Translational Research in Korea

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Agenda

• Government grants for translational research
• Industry initiatives
• Private sectors
  – Example: Seoul National University Hospital
R&D Programs of Korean Ministry of Health, Welfare & Family Affairs

• R&D focused on Disease Prevention
  – Disease oriented R&D
  – Infrastructure development for disease oriented research:
    Medical Cluster, Korea National Enterprise for Clinical trials (KoNECT)

• Focused investment for productivity
  – Innovative Research Hospital: technology transfer & commercialization
  – Human Resource Development
<table>
<thead>
<tr>
<th>Category</th>
<th>Programs</th>
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<tbody>
<tr>
<td>Disease Overcome</td>
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<tr>
<td>Disease Oriented Research</td>
<td>• Translational Research Scientists Grant; seed grant for junior faculties, 35 million KRW for 1 year</td>
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<td>• Translational Research Grant for Individual Investigators; 60 million KRW for 2 yr</td>
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<td></td>
<td>• Translational Research Grant for M.D.-Ph.D. Collaboration; 200 million KRW for 2 yr</td>
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<td>• Translational Research Center Grant for Practical Outcomes/Products; 500 million KRW for 4 yr</td>
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<td>Hospital for Specialized Research Capability</td>
<td>• Specialized Dx · Tx Technology Development</td>
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<td></td>
<td>• Support infrastructure building for research capacity of Hospital (clinical-basic scientists)</td>
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<td>• 1 billion KRW for 5 yr, 15 centers by 2012</td>
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<td>Clinical Scientist Support</td>
<td>• Support &amp; train future clinical scientists with capability of clinical and basic research</td>
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<td>• 10 million KRW for 1 yr</td>
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Ministry of Health, Welfare & Family Affairs: Innovative Research Institute Program

- Hospital based cluster for new treatment & product development
- Support IND from Translational Research of basic and clinical scientists
- Research capacity building in Hospital: dedicated research faculty, research support for clinician, etc
- 4 billion KRW per year for 5 years each center, select 6 centers by 2010
Innovative Research Institute Program at SNUH

**Project 1**

**Research Details**
- Development of New Treatment Method and Protocol for Cartilage/Bone Repair

**Expected Outcomes**
- Development of Cell-based Therapeutic Agent for Regenerating Cartilage/Bone
- System Organization of Cell-based Therapy with Regenerative Medicine

**Project 2**

**Research Details**
- Development of Cardiovascular Regeneration Therapy Using Stem/precursor Cells

**Expected Outcomes**
- Development of Cell Therapy for Myocardial Regeneration and Angiogenesis
- Development of Drug-eluting Coronary Stent

**Project 3**

**Research Details**
- Development of Cancer Therapies Using Immune Cells

**Expected Outcomes**
- Development of "D-TNT" Combined Immune Cell Therapy for Cancer

**Project 4**

**Research Details**
- Development of Technology for Diabetes Treatment Using Pancreatic Inlet Cells

**Expected Outcomes**
- Development of Cell Therapy Using Pancreatic Inlet
1. Targeted anticancer drug development
2. Drug delivery using nanotechnology
3. Molecular imaging for tumor
1. Diagnostic development
   • 7.0T MRI base, monitoring of atherosclerosis, nanotechnology base imaging dye

2. Therapeutic agent development
   • Vascular acting agents (repair, new vessel formation, etc)
   • Magnetic nano-particle based thrombolytic agent, innovative stent, etc.
Translational Research Grant of Ministry of Education, Science and Technology

Development of Fusion Technology of Medicine & Innovative Technology

• Clinician driven identification of research topic and collaboration with PhD scientists
• Superior and creative technology development by fusion of medicine and innovative techniques such as BT, NT, IT, CT, etc.
• Clinician will take the role of PI with 1 ~ 3 PhD subPI’s.
• 500 million KRW per year for 5 years
Agenda

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  – Example: Seoul National University Hospital
Partnerships for Early Phase Clinical Trials and Translational Research

- **Asia Phase I Center**
  - Chinese, Japanese subjects
  - Dedicated staff member: Chinese speaking, Japanese speaking
  - Collaboration with Japan based CRO

- **Pfizer, Core Research Site Consortium**

- **Dedicated staff member, steering committee**

- **Astra Zeneca: oncology translational research collaboration, Virtual Research Institute for diabetes, obesity and atherosclerosis**
Agenda

• Public initiatives
• Industry initiatives
• Private sectors
  – Example: Seoul National University Hospital
History of SNUH

Jejungwon (1885)
Daehan Hospital (1907)
The Affiliate Hospital of Gyeongseoung Imperial University (1928)
The Affiliate Hospital of SNU (1946)
Corporation SNUH (1978)
Branch Hospitals

- **SNUH**
  - Staff: 3,902
  - Beds: 1,355
  - Inpatients: 558,325 (2007)
  - Outpatients: 1,778,143 (2007)
  - Open: 1985.10.15.

- **SNUBH**
  - Staff: 641
  - Beds: 270
  - Inpatients: 210
  - Outpatients: 715
  - Open: 2003.5.10.

- **SNUCH**
  - Staff: 799
  - Beds: 561
  - Inpatients: 457
  - Outpatients: 1,579
  - Open: 1955.6.18.

- **Finance Center**
  - Staff: 150
  - Customer: 100 person/day

- **Boramae**
  - Staff: 1,474
  - Beds: 909
  - Inpatients: 845
  - Outpatients: 2,783
  - Open: 2003.5.10.
SNUH Clinical Trials Center

• Since June 15, 1997

• Support Clinical Research and Trials: translation of basic research into clinical practice

• Support investigator and sponsors with space, facility, expert staffs, softwares, etc.
RENOVATION, 2007
Clinical Trials Center, SNUH

Committee on General Affairs

Director
Prof. KU Min (Allergy)

Acting Committee
Prof. KS Yu (Clinical Pharmacology)
Prof. SI Oh (Cardiology)

Division of Clinical Research
Prof. DW Kim (Oncology)

Clinical Research Manager
(Head Nurse)

QC (1 Registered Nurse)

Research Ward
(7 sections, 46 beds)
Outpatient Clinic
(7 rooms)
12 Registered Nurses,
4 Nurse Aides,
1 Administrative Staff

Division of Clinical Research Support
Prof. IJ Jang (Clinical Pharmacology)

Pharmacy
(6 Pharmacists)

Core Lab
(5 Laboratory Medical Technicians)

Division of Medical Device Eval.
Prof. W. S. Ahn
(Anesthesiologist)

Admin. & Technologist

Faculties: 7
In house staff: 34
Research coordinators: 26

Administrative Manager

Administrative Office
(4 Persons)

Reception
(1 Person)
SNUH CTC

Core lab.: sample processing/storage

Outpatient clinic: 7+1 units

Pharmacy

Pharmacodynamics lab.

Research ward: 46 trial beds

Medical Device Evaluation

• Neuropsychopharmacology (128 channel EEG, portable EEG, psychomotor, thermal pain, etc)
• Dermatology, ophthalmology, etc.
• CV (QT, ABP, IC, etc), Capable of thorough QT study: MAC5000 & MAC5500 (4), MUSE & SW

• Sample processing and testing - Pharmacogenomics laboratory
• Bioanalysis: GLP compliant
  • LC MS/MS (6 sets), HPLC (5), Drug screening, etc.
CTC Expansion

- Oncology center (2010)
  - Oncology trials: 20 dedicated beds and other facilities in @ 1,000 m² space
CTC Expansion (cont.)

• Brain, Heart, & Diabetes Center (2012)
  - Cardiovascular/metabolic disease research & trials
  - Innovative treatment dev.
  - 20 beds, 5 OPD office, etc.

• Research Oriented Hospital in IFEZ
  - Global regulations and standard

Under construction
Clinical Trial & Research Technology Development

- PET imaging biomarkers
- Microdosing / exploratory IND
- Pharmacogenomics
- Metabolomics
- Modeling & simulation
PK-PD Modeling & Simulation of Functional Imaging (PET) Data in Phase I Trial of a Novel Antipsychotic, for Later Phase Dose Estimation

Dopamine (D₂) receptor occupancy of a new antipsychotic drug using PET & [¹¹C]Raclopride

At steady-state, 12 h post-dose

1. Occupancy median; 42 ~ 47.5%
2. Occupancy 10 percentile value; 32 ~ 37.5%
3. Occupancy 90 percentile value; 52.3 ~ 58.4%

PK-PD(D₂ occupancy) modeling with NONMEM

KS Lim, KS Yu, IJ Jang, SG Shin et al. CPT 2007. Feb
EMR Capability

• More than 1 million patients data: diagnosis, laboratory data, medication, image, etc.
• Excellent tool for translational research
  – Feasibility check
  – Electronic data capturing
  – ADR signal detection
  – Genetic research for rare phenotypes
Research Groups

- Pharmacogenomics
- Innovative Research Institute for Cell Therapy
- Xenotransplantation Research Center
- Regional Clinical Trial Center
- Nuclear Medicine Molecular Imaging Center
- Clinical Research Center for Stroke
- Genome Research Center for Diabetes and Endocrine disease
- Facility of GLP (Good Laboratory Practice)
- AAALAC (Association for Assessment and Accreditation of Laboratory Animal Care) International Achievement of Accreditation
Globally Competitive Research Area

• Brain Research: Alzheimer’s & Parkinson disease
• Psychiatry: genomic, imaging and neurological evaluation
• Genetics: pharmaco-, population, etc.
• Cardiovascular: stem cell, vascularization research
• Immunology: NKT, regulatory T cell, RA, pulmonary fibrosis, etc.
• Endocrine: molecular mech., role of mitochondria in insulin resistance
• Pharmacology: HIF, hypoxia related disease
• Oncology: personalized therapy based on molecular biomarker, translational research
• Surgery: genetics
• Radiology: molecular image, interventional radiology, etc.
SCI Publications at SNU MC & SNUH

- 1,427 in 2008
Research Grants

100 million USD in 2008 at SNU MC & SNUH

Intramural Grant for Translational Research
- Multidisciplinary grant: collaboration with School of Engineering and Natural Sciences
- Grant for collaborative research between basic and clinical medicine

![Graph showing research grants from 2005 to 2008]
Thank you for kind attention.