whether surgery is necessary for the patient is determined based on the progression : remaining liver function, number of tumors, presence of metastases and etc. With the latest surgical techniques, such as laparoscopic surgery and robot-assisted surgery, pain and recovery time can be significantly shortened compared to conventional laparotomy.
- **Liver transplantation** : Liver transplantation offers a cure of liver cancer and underlying chronic liver disease at the same time by replacing the diseased liver with a healthy liver. The success rate for liver transplantation at Samsung Medical Center is 99%. Even when the blood types of the donor and the recipient are not compatible, a safe liver transplantation can be done. Moreover, donors can benefit from minimal surgical scars and recovery time through laparoscopic liver resection.

### Local ablation therapy



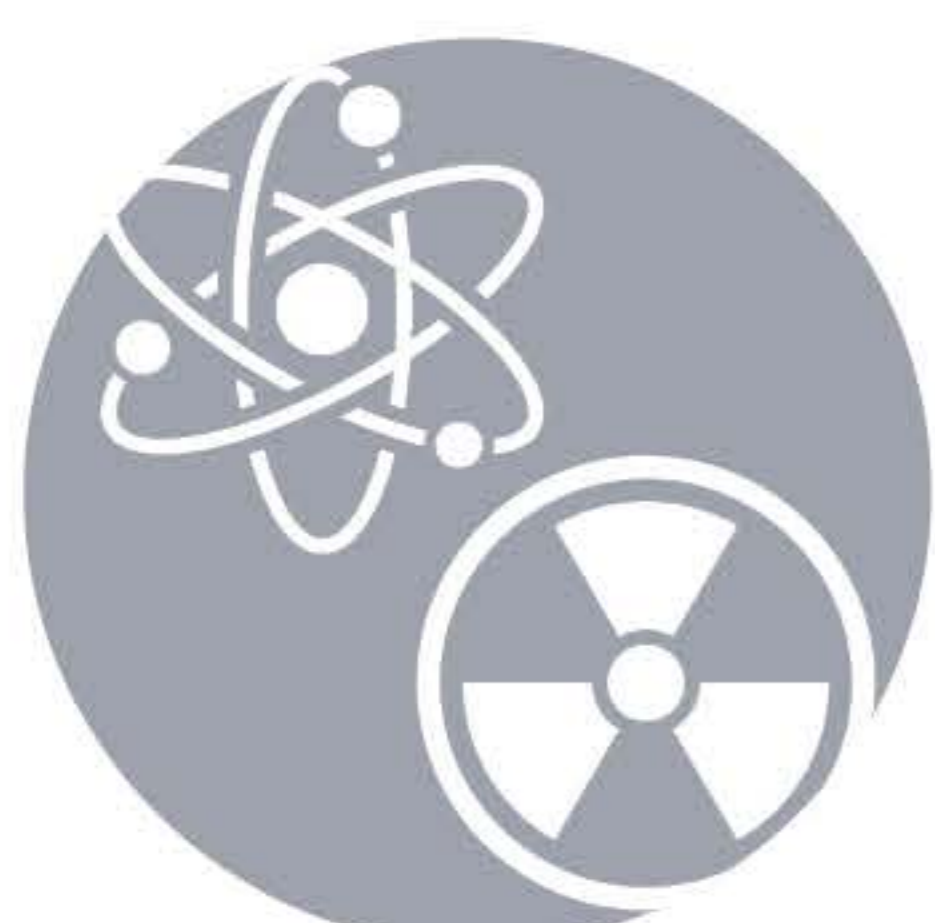
- **Radiofrequency ablation therapy** : This method burns away small liver cancer by inserting a needle-shaped radiofrequency catheter under local or conscious sedation anesthesia. It offers an excellent treatment outcome for patients with a liver cancer of less than 3 cm-size.
- **Cryoablation therapy** : When radiofrequency ablation is limited by the location of tumor, adjacent structure such as blood vessels, cryotherapy is a promising therapeutic alternative. This method destroys the tumor by rapidly freezing and thawing the cancer repeatedly through a needle inserted under CT or ultrasound guidance.

### Transarterial embolization



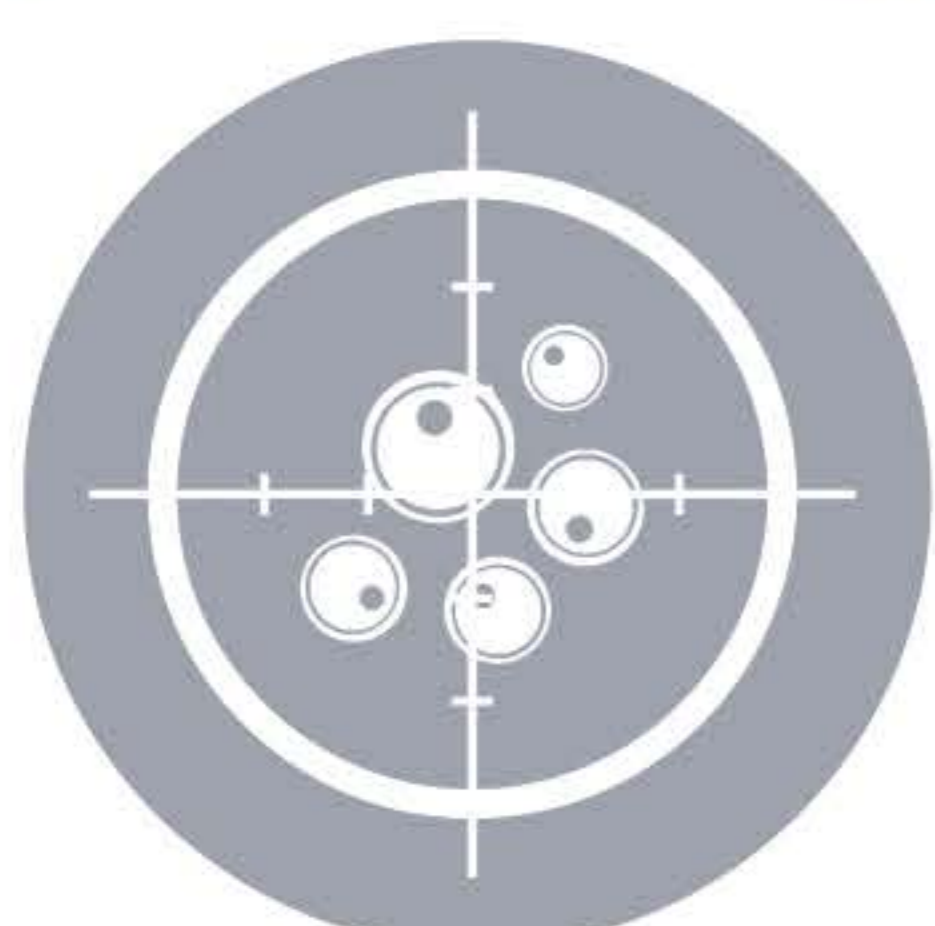
- **Transarterial chemo(or radio)embolization** : Transarterial chemoembolization (TACE) or radioembolization (TARE) is one of the most commonly used minimally invasive procedures performed in interventional radiology to treat liver cancer. Either small embolic particles coated with chemotherapeutic drugs (TACE) or microbeads coated with radioactive isotope (TARE) are injected selectively through a catheter into an artery that directly feeds the tumor. These particles attack the tumor in several ways, including blocking the blood supply, direct cytotoxicity and irradiation. Sometimes, it is performed in conjunction with other treatment options such as radiofrequency ablation therapy or radiation therapy to improve treatment outcome.

### Proton therapy, Radiation therapy



- **Proton therapy** : This is one of the most advanced techniques for treating liver cancer. Proton therapy is a type of particle therapy that uses a beam of protons to irradiate and destroy cancer cells. This enables delivery of intense energy to treat cancer while minimizing the damage of surrounding liver tissues behind the tumor.
- **Radiation therapy** : Radiation therapy is usually performed to relieve symptoms and prevent complications caused by tumor invasion into other sites, including blood vessels, lymph nodes and bones.

### Systemic therapy



- **Systemic therapy** : When liver cancer is at an advanced stage, systemic therapy can prolong the patient's survival and improve quality of life. Recommended systemic therapy includes targeted agents and immune-modulating agents.



## What distinguishes the Liver Cancer Center of Samsung Medical Center from others?

### Comprehensive and integrated management of liver cancer

The Liver Cancer Center of SMC offers a comprehensive and integrated management of liver cancer with diverse therapeutic modalities including surgery, localized therapies, systemic therapy, liver transplantation, and radiation therapy. Our center is not only renowned for excelling in **highly skillful laparoscopic liver resection, ABO incompatible liver transplantation and** radiofrequency ablation, but also for leading the most advanced therapeutic modalities including **cryotherapy, microwave ablation therapy and proton therapy** (dubbed as “the dream device in cancer treatment”) in treating liver cancer.



### A world-class clinical excellence in liver cancer treatment

Since the introduction of radiofrequency ablation therapy in 1999 in Korea, Samsung Medical Center has treated more than 9,000 cases of which **five-year survival rate is 82% surpassing that of Japan (61.1%), Italy (64.8%), and other countries, thereby achieving a world-class treatment outcome.** The liver transplantation team of Samsung Medical Center succeeded Korea’s first transfusion-free liver transplantation in 2001, liver transplantation on Korea’s youngest patient (3 months old) in 2002, and the world’s first live surgery demonstration of laparoscopic liver resection of a living donor in 2014. The liver transplantation team, which focuses on **high-level minimally-invasive clinical skills such as laparoscopic liver resection of donor**, participated in publishing a textbook on the laparoscopic organ resection of a donor with an author from Springer, an international medical science publisher.

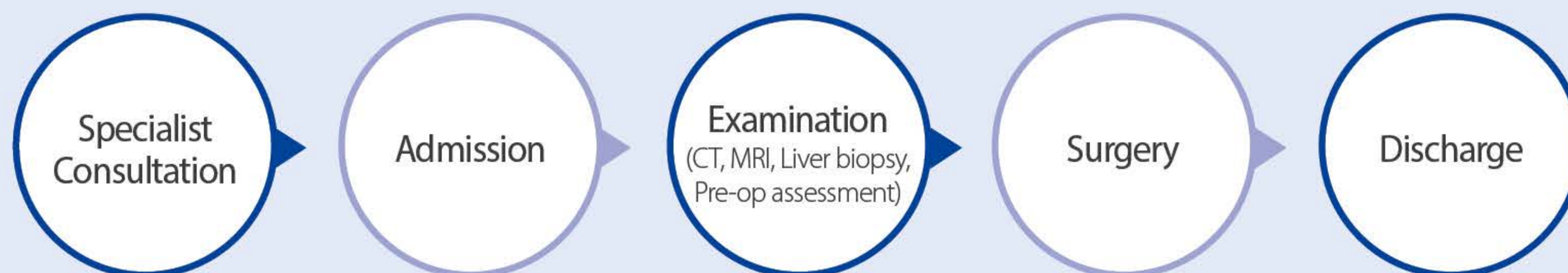
### Outstanding care through multidisciplinary approach with a team of experts

The complexity of liver cancer requires participation of highly-skilled experts in various medical specialties. At the Liver Cancer Center of Samsung Medical Center, **a team of highly-trained and experienced hepatologists, surgeons, pathologists, radiologists, interventional radiologists, radiation oncologists and medical oncologists review clinical cases in “Weekly Joint Treatment Meeting” and run “Multidisciplinary Liver Cancer Clinic”** twice a week to deliver outstanding care with a consensus opinion, clinical support and resources.



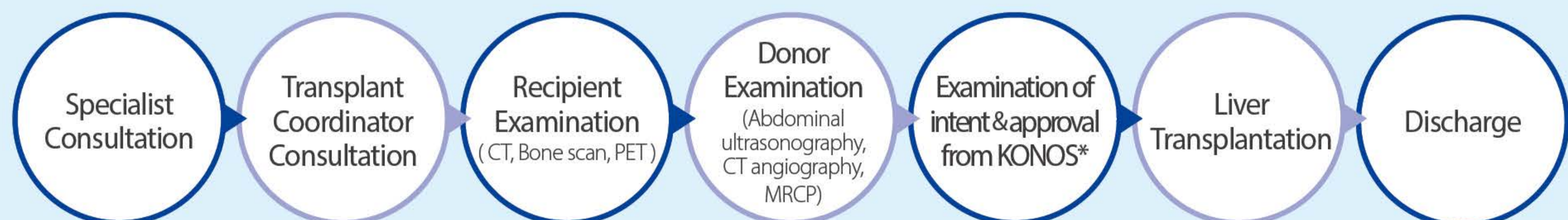
## Cancer Treatment Procedure

### Liver resection



- Liver biopsy may be needed for an accurate diagnosis
- Carotid ultrasonography will be recommended for the safety of patients over the age of 60.

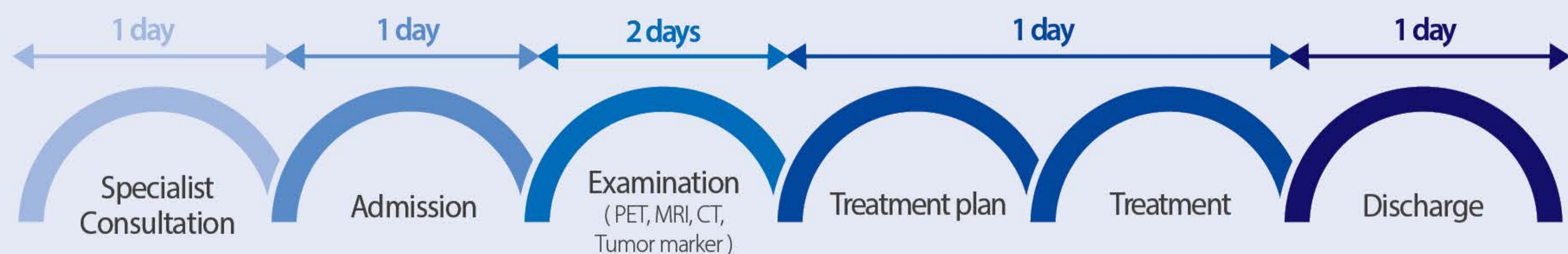
### Liver transplantation (Living donor)



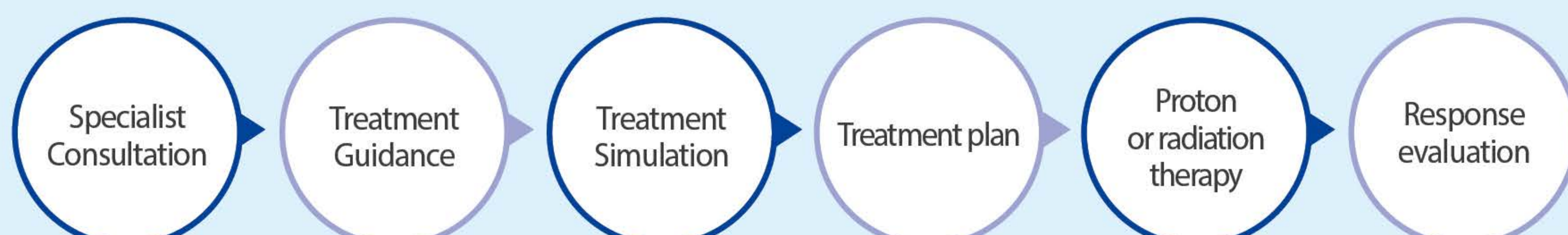
\* KONOS : Korean Network for Organ Sharing

- Whereas in the past, liver transplantation was only available for the patients with a donor of a qualified ABO blood type, now ABO Incompatible Organ Transplantation permits liver transplantation from a donor with an incompatible ABO blood type. A few weeks prior to liver transplantation, the recipient undergoes a preparation process including immune-modulation therapy to ensure safe ABO incompatible transplantation.
- Only immediate family members and first cousins can become a donor in accordance with Korean medical law. There are several documents which needs to be prepared in advance. If you need more information, please do not hesitate to contact us.
- Expected schedule for liver transplantation:
  - 4 weeks of hospitalization (5~10 days of ICU care → sub-ICU → general ward)
  - After discharge, a weekly follow up at outpatient clinic for the first month, followed by outpatient visits every 2~3 months

### RFA, TACE, TARE, Cryoablation



### Proton therapy, Radiation therapy



- Patients treated with chemotherapy or radiation therapy may require long-term stay up to several weeks or months
- For more information, please contact us via International Health Services at SMC.

# Best professors in liver cancer



## Seung Woon Paik, M.D., Ph.D.

Hepatologist  
Director of Liver Cancer Center

### Areas of Expertise:

Liver cancer  
Liver cirrhosis  
Chronic viral hepatitis



## Hyo Keun Lim, M.D., Ph.D.

Radiologist

### Areas of Expertise:

Image-guided tumor ablation  
High intensity focused ultrasound therapy  
Abdominal imaging



## Kwang Cheol Koh, M.D., Ph.D.

Hepatologist

### Areas of Expertise:

Hepatitis  
Cirrhosis  
Hepatocellular Carcinoma



## Joon Hyeok Lee, M.D., Ph.D.

Hepatologist

### Areas of Expertise:

Liver cancer  
Liver cirrhosis  
Chronic hepatitis (viral, non-viral)



## Sung Wook Shin, M.D., Ph.D.

Radiologist

### Areas of Expertise:

Interventional radiology



## Min Woo Lee, M.D., Ph.D.

Radiologist

### Areas of Expertise:

Image-guided tumor ablation therapy  
Abdominal imaging



## Gye Seong Choi, M.D., Ph.D.

Surgeon

### Areas of Expertise:

Liver transplantation  
Liver surgery  
Laparoscopic liver surgery



## Wonseok Kang, M.D., Ph.D.

Hepatologist

### Areas of Expertise:

Liver cancer  
Liver cirrhosis  
Chronic hepatitis (viral, non-viral)



## Tae Wook Kang, M.D., Ph.D.

Radiologist

### Areas of Expertise:

Image-guided tumor ablation therapy  
Abdominal imaging



## Jae Won Joh, M.D., Ph.D.

Surgeon

### Areas of Expertise:

Liver transplantation  
Liver surgery



## Ho Yeong Lim, M.D., Ph.D.

Medical oncologist

### Areas of Expertise:

Systemic chemotherapy  
(liver cancer, colorectal cancer, stomach cancer)



## Hyun Chul Rhim, M.D., Ph.D.

Radiologist

### Areas of Expertise:

Image-guided tumor ablation therapy  
High intensity focused ultrasound therapy  
Abdominal imaging



## Hee Chul Park, M.D., Ph.D.

Radiation Oncologist

### Areas of Expertise:

Proton therapy  
Radiation therapy



## Sung Ki Cho, M.D., Ph.D.

Radiologist

### Areas of Expertise:

Interventional radiology



## Jong Man Kim, M.D., Ph.D.

Surgeon

### Areas of Expertise:

Liver transplantation  
Liver surgery  
Laparoscopic liver surgery



## Dong Hyun Sinn, M.D., Ph.D.

Hepatologist

### Areas of Expertise:

Liver cancer  
Liver cirrhosis  
Liver failure

## Contact US International Health Services

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\* Please send us an email to make an appointment

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