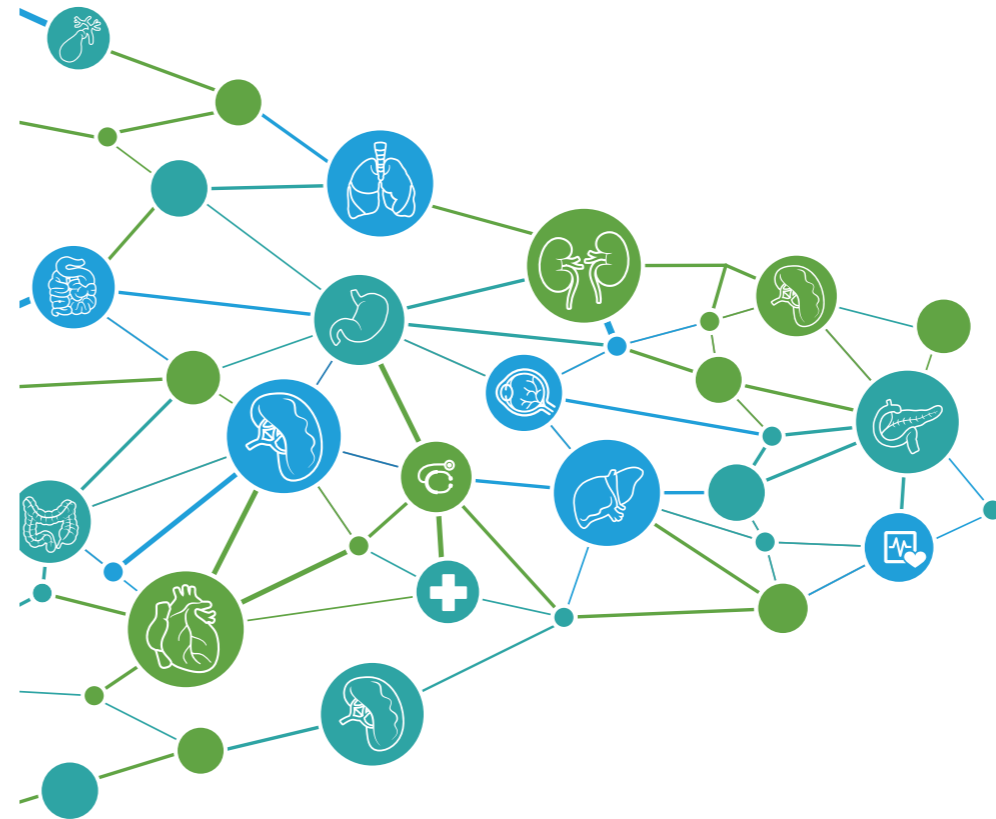




MINISTRY OF
HEALTH & WELFARE

khIDI Korea Health Industry
Development Institute



SMART CARE

Transplantation

Korea, Global Leader in
Organ Transplantation and
Bone Marrow Transplantation



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- 03 Liver Transplantation
- 07 Kidney Transplantation
- 09 How To Get an Organ Transplantation in Korea?
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Transplantation

History of Korea

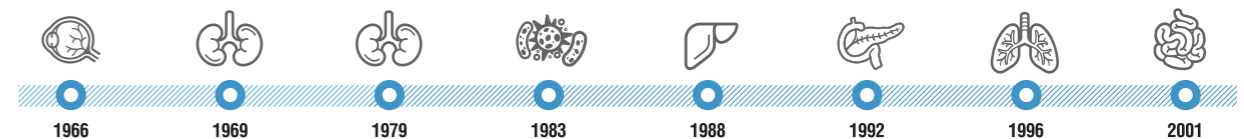


Milestones of Korean transplantation history

+ The history of organ transplantation in Korea started in the 1960s with the first corneal transplantation and kidney transplantation from a living donor

- In the 1970s, the transplantation of kidneys from brain deceased patients
- In the 1980s, the bone marrow transplantation and liver transplantation
- In the 1990s, the pancreas transplantation, heart transplantation and lung transplantation
- In the 2000s, the small intestine transplantation and islet transplantation

Organ Transplantations in Korea



- 1966** First corneal transplantation
- 1969** First living donor kidney transplantation
- 1979** First brain death donor kidney transplantation
- 1983** First bone marrow transplantation
- 1988** First brain death donor liver transplantation
- 1992** First heart transplantation and pancreas transplantation
- 1994** First living donor liver transplantation
- 1996** First lung transplantation
- 2001** First small intestine transplantation

Strict ethical evaluating process



+ One of the most important things in living donor transplantation beyond ensuring the safety of the donor is securing the integrity of the donor

+ To prevent illegal organ trade, Korea is requiring compliance with a strict approval process pursuant to the Act on Organ Transplantation

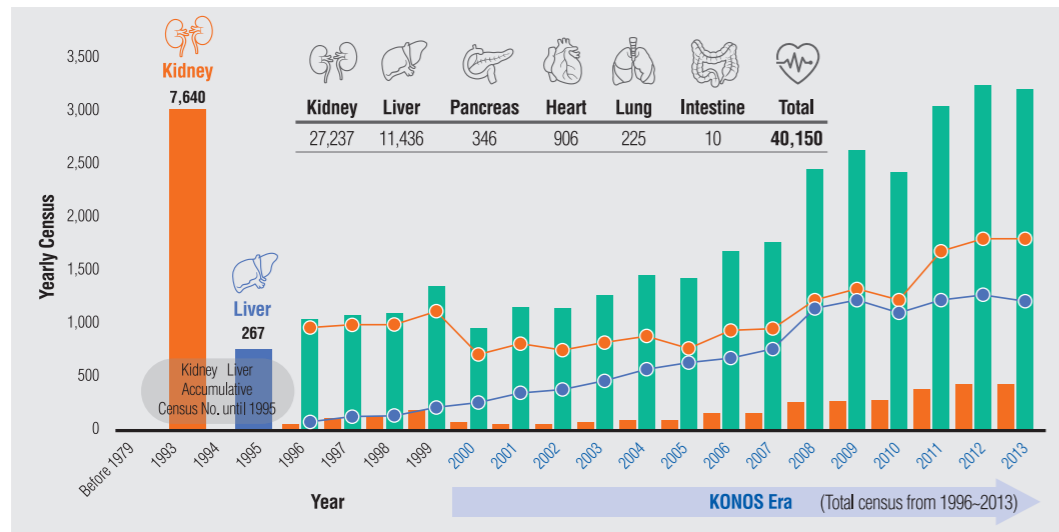
- Any living donor must have a relationship with the patient of at least first cousin or closer
- When a third party organ donation refers to the donation of organ, the transplantation surgery is approved only when objective documentary evidence proving that the organ donation is not intended for monetary trade purposes is submitted to and accepted through assessment by KONOS (Korean Network for Organ Sharing)

Transplantation

History of Korea

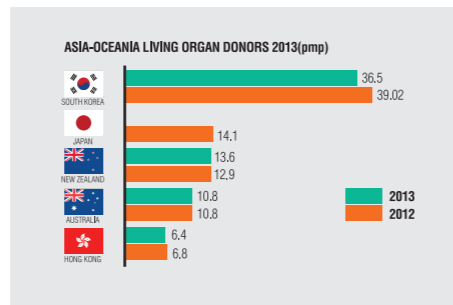


Growth of organ transplantation in Korea



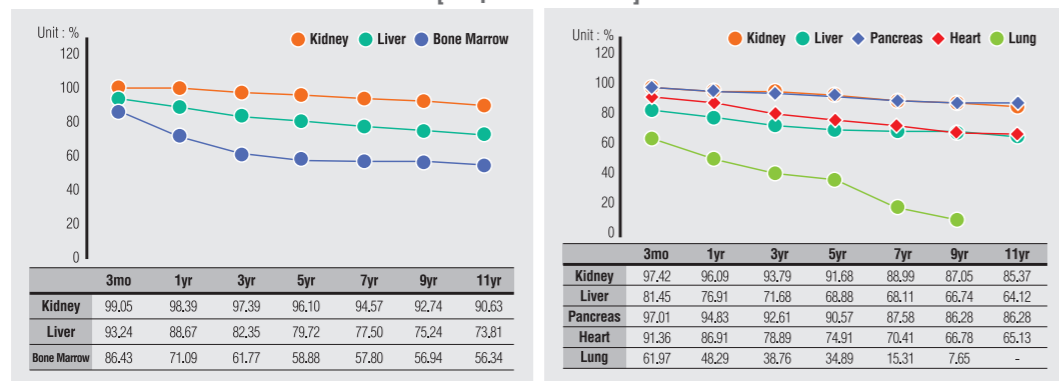
+ Living donor transplantation in Korea

- In 2014, there were more than 1,200 liver transplants and 1,800 kidney transplants
- Korea has the highest number of living donor transplantation operations per million people in the Asia-Pacific region



Outcomes of Korean organ transplantation

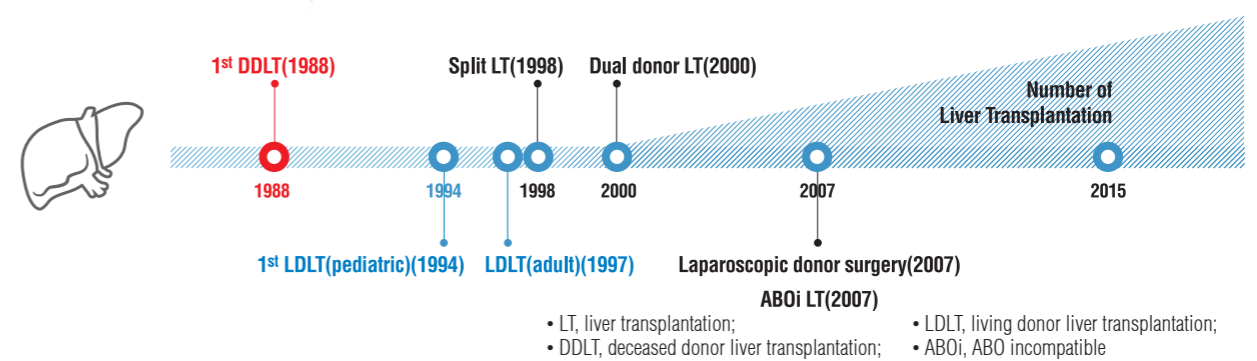
[Recipient survival rate]



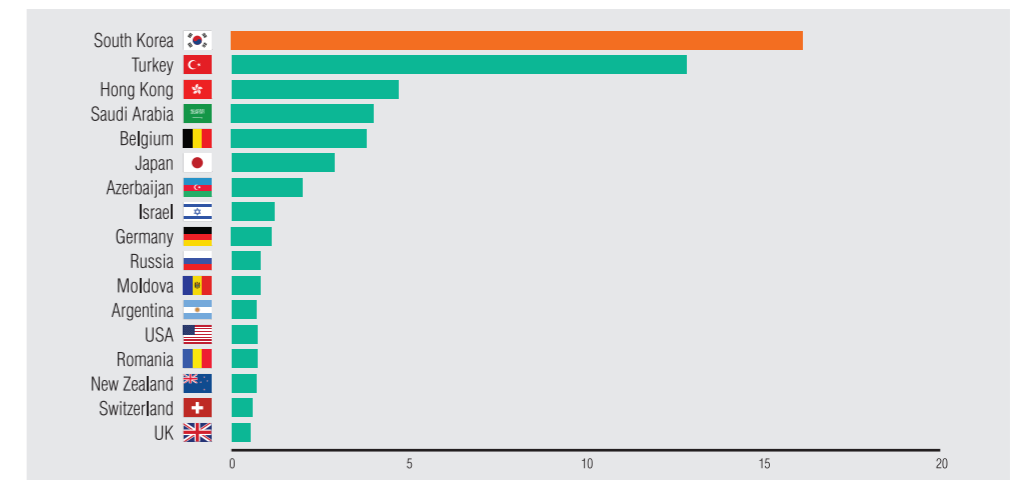
Living donor transplant

Deceased donor transplant

Liver Transplantation



- + The first brain death donor liver transplantation and the first living donor liver transplantation were successfully performed each in 1988 and in 1994
- + Brain deceased donor split liver transplantation was successfully performed in 1998
- + In 1999, a simultaneous liver-kidney transplantation was successfully performed, opening a new era of multi-organ transplantation
- + In 2000, Korea succeeded in transplanting livers from 2 living donors to a single patient with hepatic insufficiency
- + Korea conducted success in living donor hepatectomy by a laparoscopy in 2007
- + In 2007, a liver transplantation using a liver donated from an incompatible blood type donor, which had been considered a major obstacle to organ transplantation, was successfully performed in Korea using desensitization therapy



- Since the first living donor liver transplantation in Korea was performed in 1997, Korea has become the world's No. 1 country in the living donor liver transplantation sector, with the highest annual number of transplantation surgeries in the world

Liver
Transplantation



Korea's living donor liver transplantation leads the world

Excellent outcomes of liver transplantation in Korea

[The survival rates of living donor liver transplantations] (Unit : %)

Survival Rate		KOREA*	USA**
LDLT 1yr graft survival rate	Non-HCC	94.0	82.5
	HCC	92.6	
LDLT 3yr graft survival rate	Non-HCC	90.0	72.2
	HCC	86.3	

LDLT: Living donor liver transplantation, HCC: Hepatocellular carcinoma
* Survey of 10 major centers in 2015 (LDLT performed between 2011 and 2013) ** USA data from UNOS

- + As the Act on Organ Donation was enacted and the KONOS (Korean Network for Organ Sharing) was founded in 2000, liver transplantation in Korea has been growing steadily
- + Especially, the proportion of brain-deceased donor liver transplantation is gradually increasing

Strongly supportive care after liver transplantation

a. Interventional Radiology



b. Multidisciplinary approach



THE FACT

1 The Largest LDLT Program in the World

According to the data from the INTERNATIONAL REGISTRY IN ORGAN DONATION AND TRANSPLANTATION in 2014, 18 patients out of million people in Korea receive living donor liver transplantation, which is the largest number in the world. The figure is over 3 times bigger than that of Japan and Hong Kong where liver transplantation is more generally carried out than any other Asian countries. Even the number recorded in Korea is 10 times bigger compared to the United States. Such figure is not limited to the quantitative meaning, but implies Korea's world's leading technologies in living donor liver transplantation sector, backed by accumulated expertise and technical development.

2 The Best Successful Rate

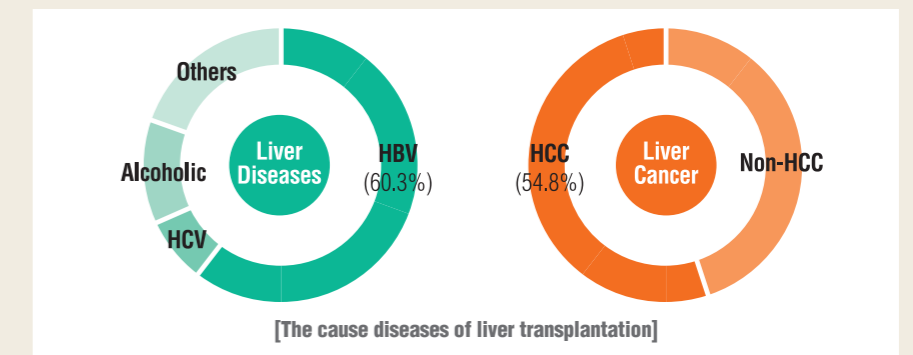
97.6%

Results of analysis on the data from top 10 liver transplantation institutions over the past 3 years have revealed that Korean medical institutions's a liver transplantation success rate of 97.6%, is way higher than the success rate of any country in the world, including the United States and India.

3 Hepatitis B related cirrhosis / HCC is the Most Common Indication

According to the data from Korea's top 10 liver transplantation institutions for a period from 2010 to 2013, the most frequent indication of liver transplantation was Hepatitis B (1,865 patients, 60.3%) followed by alcoholic liver disease (395 patients, 12.8%) and Hepatitis C (234 patients, 7.6%). Such proportions are similarly observed in the liver transplantation indication patients in other Asian and Middle East countries. As Korea has sufficient experience in liver transplantation with Hepatitis B, it features well-prepared protocol to prevent the recurrence of Hepatitis B after liver transplantation. Recently, through the combined use of HBV immunoglobulin injection and antiviral agent administration, Korea is recording an extremely low rate of Hepatitis B recurrence.

The proportion of patients receiving liver transplantation to cure the liver cancer is relatively high in Korea. Such proportion is continuously growing and has recently surpassed 50% in the total liver transplantation cases operated in Korea. In addition, various efforts to reduce the recurrence of liver cancer after transplantation are being made including pre-liver transplantation treatment on progressive liver cancer to lower the clinical stage.



Liver Transplantation



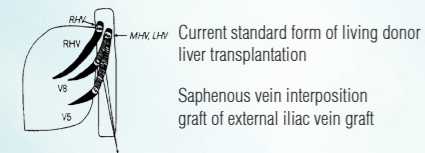
Innovations in living donor liver transplantation in Korea

Korea has developed many innovative new surgical techniques which has now become the standard technique in most centers around the world

a. Modified right lobe graft

This type of graft has become the standard method of performing LDLT for adult patients

Modified right lobe graft

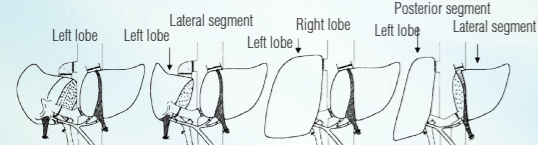


Current standard form of living donor liver transplantation

Saphenous vein interposition graft of external iliac vein graft

b. Dual graft liver transplantation

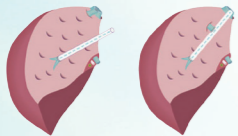
Improves donor safety and prevents a detrimental post-LT problem called small-for-size syndrome



To prevent small for size syndrome and improve donor safety

c. Middle hepatic vein reconstruction with PTFE graft (artificial vessel)

This technique has allowed safe LDLT in regions where cryopreserved vessels from deceased donors are not available



Innovative technique to simplify and shorten op procedures and improve donor safety

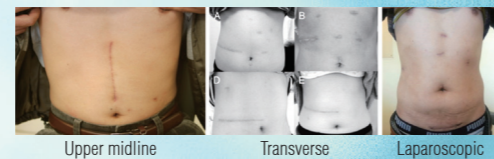
d. High hilar dissection

e. Right posterior graft

f. Minimally incisional surgery for living donor

Has the world's largest experience of minimally invasive surgery for living donors

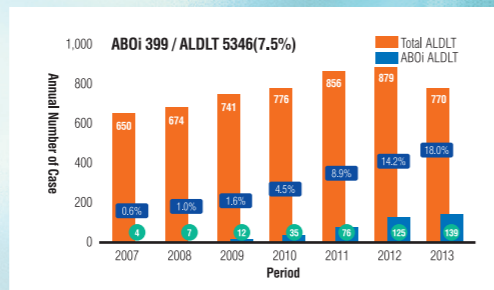
Various effort to reduce scar



g. ABO incompatible liver transplantation

LT has become possible even among donors and recipients with incompatible ABO blood type

LT made possible between different ABO blood types



Leading in medical education and research

a. International medical journal publication

Over 300 publications related to LT in the last 5 years

b. International fellowship program

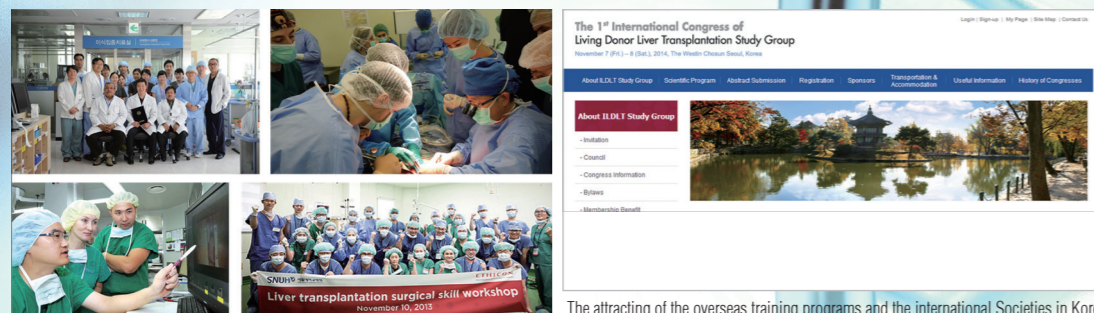
Fellowship programs for surgeons from abroad are being run by many hospitals and KHIDI

c. International congress

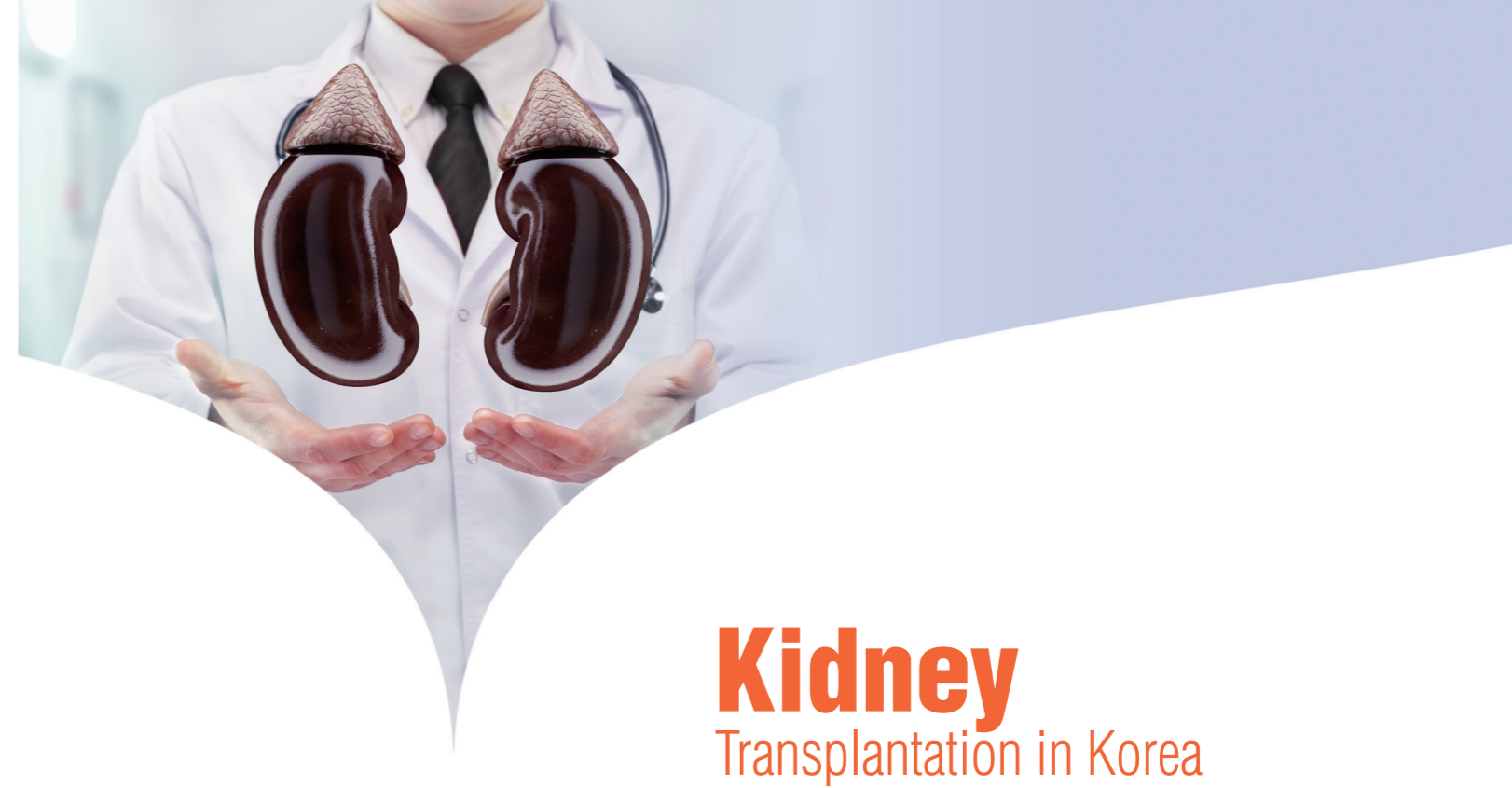
Hosted leading international congresses such as IHPBA, CAST, ISODP and will host ILTS in 2016

d. Fostering new LDLT program around the world

Korea has helped hospitals in over 10 nations start a new LDLT program



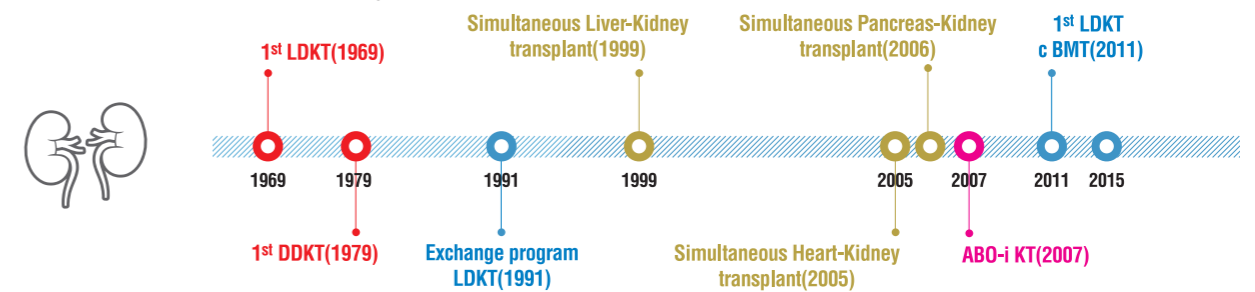
The attracting of the overseas training programs and the international Societies in Korea



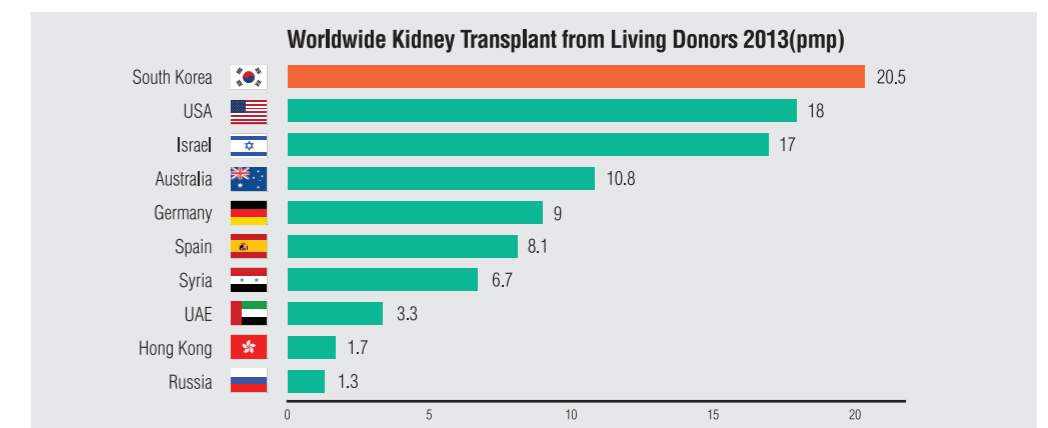
Kidney Transplantation in Korea

Milestones of Korean kidney transplantation history

+ Korea's first kidney transplantation surgery was performed in March 1969 on a patient who was receiving peritoneal dialysis due to chronic renal failure.



Living donor kidney transplantation in Korea



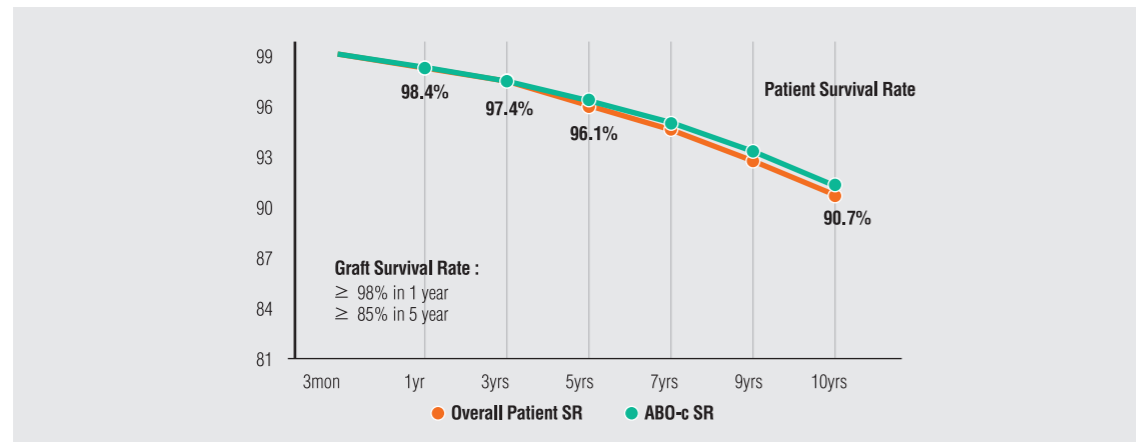
+ According to the data from the INTERNATIONAL REGISTRY IN ORGAN DONATION AND TRANSPLANTATION in 2014, Korea performs the largest number of living donor transplantation operations per million people among Asia-Pacific countries

+ Korea ranks 4th in terms of the number of living donor kidney transplantation per million people worldwide



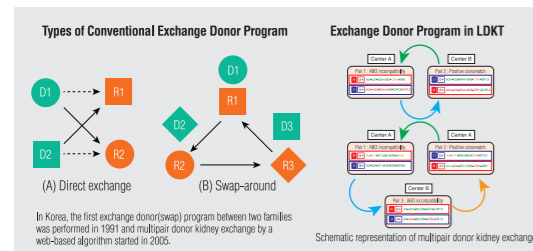
Excellent outcomes of kidney transplantation in Korea

- + The 1 year, 3 year, 5 year and 10 year survival rate of living donor kidney transplantation patients is 98.4%, 97.4%, 96.1% and 90.7%, respectively
- + Similar results have been observed in incompatible blood type kidney transplantation as well



Innovations in living donor kidney transplantation in Korea

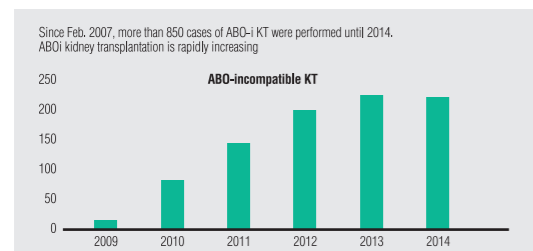
a. Exchange living donor kidney transplantation



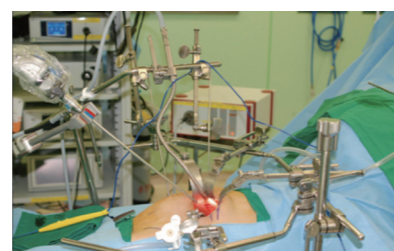
b. Anti-HLA antibody positive kidney transplantation

The recently announced results on the performance of kidney transplantation on patients who are positive to anti-HLA antibody over the past 3 years in Korea have revealed that 3 year survival of such patients is over 90% and the rate of patients experiencing acute rejection is approximately 20%

c. ABO-incompatible kidney transplantation



d. Laparoscopic donor nephrectomy and Video-assisted minilaparotomy surgery (VAMS)



Strongly supportive care after kidney transplantation

- + Immunosuppressive therapy :
 - Induction immunosuppression
The purpose of induction immunosuppression is to prevent the acute rejection that may occur in the early stage after the transplantation when the immune response occurs the most severely as strong immunosuppressive agent is used in this period
 - Maintenance immunosuppression
Maintenance immunosuppression is intended to prevent the rejection and minimize the side effect of immunosuppressive drug on a long term basis
- + Handling patients with surgical implications safely through highly advanced interventional radiology
- + Korean hospitals provide a wide range of support in collaboration with multiple medical departments including transplantation surgery department, renal department, dedicated transplant anesthesiology, critical care medicine, nutrition team and medical social work team to ensure fast recovery of the patient

How To Get an Organ Transplantation in Korea?



1. Evaluation of recipient and donor

- + Recipients are recommended to submit the medical records(age, sex, body weight, height, past medical history, previous operation history, complication), CT or MRI scans(for liver transplantation), Laboratory results(blood test and urine test)
- + Donors are recommended to submit the physical information(age, sex, body weight, height, past medical history), CT or MRI scan for volumetry(transmit images for the measurement of liver volume), Laboratory results(blood test and urine test)
- + Depending on the disease the patient is suffering from, additional examinations may be carried out to identify autoimmune diseases, malignancies, infections, heartdiseases,etc.
- + Transplantation immunologic tests(To prevent and diagnose rejection after transplantation, several immunologic tests are required before and after the transplantation.)

2. Pre-arrival preparation

- + Recommended to prepare the mandatory official document that proves the kinship (within the first cousin range) between the donor and the recipient
 - Required to be notarized by the embassy
- + Recommended to prepare documents for KONOS approval

3. Post-arrival process

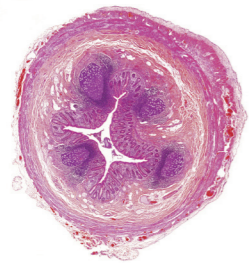
- + Recipient work-up prior to surgery
 - Cardiac evaluation
 - Gastroscopy
 - PET-CT (in case of HCC)
 - Dental examination
 - ENT examination
- + Donor work-up prior to surgery
 - Basic laboratory and X-ray check-up
 - Gastroscopy
 - Psychiatric evaluation



4. Post-transplant care

- + When the patient visits the hospital for below symptoms or renal dysfunction, the patient may be subject to biopsy where necessary
 - Fever or chill
 - Pain or pressure pain in the transplantation area
 - Significant reduction in the amount of urine or hematuria
 - Pain or severe odor during urination or frequent inclination for urination
 - Blood pressure increase or abnormal weight increase or continuous edema

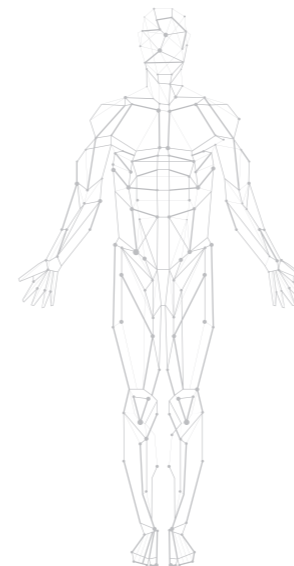
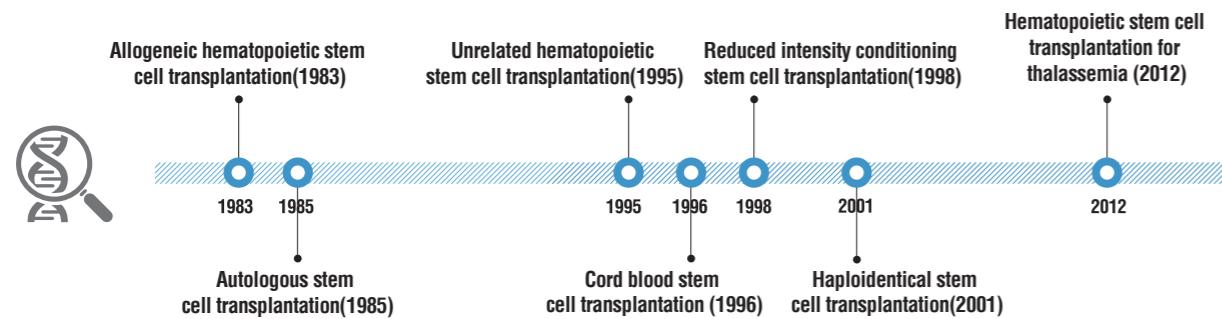
Bone Marrow Transplantation



Bone Marrow Transplantation

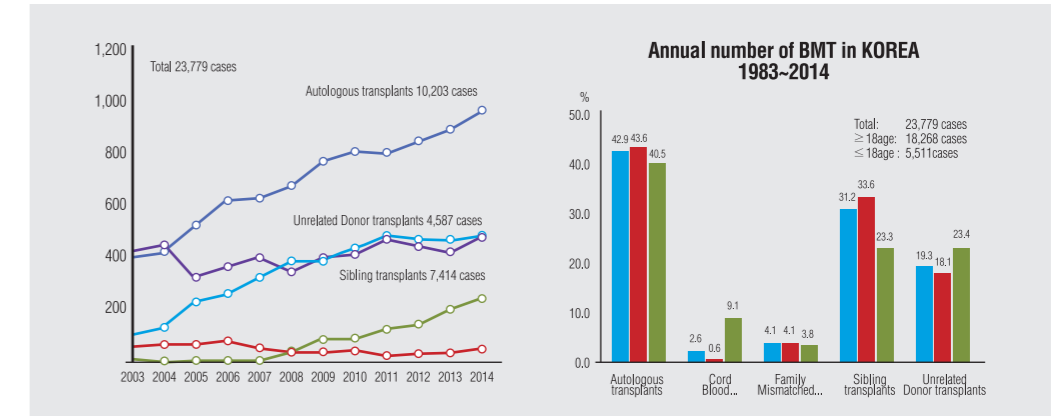
Hematopoietic Stem Cell Transplantation

Milestones of Korean Bone Marrow transplantation history



Increasing number of Bone Marrow transplantation in Korea

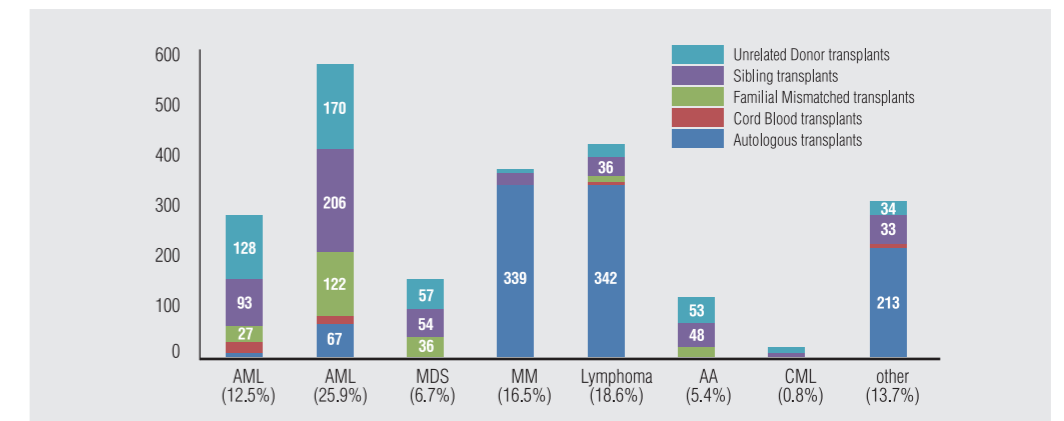
Performed more than 23,000 of cases since the first transplantation had been done



[Annual number of Bone Marrow transplantation in Korea]

Remarkable Outcome of Bone Marrow Transplantation in Korea

- + Distribution of survival rate for bone marrow transplantation of major BMT Center in Korea as of late 2014:
 - 100-day survival rate: 82.9% ~ 93.2%
 - 1-year survival rate: 60.5% ~ 85.0%
 - 5-year survival rate: 50.0% ~ 75.0%
- (United States) Distribution of 3-year survival rate for stem cell transplantation: 36.9% ~ 84.3%
- + The most transplantation conducted in 2014 are autologous stem cell transplantation as 966 cases out of 2,234 cases
 - Followed by sibling transplantation, unrelated transplantation, familial mismatched transplantation and cord blood stem cell transplantation
- + Classified by disease, transplantation for acute myeloid leukemia is the most performed transplantation with more than 600 cases per year



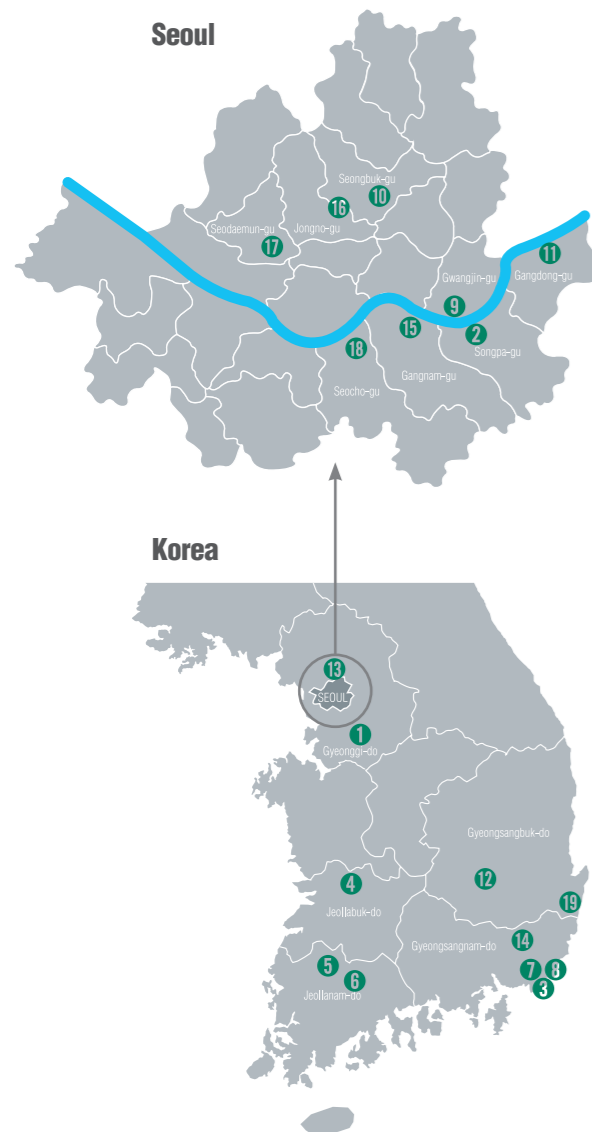
[The diseases of Hematopoietic Stem Cell Transplantation]

Strength of Bone Marrow Transplantation in Korea

- + Bone marrow transplantation centralization of major medical institutions
- + Treatment continuity of physicians who conducting transplantation
- + Supportive care after bone marrow transplantation by joint treatment system of stem cell transplantation center
- + Better outcome with 30~50% of treatment cost in comparison with advanced country



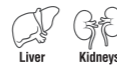
Transplantation Centers in Korea



- 1 Ajou University Hospital (since 1994)**
- **Address** 164 Worldcup-ro, Yeongtong-gu, Suwon, Gyeonggi-do, Korea
 - **Tel.** 82-31-219-5432
 - **E-mail.** inlhcc@aumc.ac.kr
 - **Homepage.** <http://hosp.ajoumc.or.kr>
 - **Language Service.** English, Chinese, Russian, Japanese
 - **Meal services for foreign patients**



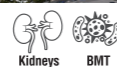
- 2 Asan Medical Center (since 1989)**
- **Address** 88, Olympic-ro 43-Gil, Songpa-Gu, Seoul, Korea
 - **Tel.** 82-2-3010-5001
 - **E-mail.** int@amc.seoul.kr
 - **Homepage.** <http://eng.amc.seoul.kr>
 - **Language Service.** English, Chinese, Russian, Mongolian, Japanese, Arabic
 - **Facilities for foreign patients**
 - **Meal services for foreign patients**



- 3 Bongseng Memorial Hospital (since 1985)**
- **Address** 401, Jungang-Daero(jwacheon-dong), Dong-gu, Busan, Korea
 - **Tel.** 82-51-664-4000
 - **E-mail.** since1949@naver.com
 - **Homepage.** <http://www.bongseng.co.kr/foreign/eng/eng/EBook.htm>
 - **Language Service.** English, Chinese, Russian



- 4 Chonbuk National University Hospital (since 1983)**
- **Address** 20, Geonji-ro, Deokjin-gu, Jeonju-si, Jeollabuk-do, Korea
 - **Tel.** 82-1577-7877
 - **Homepage.** <http://www.cuh.co.kr>
 - **Language Service.** English



- 5 Chonnam National University Hospital (since 1981)**
- **Address** 42, Jebong-ro, Dong-gu, Gwang-ju, Korea
 - **Tel.** 82-62-220-6016
 - **E-mail.** fordab@naver.com
 - **Homepage.** <http://www.cnuh.com>
 - **Language Service.** English, Russian
 - **Facilities for foreign patients**
 - **Meal services for foreign patients**



- 6 Chonnam National University Hwasun Hospital (since 2004)**
- **Address** 322 Seoyang-ro, Hwasun-eup, Hwasun-gun, Jeollanam-do, Korea
 - **Tel.** 82-61-379-7892
 - **E-mail.** geenie77@gmail.com
 - **Homepage.** <http://www.cnuhh.com/eng>
 - **Language Service.** English, Chinese, Russian, Mongolian, Japanese, Arabic
 - **Facilities for foreign patients**
 - **Meal services for foreign patients**



- 7 Inje University Busan Paik Hospital (since 1989)**
- **Address** 75, Bokji-ro, Busanjin-gu, Busan, Korea
 - **Tel.** 82-51-890-6115
 - **E-mail.** ria.seongmj@gmail.com
 - **Homepage.** <http://www.paik.ac.kr/busan>
 - **Language Service.** English
 - **Meal services for foreign patients**



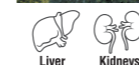
- 8 Inje University Haeundae Paik Hospital (since 2010)**
- **Address** 875, Haeundae-ro, Haeundae-gu, Busan, Korea
 - **Tel.** 82-2-2030-7221
 - **E-mail.** ihc@paik.ac.kr
 - **Homepage.** <http://haeundae.paik.ac.kr/eng/main/main.asp>
 - **Language Service.** English, Chinese, Russian, Japanese
 - **Facilities for foreign patients**
 - **Meal services for foreign patients**



- 9 Konkuk University Medical Center (since 1982)**
- **Address** 120-1 Neungdong-ro (Hwayang-dong), Gwangjin-gu, Seoul, Korea
 - **Tel.** 82-2-2072-7221
 - **E-mail.** konkuh@gmail.com
 - **Homepage.** <http://www.kuh.ac.kr/english>
 - **Language Service.** English, Chinese, Russian, Japanese
 - **Facilities for foreign patients**



- 10 Korea University Anam Hospital (since 1941)**
- **Address** 73, Incheon-ro, Seongbuk-gu, Seoul, Korea
 - **Tel.** 82-2-920-6920
 - **E-mail.** boaibs@gmail.com
 - **Homepage.** <http://anam.kumc.or.kr/language/ENG>
 - **Language Service.** English, Chinese, Russian, Mongolian, Arabic
 - **Facilities for foreign patients**
 - **Meal services for foreign patients**



- 11 Kyung Hee University Hospital at Gangdong (since 2005)**
- **Address** 892 Dongnam-ro Gangdong-gu, Seoul, Korea
 - **Tel.** 82-2-440-7304
 - **E-mail.** kuiimsseoul@gmail.com
 - **Homepage.** <http://www.kuims.or.kr>
 - **Language Service.** English, Chinese, Russian
 - **Facilities for foreign patients**
 - **Meal services for foreign patients**



- 12 Kyungpook National University Hospital (since 1910)**
- **Address** 130 Dongdeok-ro, Jung-gu, Daegu, Korea
 - **Tel.** 82-53-200-6114
 - **E-mail.** knuh200@hanmail.net
 - **Homepage.** <http://eng.knuh.kr/main>
 - **Language Service.** English, Chinese, Russian, Japanese



- 13 National Cancer Center (since 2000)**
- **Address** 323 Ilsan-ro, Ilsandong-gu, Goyang-si, Gyeonggi-do, Korea
 - **Tel.** 82-31-920-1070
 - **E-mail.** berrycool@ncc.re.kr
 - **Homepage.** <http://ncc.re.kr/english/index.jsp>
 - **Language Service.** English
 - **Facilities for foreign patients**



- 14 Pusan National University Yang-san Hospital (since 2008)**
- **Address** 20, Gaumo-ro, Mulgeum-eup, Yangsan-si, Gyeongsangnam-do, Korea
 - **Tel.** 82-55-360-2011
 - **E-mail.** hyeyoung@pnuyh.co.kr
 - **Homepage.** <http://www.pnuyh.or.kr>
 - **Language Service.** English, Chinese, Russian, Mongolian, Japanese
 - **Facilities for foreign patients**
 - **Meal services for foreign patients**



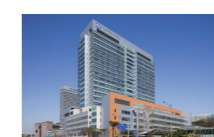
- 15 Samsung Medical Center (since 1994)**
- **Address** 81 Irwon-Ro Gangnam-gu, Seoul, Korea
 - **Tel.** 82-2-3410-0200
 - **E-mail.** ihs.smc@samsung.com
 - **Homepage.** <http://english.samsunghospital.com/main/english.do>
 - **Language Service.** English, Chinese, Russian, Mongolian, Japanese, Arabic
 - **Facilities for foreign patients**
 - **Meal services for foreign patients**



- 16 Seoul National University Hospital (since 1978)**
- **Address** 101 Daehak-ro, Jongno-gu, Seoul, 03080, Korea
 - **Tel.** 82-2-3410-0505
 - **E-mail.** international@snuh.org
 - **Homepage.** <http://snuh.org/english>
 - **Language Service.** English, Chinese, Russian, Mongolian, Japanese, Arabic, French
 - **Facilities for foreign patients**
 - **Meal services for foreign patients**



- 17 Severance Hospital, Yonsei University College of Medicine (since 1885)**
- **Address** 50-1 Yonsei-ro, Seodaemun-gu, Seoul, Korea
 - **Tel.** 82-2-2258-5817
 - **E-mail.** medseverance@yuhs.ac
 - **Homepage.** <http://www.yuhs.or.kr/en/>
 - **Language Service.** English, Chinese, Russian, Mongolian, Japanese, Arabic
 - **Facilities for foreign patients**
 - **Meal services for foreign patients**



- 18 The Catholic University of Korea Seoul St. Mary's hospital (since 1980)**
- **Address** 222 Banpo-Daero, Seocho-gu, Seoul, Korea
 - **Tel.** 82-2-2258-5745
 - **E-mail.** ihcc@catholic.ac.kr
 - **Homepage.** <http://www.cmcsoul.or.kr/global/eng/front>
 - **Language Service.** English, Chinese, Russian, Japanese, Arabic, French
 - **Facilities for foreign patients**
 - **Meal services for foreign patients**



- 19 Ulsan University Hospital (since 1975)**
- **Address** 877 Bangeojin Sunwhando-ro, Dong-gu, Ulsan, Korea
 - **Tel.** 82-52-250-7222
 - **E-mail.** intlnr@uh.ulsan.kr
 - **Homepage.** <http://www.uuh.ulsan.kr>
 - **Language Service.** English, Japanese
 - **Facilities for foreign patients**
 - **Meal services for foreign patients**



* List in alphabetical order