

NEXT GENERATON MEDICAL DEVICES FOR PRECISION MEDICINE AND BIOMEDICAL RESEARCH

Company Introduction

MICROROBOTS AS NEXT GENERATION MEDICAL DEVICES

Our team of engineers and researchers have been developing innovative medical microrobots and electromagnetic field control systems to provide next generation medical systems for interventional procedures and targeted therapy.

VISION

IMsystem Co., Ltd. is Korea's first company to commercialize medical microrobot systems and next generation medical technology for interventional procedures and targeted therapy.

The company aims to lead global markets for precision medical devices and improve global welfare.



PRODUCTS

- **A laboratory-scale magnetic field control system for research and preclinical studies**
 - IM_3D MAG_LAB
- **A medical microrobot system for interventional procedures and targeted therapy**
 - IM_SUPERMAG_CLINIC
 - Magnetic Guidewire-Microrobot
 - Magnetic Drug/Cell Carrying Microrobot
- **A high-resolution electrophysiology device for electrogenic cell analysis**
 - High-Density Microelectrode Array (HD-MEA)



CORE TECHNOLOGY

Our medical microrobot systems allow an operator(researchers, medical doctors, etc.) to remotely control the direction and position of magnetic objects or microrobots to target areas with a 3D external magnetic field



Safer and faster magnetic field control, easy patient access and compatibility with conventional medical equipment (e.g., C-arms)



Minimally invasive procedure



Minimize blood vessel damage, precise control of interventional devices inside complicated blood vessels



Super precise microrobot manipulation with high delivery accuracy



Targeted delivery of therapeutic agents

Business Goal

With our guidewire-microrobot, drug/cell carrying microrobots, 3D magnetic field control systems and high-density microelectrode arrays, we aim to overcome the limitations of conventional biomedical technology and provide improved interventional procedures

Short-term Business Plan

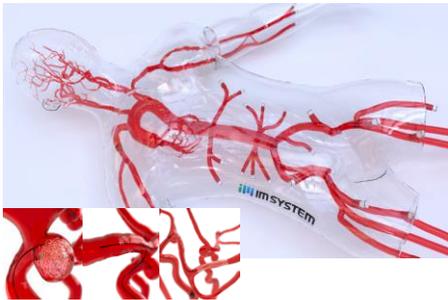
Rule the Magnetic Field



IM_3D MAG_LAB

We provide the IM_3D MAG_LAB, a 3D magnetic field control system for lab-scale magnetic materials research and preclinical studies with small animals

Simulate Blood Vessel



3D Vascular Simulator

The 3D vascular simulator provided by IMsystem Co., Ltd. mimics the structural and functional performance of real blood vessels. It can be used for various experiments and studies such as guide wires, stents, and coils using the simulator, and provides a realistic experimental environment similar to actual blood vessels.

Every Cell Counts



MaxOne
(Single-Well)

MaxTwo
(Multi-Well)



As the domestic distributor of MaxWell Biosystems, we provide MEA* systems, powerful platforms for recording and stimulating electrogenic cells in vitro

*MEA : Microelectrode Array

Long-term Business Plan

Innovative Microrobots for Improved Patient Care



High Value Medical System

Medical Microrobot Control System for Interventional Procedures

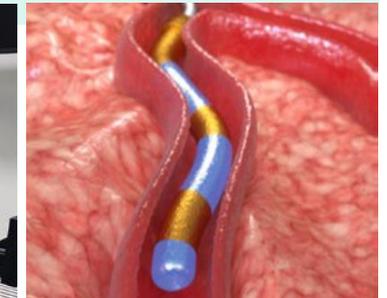


Exclusive Requisite Consumable

Magnetic Guidewire-Microrobot for Vascular Disease



IM_SUPERMAG_CLINIC :
Magnetic Field Control System for Clinical Use



Guidewire-microrobot

Our top priority is to commercialize and release the 3D magnetic field control systems and guidewire-microrobot for interventional procedures. The medical microrobot system allows for active steering of the guidewire-microrobot and provides fast, precise and safe interventional procedures.

Roadmap

IMsystem Co., Ltd.
Founded



Dr. Jin-young Kim
Co-founder / CEO

Pre Start-up Program
(2019-2020)

Best Performance



The 11th C-LAB Accelerating
Program (2021)



Seed Investment (2021, Signed)



Tech Incubator Program
for Start up (TIPS) (2021~2023)

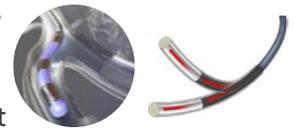


To Be Released

High Value Medical Microrobot System for
Interventional Procedures



Exclusive Requisite Consumable
(Sterilized interventional
instruments)
Magnetic Guidewire-Microrobot



2019

Prof. Hongsoo Choi
at DGIST
Co-founder / Technical Advisor



2020

Initial Start-up Program
(2020)

Excellent Performance



2021

Selected as the next
generation medical system
(Mentoring program ongoing for approval)
Medical Device Commercialization
Support Program
"Mentoring for Next
Generation Medical Device"



Prospect Robot Enterprise
Investment Activation Program
(2021, Ongoing)



2024

Establish/Operate Production Facility
under GMP Approval



Become ISO-certified

Clinical Trials
(Safety and Efficacy Evaluation)



Performance Evaluation Approval



15+ Recruitment Plans

Secure Additional Government Grants

IM_3D MAG_LAB

The IM_3D MAG_LAB is a laboratory-scale magnetic field control system for magnetic materials research and preclinical studies with small animals

Electromagnetic Coils



User Interface Software



Electronic Control Box

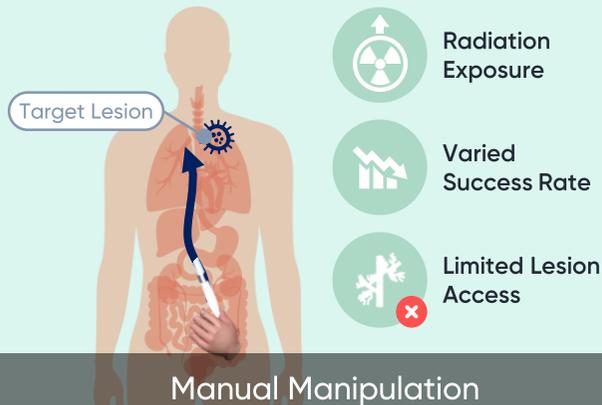


imsystem

IM_SUPERMAG_CLINIC

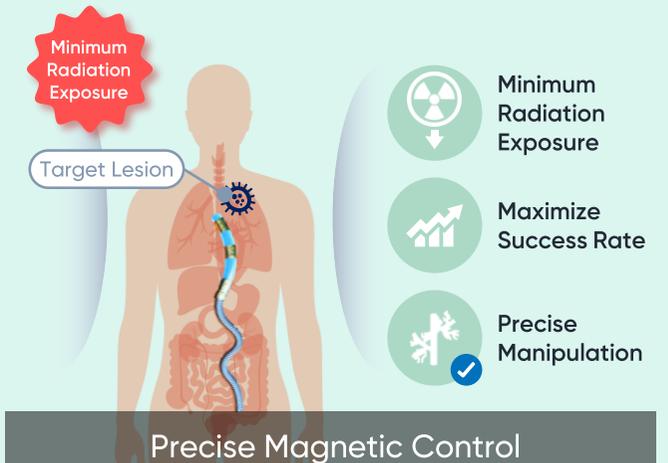
Conventional Treatment

- A super precise interventional procedures with the 3D magnetic field control system and guidewire-microrobot
- The IM_SUPERMAG_CLINIC allows for active steering of the guidewire-microrobot inside the patient's body and carries out interventional treatments with less damage, reduced time and higher precision than the traditional (manual) procedures
- Applicable to targeted therapy by precisely delivering magnetic drug/cell carrying microrobots to the target lesion sites



Medical Microrobot System

- Magnetic fields are precisely controlled by adjusting the electric current in the individual electromagnetic coils
- Minimize internal damages through precise control of the guidewire-microrobot
- The electromagnetic coils are installed under the patient bed to maximize patient access
- Highly compatible with most commercially available medical equipment (e.g., X-ray C-arms)



Key features

CHARACTERISTICS

- The magnetic field is controlled by adjusting the electric current in the coils
- Magnetic fields can be turned ON/OFF instantly
- The generated magnetic field can be used to steer magnetic guidewire-microbot or magnetic drug/cell carrying microrobots



CLINICAL ADVANTAGES

- The magnetic coil system is compatible with commercially available medical equipment, allowing for excellent space
- Electromagnetic coils are installed under the patient bed for patient access
- Fast magnetic field control in real time
- Zero magnetic field generation when not in use
- The guidewire-microbot is steered by 3D magnetic field control and travels through narrow and complicated blood vessels
- No need for an exclusive operation room for installation (can be installed in existing operation rooms)
- Reduced procedure time, costs and radiation exposure
- Reduced risk of vessel perforation and improved access to lesions



3D Vascular Simulator



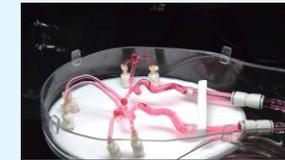
All vascular anatomies are printed from patient-specific scans or designs (CT, MRI) or STLs. Accordingly, the 3D vascular simulator can be manufactured with the desired design and structure.



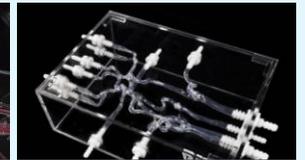
A 3D vascular simulator is a product that reflects the structure and functional and biological characteristics of actual blood vessels, and can be manufactured in various types of blood vessel disease.



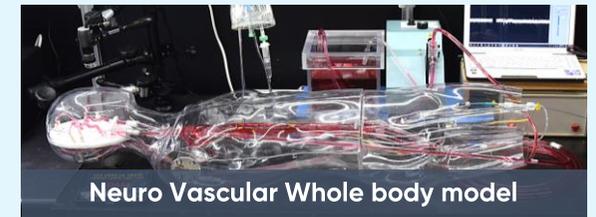
In addition, it provides a feeling and environment similar to that of actual blood vessel procedures, so it can be used for vascular intervention training and demonstration of related medical devices.



Neuro Vessel Model

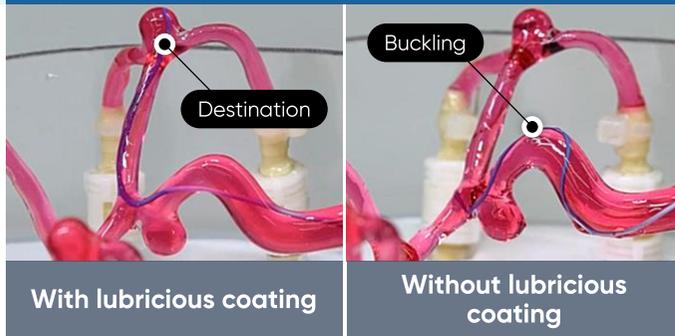


Aneurysm Model



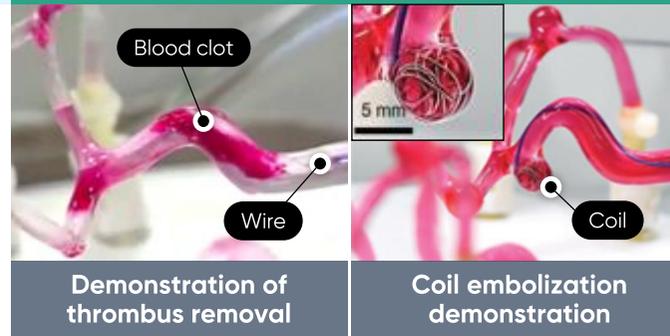
Neuro Vascular Whole body model

Lubricious coating



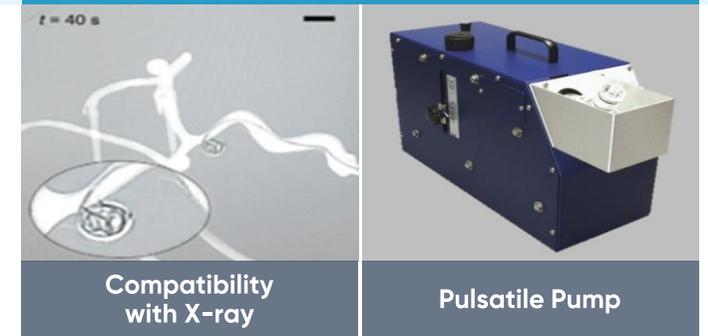
- The 3D vascular simulator provides a feeling similar to real blood vessels with a luminal surface coating.
- It has a coefficient of friction similar with the inside of an actual blood vessel. This results in true endovascular behavior just as you would feel in a real vessel.

Applications



- Using the 3D blood vascular simulator, it can be used for widely used procedures in vascular interventions such as coil embolization, stent procedure, and balloon dilatation.

Features



- It is compatible with X-ray imaging systems and can be used in conjunction with a pulsatile pump to demonstrate a procedure while flowing a fluid at the actual blood flow rate.

CMOS-based HD-MEA (High Density Microelectrode Array)

MAXONE (SINGLE-WELL)



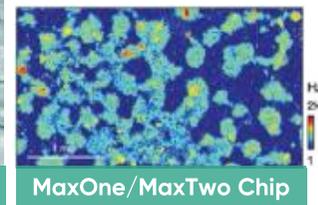
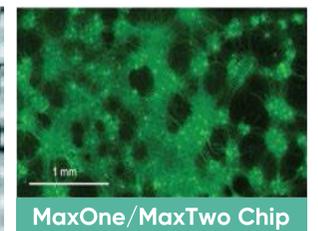
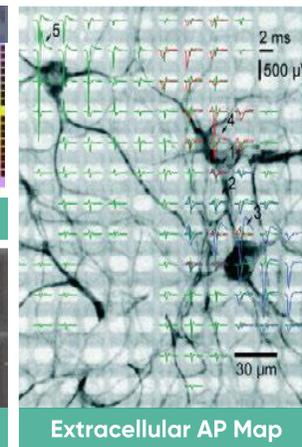
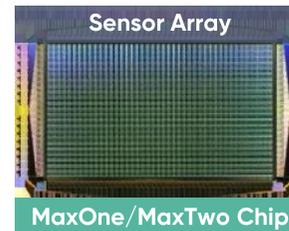
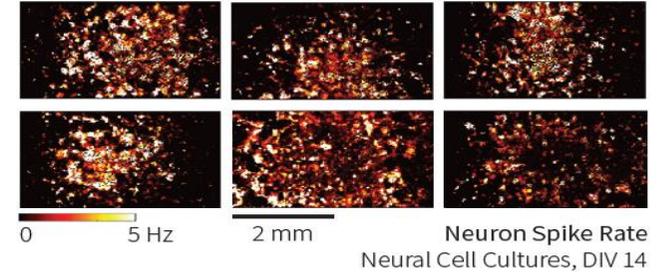
MAXTWO (MULTI-WELL)



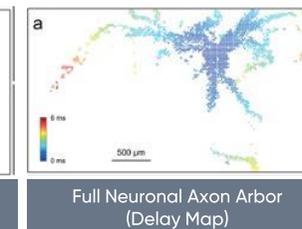
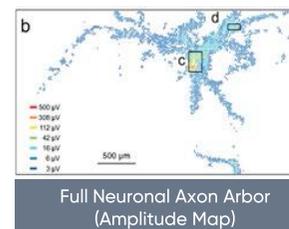
MOST POWERFUL ELECTROPHYSIOLOGY PLATFORM FOR RECORDING AND STIMULATING ELECTROGENIC CELLS IN-VITRO
26,400 MICROELECTRODES RECORD AND ANALYZE ACTION POTENTIAL FROM SINGLE CELL TO WHOLE NETWORK

- High resolution analysis with 26,400 microelectrodes
- Cell/Network mapping without chemical treatment
- Analyze various cell types including neurons, cardiac muscle cells, brain slices, etc.
- Analyze from sub-cellular level to whole network
- 32 electric stimulation units for cell reaction analysis
- Analyze cell reaction to chemical compounds and drugs
- MaxOne : Single Well
- MaxTwo : Minimum 6 Well, Maximum 24 Well

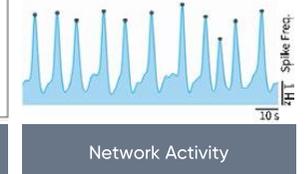
WHOLE SAMPLE ELECTRICAL IMAGING



AXON TRACKING



CONNECTIVITY AND SYNCHRONICITY EXTRACTION



Market Expansion Plan

01 Domestic marketing strategy (S. Korea)

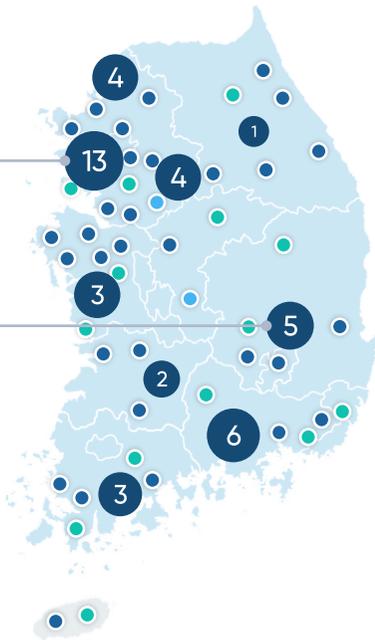
Prioritized sales

Enter the Korean market through prioritized sales to joint research and advisory organizations, gradually expanding business to general/public hospitals

SNUH SEOUL NATIONAL UNIVERSITY HOSPITAL
 THE CATHOLIC UNIVERSITY OF KOREA
 SEOUL ST. MARY'S HOSPITAL

KNUH KYUNGPOOK NATIONAL UNIVERSITY HOSPITAL **DGIST**
IMSYSTEM **DCMC**

- Regional Cardiocerebro Vascular Centers **14**
- General Hospitals **41**
- Public Hospitals **42**
 (20+ new hospitals planned by 2025)



02 Global Marketing Strategy

Establishment of a joint research network

Establish a global research network to host online demonstrations and product showcases for international market entry



EUROPE
 Enter the European market through cooperative research network

Target Hospitals
 UNIVERSITÄT GIESSEN
 HEIDELBERG
Erasmus MC
 ASSISTANCE PUBLIQUE HÔPITAUX DE PARIS

U.S.A
 Utilize joint research network and enter major hospitals in the USA

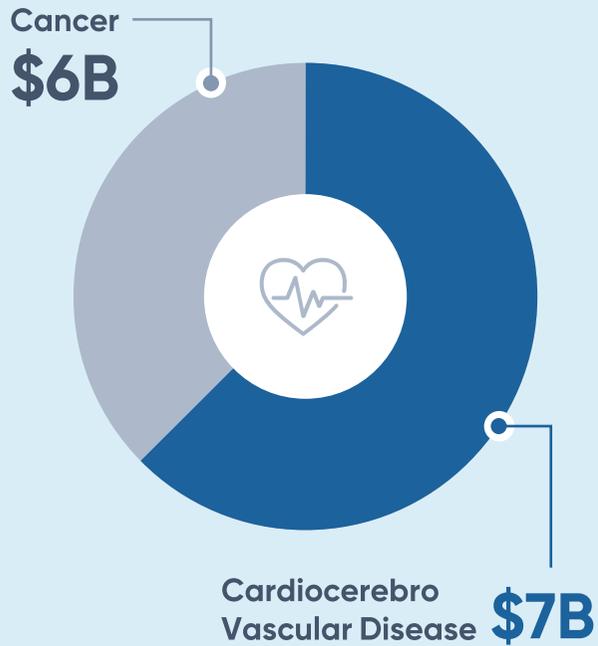
Target Hospitals
 EMORY UNIVERSITY HOSPITAL
 MAYO CLINIC
 JHS HOPKINS

Target Applications

Vascular Disease	Degenerative Arthritis	Brain Disease	Eye Disease	Stem Cell/Drug Delivery
<p>Cardio Cerebro Peripheral</p>				

Market Status

Korea Market for Cardiocerebro Vascular Disease



Korea Disease Control and Prevention Agency, 2017

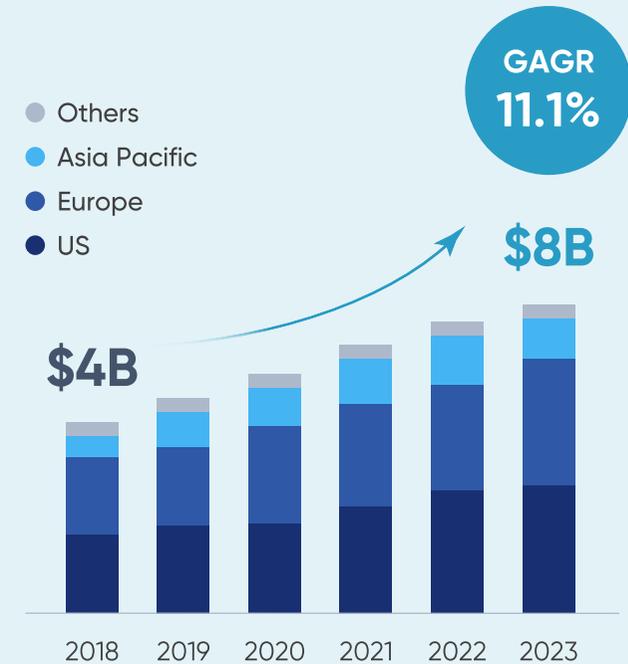
Global Market for Precision Medical Device



Approx.
\$100B(2025)

Forecasts for Precision Medicine Market, Global Market Insights

Global Market for Micro/Nanorobot Medical System



Markets & Markets (2019)

Key Personnel

CEO | Dr. Jin-young Kim



- Ph.D, Department of Bioengineering, Imperial College London, UK
- Post-doc. Department of Biosystems Science and Engineering ETH, ETH Zurich, Switzerland
- 10+ years of research experience in medical microrobot systems
- 6 published papers on microrobots for drug/cell delivery for the past 3 years
- 37+ domestic/international patents filed/registered
- 19 SCI(E) international papers published in the past 5 years

Senior Researcher | Dr. Eunhee Kim



- Ph.D., Department of Robotics Engineering, DGIST, Republic of Korea
- Team Leader for Medical Microrobots and Electrophysiology Platforms at IMsystem R&D Center
- 7 research papers published in international journals including Science Advances
- 9 patents filed/registered
- 2017 DGIST Outstanding Researcher Award Recipient

Technical Advisor | Prof. Hongsoo Choi at DGIST



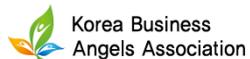
- Ph.D, Department of Mechanical Engineering, Washington State University, USA
- Professor, Department Head of Robotics and Mechatronics Engineering, DGIST, Korea since 2010
- Global leader in biomedical micro/nanorobot system
- 75+ published papers and over 2400 citation (Google Scholar)
- 7+ award winnings including
 - Prime Minister's Commendation, 2020
 - National Intellectual Property Award (Co-chairman's award), 2019
 - Prize of The State of Geneva, 2019
 - Special Award by Taiwan Invention Association, 2019

Senior Researcher | Dr. Sungwoong Jeon



- Ph.D., Department of Robotics Engineering, DGIST, Republic of Korea
- Team Leader for Medical Microrobots and Magnetic Field Control Systems at IMsystem R&D Center
- 15 research papers published in international journals including Science Robotics and Soft Robotics
- 9 patents filed/registered
- 2019 DGIST Best Student Award Recipient
- 2018 DGIST Outstanding Researcher Award Recipient

Cooperative / Advisory Organizations



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