2026 INTERNATIONAL SYMPOSIUM on ONE HEALTH ANTIMICROBIAL RESISTANCE

Nov 19 (Thu) – **Nov 20** (Fri), 2026

VOCO Seoul Myeongdong



Korea Disease Control and Prevention Agency
National Institute of Health

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ONE HEALTH

ANTIMICROBIAL RESISTANCE

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Korea Disease Control and Prevention Agency

National Institute of Health

Program

DAY 1

11. 19.(Thu)

09:30 - 10:00	Registration	
10:00 - 10:30	Opening Remarks Congratulatory Address	(Director General, NIID) **Keun Hwa Lee** (Commissioner, KDCA) **Seung-Kwan Lim**
Session 1	**New Frontiers in One Health AMR Surveillance and Transmission Epidemiology**	(Director General, NIID) Chair : **Keun Hwa Lee**
10:30 - 11:00	**[Keynote]** One Health AMR Surveillance Based on Tricycle Protocol in Madagascar	(Professor, Université Paris Cité) **Laurence Armand-Lefèvre**
11:00 - 11:25	One Health AMR Surveillance in Korea: Lessons Learned and Future Directions	(Professor, Yonsei University) **Dokyun Kim**
11:25 - 11:50	Development of an Integrated Antibiotic Resistance Gene Database in Korea: A Local Community-Based One Health Approach	(Professor, Chung-Ang University) **Woo Jun Sul**
11:50 - 12:15	Genomic Epidemiology of Carbapenemase-Producing Enterobacterales: Transmission Dynamics and Infection Prevention and Control in Healthcare Settings	(Professor, The Catholic University of Korea) **Sun Hee Park**
12:15 - 12:30	Q&A	
12:30 - 13:30	Lunch	
Session 2	**AMR in an Aging Society: Emerging Threats and Precision Responses**	(Professor, The Catholic University of Korea) Chair : **Dong-Gun Lee**
13:30 - 14:00	**[Keynote]** The Changing Epidemiology of Antimicrobial-Resistant Infections in a Super-Aged Society	(Professor, Fujita Health Univ. / Univ. of Pittsburgh) **Yohei Doi**
14:00 - 14:25	The Emerging Threat of Antifungal Resistance in Immunocompromised Patients: Beyond Antibacterial Resistance	(Professor, The Catholic University of Korea) **Sung-Yeon Cho**
14:25 - 14:50	Overcoming Antimicrobial Resistance with Digital Health and Artificial Intelligence: An Integrated Approach to Antimicrobial Stewardship and Infection Prevention	(Professor, Hanyang University) **Se Yoon Park**
14:50 - 15:15	Bloodstream Infection in an Aging Society: Shifting Epidemiology and Data-Driven Risk Prediction	(Professor, Yonsei University) **Min Hyuk Choi**
15:15 - 15:30	Q&A	
15:30 - 15:50	Coffee Break	
Session 3	**Next-Generation Innovations in AMR Diagnostics and Therapeutics**	(Director General, KNIH) Chair : **Hee Youl Chai**
15:50 - 16:15	Recent Advance for the Identification of Bacteria with Raman Scattering and AI Algorithms	(Professor, Korea Univ. KU-KIST Graduate School) **Dong-Kwon Lim**
16:15 - 16:40	Engineering Programmable Living Therapeutics through Synthetic Biology and Biofoundry Technologies	(Center Director, KRIBB) **Daehee Lee**
16:40 - 17:05	L++-Based Virtual Cell Modeling Platform for Antimicrobial Therapy Development	(Dr., Omphalos Lifescience) **Chang-Hyun C. Lee**
17:05 - 17:30	Bacteriophage Engineering: Recent Advances in Development and Applications	(CEO, Accurie Bio) **Sooan Shin**
17:30 - 17:50	Q&A	
17:50 - 18:00	Closing Remarks	(Director General, KNIH) **Hee Youl Chai**
18:00 - 20:00	Reception	

Program

DAY 2

11. 20.(Fri)

09:00 - 09:20	Registration	
09:20 - 09:30	Opening Remarks	(Director General, NIID) **Keun Hwa Lee**
Session 4	**Personalized Phage Therapy**	(Professor, Seoul National University Bundang Hospital) Chair : **Hong Bin Kim**
09:30 - 10:00	**[Keynote]** Personalized Bacteriophage Therapy: From International Consensus Guidelines to Clinical Practice	(Dr., University Medicine Frankfurt) **Simone C. Lieberknecht-Jouy**
10:00 - 10:20	The Burden of MDRO Infections in Korea: The Need for New Treatment Strategies	(Professor, Seoul National University Bundang Hospital) **Kyoung-Ho Song**
10:20 - 10:35	Strategy and Roadmap for the Clinical Application of Personalized Bacteriophage Therapy in Korea	(Professor, Korean Society for Chemotherapy) **Shinwon Lee**
10:35 - 10:50	Therapeutic Bacteriophages from Discovery to Clinical Application: Technical Challenges and Future Directions	(Professor, Kyungpook National University) **Jungmin Kim**
10:50 - 11:00	Coffee Break & Stage Reset	
11:00 - 11:50	Panel Discussion: Personalized Phage Therapy	(Professor, Korean Society for Chemotherapy) **Shinwon Lee** (Professor, Kyungpook National University) **Jungmin Kim** (Professor, Seoul National University Bundang Hospital) **Kyoung-Ho Song** (Professor, Kyungpook National University Chilgok Hospital) **Ki Tae Kwon** (Professor, Kyungpook National University) **Eun Kyung Choi**
11:50 - 13:00	Lunch	
Session 5	**Accelerating Next-Generation Antimicrobial Development**	(Professor, The Catholic University of Korea) Chair : **Sungpil Han**
13:00 - 13:25	Early Prediction of Antimicrobial Efficacy for Difficult-to-treat Infections Caused by Multidrug Resistant Organisms: In Vitro to Clinical Translational Approach	(Professor, Kyung Hee University) **Eun Kyoung Chung**
13:25 - 13:50	Challenges and Strategies in the Development of Antibiotics Using Small Molecules	(COO, Peptoid) **Hyunjung Go**
13:50 - 14:15	Challenges in Developing Bacteriophage Therapy as a Drug Product	(Professor, Yonsei University) **Dongwoo Chae**
14:15 - 14:30	Coffee Break & Stage Reset	
14:30 - 15:00	Building a Multidisciplinary Support Network	(CEO, AIMS BioScience) **Seunghoon Han**
15:00 - 15:40	Panel Discussion: Antimicrobial Development Strategies Responding to Domestic Demand	(CEO, AIMS BioScience) **Seunghoon Han** (COO, Peptoid) **Hyunjung Go** (Professor, Yonsei University) **Dongwoo Chae** (Professor, Kyung Hee University) **Eun Kyoung Chung** (CEO, A&J Science) **Hee-Jong Hwang** (Team Leader, LigaChem Bioscience) **Jae-Ho Lee**
15:40 - 16:00	Open Q&A	**All Participants**
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SESSION I

New Frontiers in One Health AMR Surveillance and Transmission Epidemiology

원헬스 항생제 내성 실태조사와 전파 역학의 새로운 지평

Chair Keun Hwa Lee (Director General, NIID)
좌장 이근화 소장 (국립감염병연구소)

I -1 **[Keynote]** One Health AMR Surveillance Based on Tricycle Protocol in Madagascar
마다가스카르의 Tricycle protocol 기반 One Health AMR 감시
Laurence Armand-Lefèvre

I -2 One Health AMR Surveillance in Korea: Lessons Learned and Future Directions
원헬스 항생제 내성 감시체계 구축 경험과 과제
Dokyun Kim

I -3 Development of an Integrated Antibiotic Resistance Gene Database in Korea: A Local Community-Based One Health Approach
국내 지역사회 기반 원헬스 접근법을 통한 통합 항생제 내성 유전자 데이터베이스 구축
Woo Jun Sul

I -4 Genomic Epidemiology of Carbapenemase-Producing Enterobacterales: Transmission Dynamics and Infection Prevention and Control in Healthcare Settings
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Sun Hee Park

Curriculum Vitae



Name	**Keun Hwa Lee**
Institution	NIID
Position	Director General

▶ Biography

Education

2003.08	Ph.D. in Microbiology and Immunology Seoul National University College of Medicine, Seoul, Republic of Korea
1999.08	M.S. in Microbiology Kyungpook National University College of Natural Science, Daegu, Republic of Korea
1994.02	B.A. in Microbiology Kyungpook National University College of Natural Sciences, Daegu, Republic of Korea

Career

2026.10 - Present	Director General National institute of Infectious Diseases(NIID)
2020.03 – 2026.10	Professor | Department of Microbiology Hanyang University College of Medicine, Seoul, Republic of Korea
2004.03 – 2020.02	Professor | Department of Microbiology Jeju National University College of Medicine, Jeju, Republic of Korea
2015.01 – 2015.07	Visiting Scientist | US Army Component-Armed Forces Research Institute of Medical Sciences(AFRIMS), Bangkok, Thailand
2014.02 – 2014.12	Surveillance and International Health Regulation(IHR) duty officer | The Emerging Diseases Surveillance and Response(ESR) World Health Organization, Regional Office for the Western Pacific(WPRO), Manila, Philippines
2013.02 - 2013.03	Completed Applied Communicable Diseases Control, The London School of Hygiene & Tropical Medicine(LSHTM), UOL, London, UK
2012.02 - 2012.02	Completed the WRAIR Tropical Medicine Course, Walter Reed Army Institute of Research(WRAIR), Washington D.C. USA

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SESSION I-1

KEYNOTE

One Health AMR Surveillance Based on Tricycle Protocol in Madagascar

마다가스카르의 Tricycle protocol 기반 One Health AMR 감시

Laurence Armand-Lefèvre

(Professor, Université Paris Cité)



Curriculum Vitae



Name **Laurence Armand-Lefèvre**
Institution Paris Cité University
Department Microbiology
Position Professor

▶ Biography

Education

2017	Habilitation to conduct research (HDR) - Paris Diderot University
2012	Hospital management graduation (EMAMH School)
2009	PhD in Microbiology - Paris Sud University

Career

2019 - today	Professor of Microbiology, IAME Unit, UMR 1137, Paris Cité University (Paris)
2017 - today	Head of Bacteriology laboratory, Bichat-Claude Bernard University hospital (Paris)
2016 - 2017	Postdoctoral fellow at Pasteur Institute, Pole Biomics, Dr Sean Kennedy
2015 - 2016	Deputy Head of Bacteriology laboratory
2003 - 2014	Bacteriologist practitioner
1999 - 2003	Assistant Professor in Bacteriology
1993 - 1998	Internship in Clinical Biology, speciality Bacteriology, AP-HP, France

Academic Specialty

.Member of the WHO Quadripartite Technical Group on Integrated Surveillance (QTG-AIS)
.Expert activity for HAS (French Haute Autorité de Santé), French society of ICU, ECDC…
.Reference laboratory (LBMR) for characterization and comparison of bacterial genomes for hospital outbreak management
.Research performed at the IAME (Infection, Antimicrobiens, Modélisation, Evolution) Unit (Pr .France Mentré, director) EVRest Team INSERM UMR 1137, Paris Cité University https://www.iame-research.center/

.Research interest: Emergence of antibiotic resistance in the human microbiota. Epidemiology and dissemination routes of multidrug-resistant enterobacteria (MDR-E) and their mobile genetic elements in humans (hospital and community) and in a One Health approach.

One Health AMR Surveillance Based on Tricycle Protocol in Madagascar

Laurence Armand-Lefèvre

Paris Cité University

Abstract

Antimicrobial resistance is a major global public health threat, and extended-spectrum beta-lactamase (ESBL)-producing *Escherichia coli* are the most widely disseminated multidrug-resistant bacteria worldwide. Their surveillance now requires a One Health approach encompassing the human, animal and environmental sectors. A review we recently conducted on the One Health circulation of ESBL-*E. coli* showed that most large-scale studies came from high-income countries, where circulation appears compartmentalized between sectors, and that data from low- and middle-income countries were scarce (Miltgen et al., 2026). We also highlighted substantial methodological heterogeneity, making comparisons between studies difficult. The WHO Tricycle protocol addresses this gap through a single indicator, the prevalence of ESBL-*E. coli* in humans, animals and the environment, measured with a standardized protocol at the scale of a single city. Implementing Tricycle in Madagascar, we found high prevalence in every sector: 39% of *E. coli* bloodstream infections, 30% of pregnant women, 57% of chickens and 100% of environmental samples. All isolates were sequenced by short- and long-read technologies. ESBLs were exclusively CTX-M, mostly CTX-M-15, and *E. coli* isolates were highly diverse (n=277, 90 different sequence types). Despite this diversity, we found significant intra- and intersectoral circulation of genetically related isolates and plasmids, including a highly conserved IncY plasmid (Milenkov et al., 2024). This contrasts with the compartmentalization reported in high-income countries and points to water as a possible link between humans and animals.

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SESSION I-2

One Health AMR Surveillance in Korea: Lessons Learned and Future Directions

원헬스 항생제 내성 감시체계 구축 경험과 과제

Dokyun Kim

(Professor, Yonsei University)



Curriculum Vitae



Name **Dokyun Kim**
Institution Yonsei University College of Medicine
Gangnam Severance Hospital
Department Department of Laboratory Medicine
Position Associate Professor

▶ Biography

Education

2014–2018	Ph.D., Department of Laboratory Medicine, Yonsei University College of Medicine, Seoul, Korea
2005–2008	M.D., Yonsei University College of Medicine, Seoul, Korea

Career

2026–present	Associate Professor, Department of Laboratory Medicine, Yonsei University College of Medicine, Seoul, Korea
2026–present	Director, Office of Infection Control, Gangnam Severance Hospital, Seoul, Korea
2024–2025	Assistant Professor, Department of Laboratory Medicine, Yonsei University College of Medicine, Seoul, Korea
2021–2023	Clinical Assistant Professor, Department of Laboratory Medicine, Yonsei University College of Medicine, Seoul, Korea

Academic Specialty

Clinical microbiology; antimicrobial resistance (AMR) surveillance (Kor-GLASS, One Health AMR cohort); molecular epidemiology and genomics of multidrug-resistant bacteria; hospital infection control

One Health AMR Surveillance in Korea: Lessons Learned and Future Directions

Dokyun Kim

Yonsei University College of Medicine, Seoul, Korea

Abstract

Antimicrobial resistance (AMR) moves across humans, animals and the environment, yet surveillance in Korea has largely been organized by sector. Since 2021, the Korea National Institute of Health has supported a community-based One Health AMR surveillance programme that links sampling, isolation and whole-genome sequencing (WGS) across sectors in two regional cohorts. Cohort A (2021–2024), in a rural–urban complex city, connected clinical isolates from local hospitals and clinics with pig and chicken farms, farm workers and wastewater treatment plants in the same watershed. Cohort B (2025–), an urban cohort in Busan, extended the design to long-term care hospitals, companion animals (healthy dogs visiting a pet park and dogs and cats attending veterinary hospitals), their owners and household members, pet-care facilities and urban wastewater. A harmonized protocol with selective enrichment in cefotaxime or meropenem raised the recovery of third-generation cephalosporin-resistant Enterobacterales from animal sources, which had been too low for cross-sector comparison in the first phase.

In Cohort A, WGS of 1,069 cefotaxime-resistant *Escherichia coli* (794 human, 160 pig, 115 chicken) showed that clones were largely sector-specific: of 117 sequence types (STs), 97 were confined to a single sector, ST131 dominated human isolates and ST410 pig isolates, and CTX-M-15/-27 predominated in humans versus CTX-M-55 in animals. Plasmids, in contrast, crossed sectors: 7 of 38 *bla*CTX-M plasmid clusters were shared by two or more sectors, including IncI1 *bla*CTX-M-55 and IncK2/Z *bla*CMY-2 plasmids with >99.5% identical backbones in human, pig and chicken isolates. In Cohort B, WGS of 451 *E. coli* from dogs, cats, humans and the environment revealed identical clones (≤10 cgMLST alleles) between dogs and cats within veterinary hospitals but none between animals and humans; instead, a 45-kb IncX3 plasmid carried *bla*NDM-5 across five animal STs, and the same backbone carried *bla*KPC-2 in human isolates.

These findings indicate that cross-sector AMR transmission in Korean communities is driven mainly by mobile genetic elements rather than clonal spread, so One Health surveillance should be genome-based and plasmid-centred. Lessons learned include the value of linked human–animal–environment sampling within a defined community, harmonized isolation protocols that make sectors comparable, and sustained longitudinal cohorts. Future directions include integrating metagenomics, assessing plasmid mobility and fitness cost experimentally, building reference panels of epidemiologically linked isolates, and translating cohort evidence into a national integrated AMR surveillance system.

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SESSION I-3

Development of an Integrated Antibiotic Resistance Gene Database in Korea: A Local Community-Based One Health Approach

국내 지역사회 기반 원헬스 접근법을 통한 통합 항생제 내성 유전자 데이터베이스 구축

Woo Jun Sul

(Professor, Chung-Ang University)



Curriculum Vitae



Name **Woo Jun Sul**
Institution Chung-Ang University
Department Systems Biotechnology
Position Professor

▶ Biography

Education

1994-2001	B.S. Yonsei University, major in Biology
2001-2003	M.S. Yonsei University, major in Biology (Environmental microbiology)
2005-2009	Ph.D. Michigan State University [Major in Crop and Soil Science Environmental Toxicology (Interdisciplinary degree)] Advisor: James M. Tiedje

Career

2013–Present	Professor, Department of Systems Biotechnology, Chung-Ang University

Development of an Integrated Antibiotic Resistance Gene Database in Korea: A Local Community-Based One Health Approach

Woo Jun Sul

Department of Systems Biotechnology, College of Biotechnology & Natural Resources, Chung-Ang University

Abstract

Understanding antibiotic resistance within local communities requires integrated information on antibiotic resistance genes (ARGs) and plasmids across human, animal, and environmental sources. In this study, metagenomic screening was undertaken to develop an integrated ARG database in Korea within a local community-based One Health framework.

A total of 1,064 samples were collected from a local community in Korea, including human, swine, and poultry fecal samples, as well as various environmental samples. The ARG screening process was integrated with AMRFinder analysis, with annotation against the Comprehensive Antibiotic Resistance Database (CARD). The ARGs detected were then subjected to classification according to gene identity and antibiotic resistance class. The MOB-suite was used to identify putative plasmid sequences from assembled sequence data. These analyses generated sample-level ARG detection records and plasmid predictions for integration into the database.

The screening results are then organized into linked sample and sequence records. It is evident that ARG records encompass gene annotations, resistance classes, and supporting sequence identifiers. In contrast, plasmid records comprise sequence identifiers and MOB-suite prediction results. The integrated records facilitate the comparison of ARG detection frequencies and resistance profiles among human, swine, poultry, and environmental sources. Furthermore, they provide a foundation for the examination of ARG-plasmid associations, where supported by sequence context.

The database under consideration combines ARG annotations, plasmid predictions, and sampling metadata. This combination of elements provides a resource for characterizing resistance across the sampled community and supporting local One Health surveillance.

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SESSION I-4

Genomic Epidemiology of Carbapenemase-Producing Enterobacterales: Transmission Dynamics and Infection Prevention and Control in Healthcare Settings

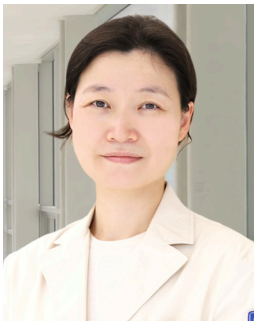
유전체 역학을 활용한 의료기관 내 카바페넴분해효소 생성 장내세균목의 전파 분석과 감염관리

Sun Hee Park

(Professor, The Catholic University of Korea)



Curriculum Vitae



Name **Sun Hee Park**
Institution The Catholic University of Korea, College of Medicine
Department Division of Infectious Diseases
Position Professor

▶ Biography

Education

MPH (May 2013)	Johns Hopkins Bloomberg School of Public Health
Ph.D. in Medical Science	The Catholic University of Korea, Graduate School, Seoul, Korea
M.D.	The Catholic University of Korea, College of Medicine, Seoul, Korea

Career

2019-present	Professor in the Division of Infectious Diseases, the Catholic University of Korea, College of Medicine
2013-2018	Associate professor in the Division of Infectious Diseases, the Catholic University of Korea, College of Medicine
2023-present	Chief attending physician in the Division of Infectious Diseases, the Catholic University of Korea, Eunpyeong St. Mary's Hospital
2024-present	Chief of the infection prevention and control department, the Catholic University of Korea, Eunpyeong St. Mary's Hospital
2007-2022	Chief attending physician in the Division of Infectious Diseases, the Catholic University of Korea, Daejeon St. Mary's Hospital
2007-2022	Chief of the infection prevention and control department, the Catholic University of Korea, Daejeon St. Mary's Hospital

Academic Specialty

Infectious diseases, hospital epidemiology, infection prevention and control

Genomic Epidemiology of Carbapenemase-Producing Enterobacterales: Transmission Dynamics and Infection Prevention and Control in Healthcare Settings

Sun Hee Park

The Catholic University of Korea, College of Medicine

Abstract

Carbapenemase-producing Enterobacterales (CPE) pose a major challenge to infection prevention and control due to their complex transmission dynamics involving clonal expansion, horizontal transfer of carbapenemase-carrying plasmids, and environmental persistence. Whole-genome sequencing (WGS) enables high-resolution investigation of these pathways by resolving clonal relationships and tracking plasmid dissemination across bacterial lineages and species. Integrating short- and long-read sequencing further enables complete plasmid reconstruction, providing insights into plasmid transmission, evolution, and persistence.

In South Korea, WGS of carbapenem-resistant Klebsiella pneumoniae bloodstream isolates identified sequence type 307 (ST307) as the predominant lineage, underscoring the role of successful clones in regional dissemination. A recent nationwide study in Singapore revealed substantial plasmid diversity, yet a small number of highly successful plasmid lineages, notably KPC-2- and NDM-1-associated clusters, accounted for much of the carbapenemase spread.

Within healthcare institutions, these mechanisms interact with patients, bacterial hosts, mobile genetic elements, and environmental reservoirs. Hospital sinks, drains, and wastewater systems may support prolonged bacterial persistence and create opportunities for horizontal gene transfer. Recent hospital-based genomic investigations in a Korea hospital demonstrated the coexistence of distinct transmission pathways. Highly conserved IncX3 plasmids carrying blaNDM-1 were detected across multiple Enterobacterales species in clinical and environmental isolates, alongside persistent sink contamination with NDM-1-producing Enterobacter asburiae. This suggests horizontal plasmid dissemination involving patient-associated and environmental bacterial populations. KPC-2-producing K. pneumoniae ST307 spread predominantly through clonal expansion. However, an IncX3 plasmid carrying blaKPC-2 was also shared between K. pneumoniae and Escherichia coli. This plasmid was identical to pKPC_Kp01, previously reported in other Korean hospitals. Therefore, plasmid-mediated spread may also contribute to blaKPC-2 dissemination alongside clonal expansion of ST307.

Integrating bacterial and plasmid genomics with clinical, temporal, spatial, and environmental epidemiological data is essential for resolving these interconnected pathways. Expanding genomic surveillance beyond bacterial clones to resistance plasmids and environmental reservoirs, including the hospital–wastewater interface, may enable more precise identification of transmission networks and support targeted infection prevention at institutional, interinstitutional, and One Health levels.

2026 INTERNATIONAL SYMPOSIUM on

ONE HEALTH ANTIMICROBIAL RESISTANCE

SESSION II

AMR in an Aging Society: Emerging Threats and Precision Responses

고령사회 항생제 내성의 새로운 위협과 정밀 대응 전략

Chair Dong-Gun Lee (Professor, The Catholic University of Korea)
좌장 이동건 교수 (가톨릭대학교)

II -1 **[Keynote]** The Changing Epidemiology of Antimicrobial-Resistant Infections in a Super-Aged Society
초고령 사회에서 변화하는 항생제 내성 감염의 역학
Yohei Doi

II -2 The Emerging Threat of Antifungal Resistance in Immunocompromised Patients: Beyond Antibacterial Resistance
면역저하 환자에서 증가하는 항진균제 내성: 항생제 내성을 넘어
Sung-Yeon Cho

II -3 Overcoming Antimicrobial Resistance with Digital Health and Artificial Intelligence: An Integrated Approach to Antimicrobial Stewardship and Infection Prevention
항생제 내성 극복을 위한 디지털 헬스케어와 AI
Se Yoon Park

II -4 Bloodstream Infection in an Aging Society: Shifting Epidemiology and Data-Driven Risk Prediction
변화하는 항생제 내성 위협과 새로운 대응 전략
Min Hyuk Choi

Curriculum Vitae



Name **Dong-Gun Lee**
Institution The Catholic University of Korea
Department College of Medicine
Position Professor

▶ Biography

Education

1987-1993	MD, College of Medicine, the Catholic University of Korea
1997-1999	MS, College of Medicine, the Catholic University of Korea
1999-2002	PhD, College of Medicine, the Catholic University of Korea

Career

2002-PRESENT	Professor, Department of Infectious Diseases, College of Medicine, the Catholic University of Korea
2006-2008	Visiting Scientist, University of Wisconsin, Madison, WI, USA
2013-2024	Editor-in-chief, Infection & Chemotherapy
2023-2025	Chief Director, the Korean Society of Infectious Diseases
2025-PRESENT	Dean, College of Medicine, the Catholic University of Korea

Academic Specialty

Infectious Diseases

2026 INTERNATIONAL SYMPOSIUM on

ONE HEALTH ANTIMICROBIAL RESISTANCE

SESSION II-1

KEYNOTE

The Changing Epidemiology of Antimicrobial-Resistant Infections in a Super-Aged Society

초고령 사회에서 변화하는 항생제 내성 감염의 역학

Yohei Doi

(Professor, Fujita Health Univ. / Univ. of Pittsburgh)



Curriculum Vitae



Name **Yohei Doi**
Institution Fujita Health University/University of Pittsburgh
Department Microbiology and Infectious Diseases
Position Professor

▶ Biography

Education

2004	PhD, Nagoya University Graduate School of Medicine, Japan
1998	MD, Nagoya University School of Medicine, Japan

Career

2021–Present	Professor of Medicine, Division of Infectious Diseases, University of Pittsburgh School of Medicine, USA
2018–Present	Professor, Department of Infectious Diseases, Fujita Health University School of Medicine, Japan
2017–Present	Professor, Department of Microbiology, Fujita Health University School of Medicine, Japan
2016–2021	Associate Professor of Medicine, Division of Infectious Diseases, University of Pittsburgh School of Medicine, USA
2008–2016	Assistant Professor of Medicine, Division of Infectious Diseases, University of Pittsburgh School of Medicine, USA
2005–2008	Clinical Fellow in Infectious Diseases, University of Pittsburgh Medical Center, USA
2003–2005	Resident in Internal Medicine, St. Luke's–Roosevelt Hospital Center, New York, USA
2000–2003	Researcher, Department of Bacteriology II, National Institute of Infectious Diseases, Japan
1998–2000	Resident in Internal Medicine, Anjo Kosei Hospital, Japan

Academic Specialty

Infectious Diseases, Clinical Microbiology, and Antimicrobial Resistance, with particular expertise in:
Molecular mechanisms and epidemiology of antimicrobial resistance in Gram-negative bacterial pathogens
Carbapenem-resistant Enterobacterales and other multidrug-resistant Gram-negative bacteria
Development of rapid diagnostics for antimicrobial resistance
Antimicrobial drug discovery and resistance-reversing strategies
Clinical trials and optimization of antimicrobial therapy for multidrug-resistant bacterial infections

The Changing Epidemiology of Antimicrobial-Resistant Infections in a Super-Aged Society

Yohei Doi

Fujita Health University

Abstract

Population ageing is quietly redrawing the map of antimicrobial resistance (AMR). Over the past three decades, AMR deaths in children have fallen while those in adults aged 70 and older have risen sharply. By 2050, older adults are expected to account for most AMR deaths worldwide. Japan, where nearly 30% of people are aged 65 or older, and Korea, which became a super-aged society in 2024, offer an early view of a future most countries will reach within a generation.

Ageing changes who acquires resistant infections, where, and with what consequences. Older adults carry multiple comorbidities, devices, and repeated antibiotic exposure. They move between home, acute hospitals and long-term care facilities, which now act as reservoirs for carbapenem-resistant organisms. Infections present atypically, dosing is complicated by frailty and declining renal function, and goals of care shape treatment choices. Outcomes extend beyond survival to function and whether patients return home.

This lecture contrasts the epidemiology of resistant infections in Japan and Korea. The two countries share similar demographics but have different resistance mechanisms. The lecture also considers how carbapenem-sparing strategies, cross-setting surveillance, trials designed for the oldest patients, and One Health prevention can meet the needs of super-aged societies.

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ANTIMICROBIAL RESISTANCE

SESSION II-2

The Emerging Threat of Antifungal Resistance in Immunocompromised Patients: Beyond Antibacterial Resistance

면역저하 환자에서 증가하는 항진균제 내성: 항생제 내성을 넘어

Sung-Yeon Cho

(Professor, The Catholic University of Korea)



Curriculum Vitae



Name **Sung-Yeon Cho**
Institution The Catholic University of Korea, Seoul St. Mary's Hospital
Department Department of Internal Medicine, Division of Infectious Diseases
Position Associate Professor

▶ Biography

Education

2007	M.D. degree from The Catholic University, College of Medicine, Seoul, Korea
2016	Master degree from The Catholic University, College of Medicine, Seoul, Korea
2019	Ph.D. degree from The Catholic University, College of Medicine, Seoul, Korea

Career

2007	Internship, Catholic Medical Center
2008-2011	Residency of Internal Medicine, Catholic Medical Center
2012	Fellowship, Infectious diseases, Seoul St. Mary's Hospital, Seoul, Korea
2013-2014	Fellowship, Infectious diseases, Yeouido St. Mary's Hospital, Seoul, Korea
2015	Researcher, Vaccine Bio Research Institute
2016-2020	Clinincal Assistant Professor, Division of Infectious Diseases, Department of Internal edicine, College of Medicine, The Catholic University of Korea
2021-2024	Assistant Professor, Division of Infectious Diseases, Department of Internal edicine, College of Medicine, The Catholic University of Korea
2023-2024	Visiting Scientist, University of Texas, MD Anderson Cancer Center, Department of Infectious Diseases, Infection Control & Employee Health
2025-	Associate Professor, Division of Infectious Diseases, Department of Internal edicine, College of Medicine, The Catholic University of Korea, Seoul, Korea

Academic Specialty

Medical Specialty
: Infectious complications in hematologic malignancy patients
: Invasive fungal infections
: Prevention of Infection in immunocompromised host (prophylaxis, vaccination)
: Post-transplantation infectious complications (cytomegalovirus, BKV)

Personal Statement

Sung-Yeon Cho is an associate professor of Division of Infectious Diseases, College of medicine, the Catholic University of Korea in Seoul, Korea. She has majored in the field of infectious diseases since 2012, and focus on infectious complications in immunocompromised patients and invasive fungal infections.

Her medical specialty and research interests include the diagnosis and management of infectious complications in patients with hematological malignancy, invasive fungal infections, post-transplantation infectious complications, and prevention of infectious diseases such as antibacterial, antiviral, or antifungal prophylaxis and post-transplantation vaccination.

Her research works have been published in various scientific journals. She is also actively involved in clinical trials of management and prevention of invasive fungal and viral infections.

The Emerging Threat of Antifungal Resistance in Immunocompromised Patients: Beyond Antibacterial Resistance

Sung-Yeon Cho

The Catholic University of Korea, Seoul St. Mary's Hospital

Abstract

Antimicrobial resistance has traditionally been discussed in the context of bacterial pathogens, yet invasive fungal infections (IFIs) represent a parallel and often underrecognized threat, particularly in immunocompromised patients. Advances in chemotherapy, hematopoietic stem cell and solid organ transplantation, and immunomodulatory therapies have expanded the population at risk for IFIs. Despite improvements in antifungal prophylaxis and treatment, these infections remain associated with substantial morbidity and mortality, while emerging antifungal resistance poses additional challenges to their management.

In 2022, the World Health Organization released its first Fungal Priority Pathogens List, identifying *Candida auris*, *Aspergillus fumigatus*, *Candida albicans*, and *Cryptococcus neoformans* as critical priority pathogens. The emergence and spread of azole-resistant *A. fumigatus*, multidrug-resistant *C. auris*, and resistant *Candida* species have raised growing concerns worldwide. Notably, azole resistance in *A. fumigatus* has exceeded 20% in certain settings, underscoring the substantial geographic variation in resistance prevalence. In Korea, Kor-GLASS surveillance has documented the burden of *Candida* bloodstream infections, while recent reports of fluconazole-resistant *C. parapsilosis* and nosocomial *C. auris* transmission highlight emerging resistance threats. However, systematic national surveillance of antifungal resistance, particularly among filamentous fungi, remains limited.

Antifungal resistance may emerge through selective pressures associated with clinical antifungal use as well as environmental exposure, including agricultural fungicides. These interconnected pathways highlight the importance of considering antifungal resistance within a broader One Health framework. In immunocompromised patients, resistant fungal infections pose particular challenges because of diagnostic difficulties, limited therapeutic options, and the risk of breakthrough infections during antifungal prophylaxis or treatment.

This lecture will review recent trends in antifungal resistance among immunocompromised patients, focusing on key resistant fungal pathogens and emerging therapeutic options, and will discuss why antifungal resistance should be addressed as part of the broader antimicrobial resistance and One Health agenda.

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ANTIMICROBIAL RESISTANCE

SESSION II-3

Overcoming Antimicrobial Resistance with Digital Health and Artificial Intelligence: An Integrated Approach to Antimicrobial Stewardship and Infection Prevention

항생제 내성 극복을 위한 디지털 헬스케어와 AI

Se Yoon Park
(Professor, Hanyang University)



Curriculum Vitae



Name	**Se Yoon Park**
Institution	Hanyang University Hospital, Hanyang University College of Medicine
Department	Division of Infectious Diseases, Department of Internal Medicine
Position	Associate Professor

▶ Biography

Education

Feb 2007	M.D., Soonchunhyang University College of Medicine
Feb 2011	M.S. in Internal Medicine, Graduate School, Soonchunhyang University
Aug 2019	Ph.D. in Internal Medicine, Graduate School, Soonchunhyang University

Career

Mar 2007 – Feb 2012	Intern and Resident, Soonchunhyang University Seoul Hospital
May 2015 – Feb 2018	Fellow, Division of Infectious Diseases, Asan Medical Center and Soonchunhyang University Seoul Hospital
Mar 2018 – Feb 2022	Assistant Professor, Division of Infectious Diseases, Soonchunhyang University Seoul Hospital
Mar 2022 – Jun 2023	Clinical Assistant Professor, Department of Hospital Medicine, Yongin Severance Hospital
Jul 2023 – Feb 2025	Clinical Associate Professor, Division of Infectious Diseases, Hanyang University Hospital
Mar 2025 – Present	Associate Professor, Division of Infectious Diseases, Hanyang University Hospital
Awards	2020 Commendation from the Minister of Health and Welfare, Republic of Korea; 2021 SHEA International Ambassador; 2024 Young Investigator Award, Korean Society for Antimicrobial Therapy

Academic Specialty

Antimicrobial stewardship; Infection prevention and control; Digital health and artificial intelligence in infectious diseases; Clinical infectious diseases

Overcoming Antimicrobial Resistance with Digital Health and Artificial Intelligence: An Integrated Approach to Antimicrobial Stewardship and Infection Prevention

Se Yoon Park

Hanyang University Hospital, Republic of Korea

Abstract

Background. Antimicrobial resistance (AMR) is a leading threat to global health: bacterial AMR was directly responsible for an estimated 1.14 million deaths in 2021, and this number is projected to reach 1.91 million by 2050. Overcoming AMR requires two complementary strategies: antimicrobial stewardship (ASP), which reduces selective pressure by optimizing antimicrobial use, and infection prevention and control (IPC), which interrupts the transmission of resistant organisms. Both depend on timely and accurate data, yet most hospitals still rely on manual data collection and review.

Stewardship. Digital tools now support stewardship from surveillance to the prescribing decision. Automated systems linking claims and resistance data generate indication-specific prescribing data in minutes rather than days, and EHR-integrated clinical decision support has improved adherence to evidence-based management of *Staphylococcus aureus* bacteremia and reduced readmission. Artificial intelligence (AI) is moving these tools from information to recommendation: machine learning (ML) software selected empirical therapy more accurately than clinicians, and in a cluster-randomized trial, EHR-embedded prompts showing patient-specific multidrug-resistant organism (MDRO) risk reduced empirical extended-spectrum antibiotic use for pneumonia without harm.

Infection control. Healthcare-associated infection surveillance is moving toward fully automated, interoperable reporting. Large language models can now interpret narrative clinical notes, adjudicating central line-associated bloodstream infection and surgical site infection with high sensitivity while greatly reducing review time, although performance depends on complete input data and expert review remains essential. ML models can predict MDRO carriage at ICU admission, and statistical scanning of routine microbiology data detects clusters that warrant investigation. Our group is developing VisionGuard-IC, a smartphone video-based deep learning system that automatically assesses ICU bundle compliance.

Future direction. Real-world integration remains limited; only a minority of AI applications for IPC have been incorporated into existing digital infrastructure. We propose an integrated platform that combines hospital and national surveillance data, automates quantitative and qualitative assessment of antimicrobial use, returns feedback to prescribers within the clinical workflow, and links ASP, the clinical microbiology laboratory and IPC on a shared data layer. Overcoming AMR will require such integrated, interoperable and expert-supervised digital systems, designed according to WHO principles of clinical decision support and continuously evaluated for impact.

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SESSION II-4

Bloodstream Infection in an Aging Society: Shifting Epidemiology and Data-Driven Risk Prediction

변화하는 항생제 내성 위협과 새로운 대응 전략

Min Hyuk Choi

(Professor, Yonsei University)



Curriculum Vitae



Name **Min Hyuk Choi**
Institution Yonsei University College of Medicine
Department Department of Laboratory Medicine
Position Clinical Assistant Professor

▶ Biography

Education

2006-2013	Graduate, Yonsei University Wonju College of Medicine (M.D. degree)
2015-2023	Yonsei University College of Medicine (Ph.D. degree)

Career

2013-2018	Intern and Resident, Department of Laboratory Medicine at Severance hospital affiliated Yonsei University College of Medicine
2018-2021	Military service, Armed Forces Daegu Hospital
2021-2022	Clinical Fellow, Department of Laboratory Medicine at Gangnam Severance Hospital affiliated Yonsei University College of Medicine
2022-2023	Medical Professor, Department of Laboratory Medicine at Gangnam Severance Hospital affiliated Yonsei University College of Medicine
2024-present	Clinical Assistant Professor, Department of Laboratory Medicine at Gangnam Severance Hospital affiliated Yonsei University College of Medicine

Academic Specialty

Artificial intelligence, metagenome, clinical microbiology

Bloodstream Infection in an Aging Society: Shifting Epidemiology and Data-Driven Risk Prediction

Min Hyuk Choi

Yonsei University College of Medicine

Abstract

Bloodstream infection (BSI) is among the most lethal common infections, and its incidence rises steeply with age, most sharply in people aged 80 years or older. Korea, now a super-aged society, is aging faster than any other country. Aging changes not only how many infections reach hospitals but also which organisms cause them and where the deaths fall. Diagnostics, empirical therapy, infection prevention and resistance surveillance are all organized by pathogen and resistance phenotype. Whether demographic pressure falls evenly across pathogens is therefore a central question for response planning.

The talk describes how aging is reshaping the organisms we culture. In hospitalized urinary tract infection (2011–2021), patients aged 65 years or older and those with indwelling catheters showed a shift away from *Escherichia coli* toward Gram-positive bacteria such as enterococci and toward *Candida*. These organisms progress to BSI more often and carry higher mortality, yet they are exactly the organisms for which leukocyte esterase and nitrite screening lose accuracy. In 37,100 adults with BSI at two university hospitals (2006–2023), older age was associated with higher 30-day mortality through shifts in pathogen distribution. The common pathogens were not the deadly ones: *E. coli* accounted for 28.8% of cases, but *Klebsiella pneumoniae* accounted for the largest share of deaths (20.9%).

Next, We counterfactual projection using two tertiary hospitals in Seoul (2019–2023; 8,950 bacterial units and 1,336 candidemia cases) and the US MIMIC-IV cohort. Age- and sex-specific hospital case capture and case fatality were held fixed, and cases were re-weighted to UN World Population Prospects 2024. Although Korea's population is projected to be 0.91 times its 2023 size by 2045, in-hospital deaths rose in every estimable pathogen group (death multipliers 1.36–2.03). Methicillin-resistant *Staphylococcus aureus* (MRSA) had the largest multiplier, 2.03 (95% CI 1.77–2.49), versus 1.66 (1.58–1.75) for candidemia. Case multipliers were similar (1.63 vs 1.60); the difference appeared in deaths only, because MRSA deaths are concentrated in patients aged 80 years or older, the fastest-growing age group (contribution 0.74 vs 0.43). The US cohort showed the same ordering (1.57 vs 1.30). Aging alone did not clearly increase the CRE share of *K. pneumoniae* deaths or the VRE share of enterococcal deaths; any future rise in resistance share would come from spreading resistance itself, which needs its own surveillance.

Finally, I discuss data-driven risk prediction. Culture and susceptibility results, linked to the clinical course, form large labelled datasets well suited to AI. A machine-learning model combining automated urinalysis with age and sex restored the screening performance lost by conventional rules and has been in pilot service at a reference laboratory since 2024. In a multicenter cohort of more than 32,000 BSI episodes, an XGBoost model using only information available before susceptibility results predicted 30-day mortality with an AUROC of 0.884 in external validation, outperforming a large language model-based approach (0.815).

In an aging society, antimicrobial resistance response should monitor age-specific death burden, not case counts alone, and link risk prediction built on routine laboratory data to surveillance. Preparation is needed both for *S. aureus*, including MRSA, where the relative increase is largest, and for candidemia, where the absolute number of deaths is largest.

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SESSION III

Next-Generation Innovations in AMR Diagnostics and Therapeutics

첨단기술 기반 항생제 내성 대응을 위한 혁신 진단·치료 기술

Chair Hee Youl Chai (Director General, KNIH)
좌장 채희열 센터장 (감염병연구센터)

III-1 Recent Advance for the Identification of Bacteria with Raman Scattering and AI Algorithms
AI·표면증강 라만 분광법 기반 병원성 세균 신속 동정 기술
Dong-Kwon Lim

III-2 Engineering Programmable Living Therapeutics through Synthetic Biology and Biofoundry Technologies
Programmable living therapeutic 개발
Daehee Lee

III-3 L++-Based Virtual Cell Modeling Platform for Antimicrobial Therapy Development
L++ 기반 가상세포 모델링을 활용한 항균 치료기술 개발 플랫폼
Chang-Hyun C. Lee

III-4 Bacteriophage Engineering: Recent Advances in Development and Applications
합성생물학 기반의 박테리오파지 엔지니어링 기술
Sooan Shin

Curriculum Vitae



Name **Hee Youl Chai**
Institution National Institute of Health
Department Center for Infectious Disease Research
Position Director General

▶ Biography

Education

2004.03.~2009.02.	Ph.D., College of Veterinary Medicine, Chungbuk National University
2002.03.~2004.02.	Master, College of Veterinary Medicine, Chungbuk National University
1994.03.~2002.02.	D.V.M., College of Veterinary Medicine, Chungbuk National University

Career

2026.03. ~ Present	Director General, Center for Infectious Disease Research, Korea National Institute of Health (KNIH)
2020.09. ~ 2026.03.	Director, Division of Bio Bigdata, Korea National Institute of Health (KNIH)
2021.01. ~ 2022.04.	Team Leader, National Bio Bigdata Establishment Task Force, Korea National Institute of Health (KNIH)
2020.03.~2020.09.	Director, Division of Bioinformatics, Korea Center for Disease Control and Prevention (KCDC)

2026 INTERNATIONAL SYMPOSIUM on
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ANTIMICROBIAL RESISTANCE

SESSION III-1

Recent Advance for the Identification of Bacteria with Raman Scattering and AI Algorithms

AI·표면증강 라만 분광법 기반 병원성 세균 신속 동정 기술

Dong-Kwon Lim

(Professor, Korea Univ. KU-KIST Graduate School)



Curriculum Vitae



Name **Dong-Kwon Lim**
Institution Korea University
Department KU-KIST Graduate School of Converging Science and Technology
Position Professor

▶ Biography

Education

1990-1994	Kyungpook National University, Chemistry. B.Sc.
1994-1996	Kyungpook National University, Chemistry. M.Sc.
2007-2011	Seoul National University, Chemistry, Ph.D

Career

1996.01 - 2001. 08	Daesang Corporation (Pharmaceutical Devision), Senior Researchrer
2001. 09 - 2011. 08	CJ Corporation (Pharmaceutical Devision), Principle Researcher
2011. 08 - 2013. 02	MIT David Koch Institute for Integrtive Cancer Research, Research Fellow
2011. 08 - 2013. 02	Harvard Medical School, Childrens Hospital Boston, Research Fellow
2013. 03 - 2015. 02	Chonbuk National University, College of Engineering, BIN Convergence Department, Professor
2015. 03 - Current	Korea University, KU-KIST Graduate School of Converging Science and Technology, Professor
2020. 03 - Current	Korea University, College of Engineering, Professor

Academic Specialty

Synthesis of Organic or Inorganic Nanomaterials for Biosensing, Bioimaging Applications. Nanotechnology for Breakthrough Technology in a Bioscience, Energy Field.

Recent Advance for the Identification of Bacteria with Raman Scattering and AI Algorithms

Dong-Kwon Lim

Korea University

Abstract

In this talk, I like to introduce the new advanced technology for a highl accurate identification of bacteria with Raman sattering and AI algorithms. First, I will introduce the spectroscopic method of Raman scattering for bioanalysis, and will talk about the progress of bioanalytical techniques with Raman scattering. The pros and cons of Raman scattering and how scientists in this area tried to address the limitation of Raman scattering. Then, the biacteria identification of Raman scattering and AI algorithms will be introduced including the recent progresses in the area and our strategies in detail as following.

The analysis of complex Raman spectra from biological samples has traditionally relied on conventional chemometric-based methods, the performance of which has been further improved by artificial intelligence (AI). The accurate identification of bacteria is critical to preventing sepsis, even in advanced clinical settings. Among several methods, Raman scattering has shown great promise in overcoming the limitations of conventional approaches. Despite this promise, unresolved challenges remain in the optimization of SERS and interpretation of AI algorithms. In this study, we used colloidal Au and Ag nanoparticles (NPs) to obtain reproducible surface-enhanced Raman scattering (SERS) spectra of bacteria. We investigated the effects of ligands on plasmonic NPs and wavelength dependence in SERS-based bacterial identification. The analysis was conducted within the biological fingerprint region of 500–1300 cm–1. Using a deep neural network model, the targeted SERS approach with mannose-modified AuNPs under 532 nm excitation achieved a high classification accuracy (96.1%) for 14 bacterial species. In addition, we propose a framework designed to explain how AI algorithms accurately interpret Raman spectra. The normalized positive values of Shapley additive explanations (npSHAP) were utilized to identify the top five peaks as an AI-selected spectral barcode. The spectral signatures identified by the proposed framework are presented in a manner that is both intuitive and straightforward, facilitating a clear and precise interpretation of the bacterial classification process.

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ANTIMICROBIAL RESISTANCE

SESSION III-2

Engineering Programmable Living Therapeutics through Synthetic Biology and Biofoundry Technologies

Programmable living therapeutic 개발

Daehee Lee
(Center Director, KRIBB)



Curriculum Vitae



Name **Daehee Lee**
Institution Korea Research Institute of Bioscience and Biotechnology
Department Synthetic Biology Research Center
Position Center Director

▶ Biography

Education

1996 - 2000	Dept. of Food Sci. & Technol., Seoul National University
2000 - 2003	Dept. of Food Sci. & Biotechnol., Seoul National University
2003 - 2007	Dept. of Food Sci. & Biotechnol., Seoul National University

Career

2022 - Present	Director, Synthetic Biology Research Center, KRIBB
2023 - Present	Adjunct Professor, Graduate School of Engineering Biology, Korea Advanced Institute of Science and Technology (KAIST)
2022 - Present	Adjunct Professor, Department of Integrative Biotechnology, Sungkyunkwan University (SKKU)
2015 - Present	Head Professor, Systems Biotechnology, University of Science and Technology (UST), KRIBB School
2020 - Present	Principal Researcher, Synthetic Biology Research Center, KRIBB

Academic Specialty

I specialize in several key areas within synthetic biology and biofoundry. My work encompasses the creation of therapeutic microbes through synthetic biology for medical applications and the engineering of artificial microbes capable of breaking down plastics. Additionally, I focus on harnessing metabolic engineering techniques to produce valuable plant-derived compounds. Further, I am dedicated to advancing foundational synthetic biology methodologies within a biofoundry setting.

Engineering Programmable Living Therapeutics through Synthetic Biology and Biofoundry Technologies

Daehee Lee

Korea Research Institute of Bioscience and Biotechnology

Abstract

The growing challenges of infectious diseases and antimicrobial resistance highlight the need for innovative therapeutic strategies beyond conventional antibiotics. Synthetic biology offers new opportunities to engineer microorganisms as programmable living therapeutics capable of sensing disease-associated signals, processing biological information, and delivering therapeutic functions. By integrating genetic circuits, biosensors, and metabolic engineering, microorganisms can be designed to perform targeted diagnostic and therapeutic activities in response to specific biological conditions. In this presentation, I will introduce recent advances in synthetic biology approaches for engineering microorganisms with programmable functions, with a particular focus on the development of microbial biosensors and therapeutic platforms. I will also discuss how biofoundry technologies can accelerate the development of engineered microorganisms through automated and high-throughput Design–Build–Test–Learn (DBTL) workflows. The integration of computational design, genome engineering, and systematic characterization enables more efficient and scalable development of microbial systems with desired biological functions. Finally, I will highlight the potential of combining synthetic biology and biofoundry technologies to establish next-generation platforms for precision diagnostics and living therapeutics. These advances may provide new opportunities for addressing infectious diseases and antimicrobial resistance through innovative approaches that complement conventional antimicrobial treatments.

2026 INTERNATIONAL SYMPOSIUM on
ONE HEALTH
ANTIMICROBIAL RESISTANCE

SESSION III-3

L++-Based Virtual Cell Modeling Platform for Antimicrobial Therapy Development

L++ 기반 가상세포 모델링을 활용한 항균 치료기술 개발 플랫폼

Chang-Hyun C. Lee
(Dr., Omphalos Lifescience)



Curriculum Vitae



Name **Chang-Hyun C. Lee**
Institution Omphalos Korea Inc
Department Digital Life R&D Division
Position Principal Scientist

▶ Biography

Education

B.S.	Korea University / Life Sciences Dept. (Seoul, ROK)
M.S.	Korea University / Biotechnology Dept. (Seoul, ROK)
Ph.D.	Albert Einstein College of Medicine, Genetics (NY, NY, USA)

Career

Postdoctoral Researcher	Johns Hopkins Medical Institute (Baltimore, MD, USA)
Research Associate	UT Southwestern Medical Center (Dallas, TX, USA)

Academic Specialty

Genetics, Cell Biology, Stem Cell Biology

L++-Based Virtual Cell Modeling Platform for Antimicrobial Therapy Development

Chang-Hyun C. Lee
Omphalos Korea Inc

Abstract

Antimicrobial resistance (AMR) is a growing global health threat requiring innovative approaches to understanding bacterial physiology, resistance mechanisms, and therapeutic responses. Virtual cell modeling offers a promising solution by integrating biological knowledge and experimental data into executable computational representations of living systems.

We present **L++**, a pioneering biology-oriented programming language and scalable modeling framework capable of constructing multiscale, dynamic, mechanistic virtual cells and organisms. As a proof of concept, we developed a virtual *Escherichia coli* model integrating key cellular processes, including gene expression, metabolism, regulatory networks, stress responses, and cell growth and division. The model enables time-resolved simulations of cellular dynamics and responses to genetic and environmental perturbations. We are progressively validating its predictive capabilities against experimental data, including essential gene functions, gene expression perturbations, and growth phenotypes. We subsequently extended our initial *E. coli* modeling framework to *Acinetobacter baumannii*, both to investigate antimicrobial resistance and to evaluate its adaptability to other prokaryotic species. Drug-susceptible and multidrug-resistant virtual *A. baumannii* models reproduced bacterial growth dynamics and differential responses to clinically relevant antibiotics.

In addition, we are currently developing **Lifabrica**, a chat-based AI platform enabling researchers to build, interact with and simulate virtual cell models through natural-language conversations. **Lifabrica** is designed to support collaborative model improvement by incorporating user-contributed biological knowledge, experimental data, and feedback, while incentivizing through contribution-based revenue sharing. Omphalos Lifesciences provide together through **L++** and **Lifabrica** a foundation for developing scalable, continuously evolving virtual bacterial models to accelerate antimicrobial research, including novel therapeutic strategies.

2026 INTERNATIONAL SYMPOSIUM on
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ANTIMICROBIAL RESISTANCE

SESSION III-4

Bacteriophage Engineering: Recent Advances in Development and Applications

합성생물학 기반의 박테리오파지 엔지니어링 기술

Sooan Shin
(CEO, Accurie Bio)



Curriculum Vitae



Name	**Sooan Shin**
Institution	Accurie Biosciences
Position	CEO/Founder

▶ Biography

Education

PhD	Korea Advanced Science and Technology (1995)
M.S	Korea Advanced Science and Technology (1991)
B.S	Korea University (1989)

Career

CTO (Exc. Vice President)	CJ Cheiljedang WhiteBio CIC
Director (Vice President)	CJ Cheiljedang BIO BU
Senior Scientist	British Petroleum (BP) Group Technology

Academic Specialty

Microbial Genetics and Physiology

Bacteriophage Engineering: Recent Advances in Development and Applications

Sooan Shin

Accurie Biosciences

Abstract

Bacteriophages have quietly underpinned the major leaps of modern biology — from the Hershey–Chase confirmation of DNA as the genetic material, to restriction enzymes, phage display, and CRISPR. Having mastered phages as tools for discovery, the field is now working to master them as tools for therapy. The resurgence of interest is driven by antimicrobial resistance (AMR), yet natural phage therapy remains a sur-mesure boutique practice rather than a prêt-à-porter medicinal product. Three barriers explain the gap: a pharmacodynamic sourcing gap (difficulty isolating phages against unculturable pathogens; narrow host range), a pharmacokinetic retention gap (rapid immune clearance and short duration of action), and a CMC scale gap (manufacture often requires propagation on pathogenic or unculturable hosts).

Phage engineering has emerged as the strategy to overcome these limitations, recognized by the World Economic Forum among its Top 10 Emerging Technologies of 2023 as "designer phages," and clinically credentialed by the first compassionate-use treatment of disseminated drug-resistant Mycobacterium abscessus with engineered phages and by ongoing Phase 2 trials in MDR E. coli UTI. This talk reviews the enabling techniques of phage engineering. Because phage engineering is effectively phage genome engineering at scales of tens to hundreds of kilobases, it depends on engineering-biology and biofoundry capability, and on a surrogate host for one-time "rebooting" of synthetic genomes. Two routes are compared: homologous recombination–based approaches (BRED, with CRISPR-Cas counterselection to improve efficiency) and de novo genome assembly plus rebooting (Gibson, Golden Gate, PCA, and yeast TAR). Rebooting strategies are illustrated by E. coli as a cross-species surrogate for Gram-negative phages, L-form bacteria for cross-genus rebooting of Gram-positive phages, and cell-free transcription–translation systems as an emerging host-independent alternative.

Finally, representative therapeutic programs are examined — CRISPR-Cas3–armed phages, tail-fiber-swapped delivery vectors, and in situ base editing of gut-colonizing bacteria — together with the comparative landscape of natural phage-bank versus engineering-based developers. Engineering offers a credible path from artisanal practice to a standardized, scalable medicinal product, but realizing it will require parallel progress in CMC and in regulatory science.

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SESSION IV

Personalized Phage Therapy

환자맞춤형 정밀 박테리오파지 치료

Chair Hong Bin Kim (Professor, Seoul National University Bundang Hospital)
좌장 김홍빈 교수 (분당서울대병원)

IV-1 **[Keynote]** Personalized Bacteriophage Therapy: From International Consensus Guidelines to Clinical Practice
맞춤형 박테리오파지 치료: 합의 가이드라인부터 임상실무까지
Simone C. Lieberknecht-Jouy

IV-2 The Burden of MDRO Infections in Korea: The Need for New Treatment Strategies
다제내성균 감염의 질병 부담과 새로운 치료 전략의 필요성
Kyoung-Ho Song

IV-3 Strategy and Roadmap for the Clinical Application of Personalized Bacteriophage Therapy in Korea
국내 환자 맞춤형 박테리오파지 치료의 임상 적용을 위한 전략과 로드맵
Shinwon Lee

IV-4 Therapeutic Bacteriophages from Discovery to Clinical Application: Technical Challenges and Future Directions
치료용 박테리오파지의 발굴에서 임상 적용까지: 기술적 과제와 발전 방향
Jungmin Kim

IV-5 **[Panel Discussion]** Personalized Phage Therapy
[전문가 논의] 국내 환자맞춤형 박테리오파지 치료 도입
Panelists: Shinwon Lee, Jungmin Kim, Kyoung-Ho Song, Ki Tae Kwon, Eun Kyung Choi

Curriculum Vitae



Name **Hong Bin Kim**
Institution Seoul National University Bundang Hospital
Department Division of Infectious Diseases
Position Professor

▶ Biography

Education

1998-1994	Seoul National University College of Medicine (MD)
1997-1999	Seoul National University (Master, Infectious Diseases)
2002-2005	Seoul National University (PhD, Infectious Diseases)

Career

2003-	Professor, Seoul National University Bundang Hospital
2005-	Professor, Seoul National University College of Medicine
2016-	Fellow, Infectious Diseases Society of America (FIDSA)
2021-	Chair, Antimicrobial Resistance (AMR) Expert Committee, KDCA
2023-	Fellow, Society for Healthcare Epidemiology of America (FSHEA)
2024-	Member, WHO STAG-AMR
2025-	President, The Korean Society of Infectious Diseases

2026 INTERNATIONAL SYMPOSIUM on

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SESSION IV-1

KEYNOTE

Personalized Bacteriophage Therapy: From International Consensus Guidelines to Clinical Practice

맞춤형 박테리오파지 치료: 합의 가이드라인부터 임상실무까지

Simone C. Lieberknecht-Jouy

(Dr., University Medicine Frankfurt)



Curriculum Vitae



Name **Simone C. Lieberknecht-Jouy**
Institution University Medicine Frankfurt, Germany
Department Infectious Diseases
Position Clinician Scientist

▶ Biography

Education

2010 – 2017	Medical studies University of Göttingen, Germany
2015 – 2019	Medical thesis University of Göttingen, Germany

Career

10/2017 – 08/2018	Resident physician Ear-nose-throat surgery Helios Dr. Horst Schmidt Kliniken, Wiesbaden, Germany
Since 01/2019	Resident physician, clinician scientist Infectious Diseases University Hospital Frankfurt, Frankfurt, Germany

Academic Specialty

Internal Medicine, Infectious Diseases

Personalized Bacteriophage Therapy: From International Consensus Guidelines to Clinical Practice

Simone C. Lieberknecht-Jouy
University Medicine Frankfurt

Abstract

Background: Bacteriophages (phages), viruses that selectively infect bacteria, are a promising option for the personalized treatment of difficult-to-treat bacterial infections. However, their clinical implementation remains challenging due to the lack of consensus on key principles, infrastructural requirements, quality-assured phage selection and preparation, clinical administration, monitoring, and documentation. Existing guidance provides limited practical direction across the translational pathway and lacks inspection-ready specifications for pharmacies and clinical sites. Furthermore, systematic approaches to identifying priorities for future clinical phage research are lacking.

Methods: To address these gaps, a consensus-based guideline was developed within the methodological framework of the Association of the Scientific Medical Societies in Germany (AWMF), under the leadership of the German Society for Infectious Diseases. The development process involved 20 professional societies, patient advocacy groups, and regulatory authorities, as well as 18 international experts.

Results: The guideline comprises more than 60 recommendations addressing fundamental principles of phage therapy, infrastructure, phage preparation and quality control, clinical administration, and priorities for future research. The recommendations are supported by international societies, organizations, and relevant stakeholders, providing practical guidance for safe, transparent, and standardized clinical implementation. Importantly, the first treatments compliant with the guideline have been successfully introduced at University Hospital Frankfurt, demonstrating the feasibility of translating consensus recommendations into clinical practice. Initial experiences with their implementation will be briefly presented.

Conclusion: This consensus-based guideline provides a comprehensive, practice-oriented framework for the safe and standardized use of personalized phage therapy. Its successful implementation at University Hospital Frankfurt represents an important step toward bridging the gap between consensus guidance and clinical application, while supporting quality assurance, regulatory oversight, and the advancement of clinical phage research.

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SESSION IV-2

The Burden of MDRO Infections in Korea: The Need for New Treatment Strategies

다제내성균 감염의 질병 부담과 새로운 치료 전략의 필요성

Kyoung-Ho Song

(Professor, Seoul National University Bundang Hospital)



Curriculum Vitae



Name **Kyoung-Ho Song**
Institution Seoul National University Bundang Hospital
Department Division of Infectious Diseases, Department of Internal Medicine
Position Professor

▶ Biography

Education

Mar 1997 ~ Feb 2003	Seoul National University College of Medicine, B.S, M.D.
Mar 2007 ~ Feb 2009	Seoul National University, M.S.
Mar 2009 ~ Feb 2015	Seoul National University, Ph.D.

Career

Mar 2003 ~ Feb 2009	Intern, Resident, and Fellow, Seoul National University Hospital
Mar 2009 ~ present	Faculty Member (Assistant Professor, Associate Professor, and Professor), Division of Infectious Diseases, Department of Internal Medicine, Seoul National University Bundang Hospital
Current	Current Professor & Chief, Division of Infectious Diseases, Department of Internal Medicine, Seoul National University Bundang Hospital
Aug 2018 ~ Jul 2019	Visiting Scholar, Rush University Medical Center, Chicago, IL, USA
Apr 2021 ~ Dec 2025	Chairman, Steering Committee for the Surgical Site Infection (SSI) Module, Korean National Healthcare-associated Infections Surveillance System (KONIS)
Dec 2025 ~	Secretary General, The Korean Society of Infectious Diseases (KSID)

Academic Specialty

Antimicrobial resistance, Methicillin-resistant Staphylococcus aureus, Acinetobacter baumannii, Antibiotic stewardship

The Burden of MDRO Infections in Korea: The Need for New Treatment Strategies

Kyoung-Ho Song

Seoul National University Bundang Hospital

Abstract

Antimicrobial resistance was directly responsible for an estimated 1.14 million deaths worldwide in 2021, projected to reach 1.91 million annually by 2050, with roughly two-thirds of attributable deaths in people aged 70 years or older — a projection of particular relevance to rapidly ageing Korea.

Our group has quantified this burden nationally. Population-based surveillance estimated 11,000 methicillin-resistant Staphylococcus aureus (MRSA) bacteremia episodes and 3,100 attributable deaths annually in the early 2010s. A multicenter cohort of bacteremia caused by five multidrug-resistant organisms (MDROs) showed 90-day mortality of 63% for multidrug-resistant Acinetobacter baumannii and 55% for carbapenem-resistant Enterobacterales (CRE), with a socioeconomic burden of 326.9 billion KRW in 2017. Examining CRE infection as a whole, record review at 15 hospitals showed that only 22.4% of notifications represented true infection, yielding 7,117 infections nationwide in 2022, 30-day mortality of 29.3%, and a burden of 669.8 billion KRW; notifications rose 60.6% by 2025, implying over 10,000 infections and more than 1 trillion KRW annually hereafter. A four-timepoint point-prevalence survey at 21 hospitals (2024–2025) found that, among 49,651 inpatients, 6.50% were colonized with an MDRO — one in every 15 — and 1.43% had active infection. CRE showed the highest colonization prevalence (1.79%), MRSA the highest infection prevalence (0.53%).

Can continued antibiotic development alone solve this? Resistance follows introduction within one to three years — ceftazidime/avibactam resistance was reported in its approval year and emerges during therapy in 8–10% of treated patients, with cross-resistance to ceftolozane/tazobactam. Resistance also predates antibiotic use: penicillinase was described before penicillin reached patients, and resistance genes have been recovered from 30,000-year-old permafrost. Antibiotics select pre-existing resistance rather than create it. Finally, development costs approach USD 1 billion while most new antibiotics earn under USD 150 million yearly, and a single course costs millions to tens of millions of KRW.

Therefore, non-antibiotic strategies are essential. Among current alternatives, bacteriophage therapy is distinctive in killing bacteria directly, acting independently of resistance mechanisms, and already reaching patients with refractory infection. Phages are host-specific, self-amplifying, active against biofilms, and spare commensal flora. Realizing this potential requires standardized susceptibility testing, GMP production, phage banks with rapid strain matching, and a domestic regulatory pathway. New antibiotics remain indispensable — but antibiotics alone will not win this fight.

Keywords: antimicrobial resistance; disease burden; carbapenem-resistant Enterobacterales; MRSA; point prevalence; bacteriophage therapy

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SESSION IV-3

Strategy and Roadmap for the Clinical Application of Personalized Bacteriophage Therapy in Korea

국내 환자 맞춤형 박테리오파지 치료의 임상 적용을 위한 전략과 로드맵

Shinwon Lee

(Professor, Korean Society for Chemotherapy)



Curriculum Vitae



Name **Shinwon Lee**
Institution Pusan National University School of Medicine
Department Department of Internal Medicine
Position Professor

▶ Biography

Education

2000	M.D., Kyungpook National University School of Medicine, Korea
2004	M.S., Department of Internal Medicine, Kyungpook National University School of Medicine, Korea
2013	Ph.D., Department of Internal Medicine (Infectious Diseases), Kyungpook National University, School of Medicine, Korea

Career

2025 – present	Chair, Bacteriophage Research Group, Korean Society for Antimicrobial Therapy
2014 – present	Professor, Department of Internal Medicine, Pusan National University School of Medicine, Korea
2022–2023	Visiting Researcher, Phage Therapy Laboratory, Westmead Institute for Medical Research, University of Sydney, Australia
2010–2014	Director, Daegu, Fatima Hospital, Korea
2008–2010	Clinical Fellow, Division of Infectious Diseases, Seoul National University Hospital, Korea
2005–2008	International Cooperation Physician, Korea International Cooperation Agency (KOICA)

Academic Specialty

Infectious diseases, with a focus on Staphylococcus aureus infections and antimicrobial treatment outcomes.
Bacteriophage therapy, including clinical applications, bacteriophage host-range analysis, and mechanisms of bacterial resistance to bacteriophages

Strategy and Roadmap for the Clinical Application of Personalized Bacteriophage Therapy in Korea

Shinwon Lee

Pusan National University School of Medicine

Abstract

The growing burden of antimicrobial resistance and the limited treatment options for difficult-to-treat bacterial infections have renewed interest in bacteriophage therapy as a potential adjunct to conventional antimicrobial treatment. Personalized bacteriophage therapy, in which therapeutic phages are selected according to the susceptibility of an individual patient's bacterial isolate, offers a promising approach for infections that poorly respond to current antibiotics. However, its clinical implementation requires an integrated framework encompassing phage selection, manufacturing, quality control, clinical protocols, and regulatory oversight.

International experience demonstrates several approaches to implementing personalized phage therapy, including ethically approved experimental therapy in Poland, standardized compassionate-use pipeline programs in Israel, the magistral preparation framework in Belgium, and standardized clinical research protocols in Australia. These models illustrate that personalized phage therapy can implemented through different clinical and regulatory pathways, provided that appropriate safety, quality, and clinical monitoring standards are maintained.

In Korea, growing clinical interest and emerging research capabilities provide a foundation for introducing personalized phage therapy. Nevertheless, important challenges remain, including limited access to clinically characterized phage libraries, the absence of standardized phage selection and manufacturing procedures, and uncertainty regarding appropriate regulatory pathways. To address these challenges, the Phage Korea initiative has established a multidisciplinary collaborative network integrating clinical investigators, microbiologists, standardization experts, and regulatory specialists.

This presentation will outline a proposed strategy for introducing personalized phage therapy in Korea, focusing on the development of standardized protocols, phage selection procedures, and appropriate regulatory pathways. Through coordinated efforts in clinical research, technical standardization, and regulatory development, this initiative aims to establish a sustainable framework for integrating personalized phage therapy into clinical practice in Korea.

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SESSION IV-4

Therapeutic Bacteriophages from Discovery to Clinical Application: Technical Challenges and Future Directions

치료용 박테리오파지의 발굴에서 임상 적용까지: 기술적 과제와 발전 방향

Jungmin Kim

(Professor, Kyungpook National University)



Curriculum Vitae



Name **Jungmin Kim**
Institution School of Medicine, Kyungpook National University
Department Microbiology
Position Professor

▶ Biography

Education

1985~1991	School of Medicine, Kyungpook National University, M.D.
1991~1993	Kyungpook National University, M.Sc.
1993~1996	Kyungpook National University, Ph.D.

Career

2005~Present	Professor, School of Medicine, Kyungpook National University
2007~2008	Visiting Professor, Stanford University School of Medicine
2001~2003	Research Associate, Duke University School of Medicine
1996~2005	Lecturer~Associate Professor, Dankook University College of Medicine

Academic Specialty

Bacterial Antibiotic Resistance; Bacteriophage Therapy; Microbiome and Live Biotherapeutic Products (LBPs)

Therapeutic Bacteriophages from Discovery to Clinical Application: Technical Challenges and Future Directions

Jungmin Kim

School of Medicine, Kyungpook National University

Abstract

Therapeutic Bacteriophages from Discovery to Clinical Application: Technical Challenges and Future Directions

The growing burden of antibiotic-resistant infections highlights the need for therapeutic strategies that complement conventional antibiotics. This presentation reviews research and clinical approaches to bacteriophage therapy, focusing on phage discovery and selection for multidrug-resistant pathogens, including carbapenem-resistant *Acinetobacter baumannii*. Phage libraries and clinical isolate collections provide a foundation for evaluating candidates based on host range, lytic activity, genomic characteristics, and resistance emergence. Preclinical studies of phage–antibiotic combinations, sequential administration, and PEGylation to improve phage persistence illustrate development strategies that consider both antibacterial activity and host immune responses.

Clinical translation requires systematic quality control throughout phage production and formulation, with identity, potency, purity, and stability as key quality attributes. Major considerations include genomic assessment of potential safety risks, management of bacterial production strains and phage seed lots, consistency across manufacturing batches, and control of endotoxins and residual bacterial DNA and proteins. Microbiological quality appropriate to the route of administration, validated analytical methods, and maintenance of phage activity during storage and transport are also essential. For phage cocktails, the potency and stability of individual components and the effects of changes in composition require particular attention.

Key challenges for clinical application include rapid matching of phages to patient-derived bacterial isolates, standardization of susceptibility testing and interpretation criteria, and pharmacokinetic and pharmacodynamic assessment according to the infection site and administration route. Monitoring phage resistance and host immune responses, including neutralizing antibodies, must be integrated with clinical and microbiological outcome assessment. The presentation discusses how phage banks, standardized quality and efficacy evaluation, and multidisciplinary collaboration can support timely access to personalized precision phage therapy while maintaining consistent product quality and building reliable evidence of safety and efficacy.

Keywords: Bacteriophage therapy; Multidrug-resistant bacteria; Phage selection; Quality control; Clinical application

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SESSION IV-5

PANEL DISCUSSION

Personalized Phage Therapy

국내 환자맞춤형 박테리오파지 치료 도입

Shinwon Lee (Professor, Korean Society for Chemotherapy)

Jungmin Kim (Professor, Kyungpook National University)

Kyoung-Ho Song (Professor, Seoul National University Bundang Hospital)

Ki Tae Kwon (Professor, Kyungpook National University Chilgok Hospital)

Eun Kyung Choi (Professor, Kyungpook National University)



Curriculum Vitae



Name **Shinwon Lee**
Institution Pusan National University School of Medicine
Department Department of Internal Medicine
Position Professor

▶ Biography

Education

2000	M.D., Kyungpook National University School of Medicine, Korea
2004	M.S., Department of Internal Medicine, Kyungpook National University School of Medicine, Korea
2013	Ph.D., Department of Internal Medicine (Infectious Diseases), Kyungpook National University, School of Medicine, Korea

Career

2025 – present	Chair, Bacteriophage Research Group, Korean Society for Antimicrobial Therapy
2014 – present	Professor, Department of Internal Medicine, Pusan National University School of Medicine, Korea
2022–2023	Visiting Researcher, Phage Therapy Laboratory, Westmead Institute for Medical Research, University of Sydney, Australia
2010–2014	Director, Daegu, Fatima Hospital, Korea
2008–2010	Clinical Fellow, Division of Infectious Diseases, Seoul National University Hospital, Korea
2005–2008	International Cooperation Physician, Korea International Cooperation Agency (KOICA)

Academic Specialty

Infectious diseases, with a focus on Staphylococcus aureus infections and antimicrobial treatment outcomes.
Bacteriophage therapy, including clinical applications, bacteriophage host-range analysis, and mechanisms of bacterial resistance to bacteriophages

Curriculum Vitae



Name **Jungmin Kim**
Institution School of Medicine, Kyungpook National University
Department Microbiology
Position Professor

▶ Biography

Education

1985~1991	School of Medicine, Kyungpook National University, M.D.
1991~1993	Kyungpook National University, M.Sc.
1993~1996	Kyungpook National University, Ph.D.

Career

2005~Present	Professor, School of Medicine, Kyungpook National University
2007~2008	Visiting Professor, Stanford University School of Medicine
2001~2003	Research Associate, Duke University School of Medicine
1996~2005	Lecturer~Associate Professor, Dankook University College of Medicine

Academic Specialty

Bacterial Antibiotic Resistance; Bacteriophage Therapy; Microbiome and Live Biotherapeutic Products (LBPs)

Curriculum Vitae



Name **Kyoung-Ho Song**
Institution Seoul National University Bundang Hospital
Department Division of Infectious Diseases, Department of Internal Medicine
Position Professor

▶ Biography

Education

Mar 1997 ~ Feb 2003	Seoul National University College of Medicine, B.S, M.D.
Mar 2007 ~ Feb 2009	Seoul National University, M.S.
Mar 2009 ~ Feb 2015	Seoul National University, Ph.D.

Career

Mar 2003 ~ Feb 2009	Intern, Resident, and Fellow, Seoul National University Hospital
Mar 2009 ~ present	Faculty Member (Assistant Professor, Associate Professor, and Professor), Division of Infectious Diseases, Department of Internal Medicine, Seoul National University Bundang Hospital
Current	Current Professor & Chief, Division of Infectious Diseases, Department of Internal Medicine, Seoul National University Bundang Hospital
Aug 2018 ~ Jul 2019	Visiting Scholar, Rush University Medical Center, Chicago, IL, USA
Apr 2021 ~ Dec 2025	Chairman, Steering Committee for the Surgical Site Infection (SSI) Module, Korean National Healthcare-associated Infections Surveillance System (KONIS)
Dec 2025 ~	Secretary General, The Korean Society of Infectious Diseases (KSID)

Academic Specialty

Antimicrobial resistance, Methicillin-resistant Staphylococcus aureus, Acinetobacter baumannii, Antibiotic stewardship

Curriculum Vitae



Name	**Ki Tae Kwon**
Institution	Kyungpook National University School of Medicine
Department	Division of Infectious Diseases
Position	Professor

▶ Biography

Education

2005 ~ 2007	Ph.D., Kyungpook National University School of Medicine
2001 ~ 2003	M.S., Kyungpook National University School of Medicine
1991 ~ 1997	B.S., Kyungpook National University School of Medicine

Career

2018 ~ Present	Professor, Division of Infectious Diseases, Kyungpook National University Chilgok Hospital
2017 ~ 2018	Attending Physician, Division of Infectious Diseases, Daegu Fatima Hospital
2005 ~ 2007	Fellow, Division of Infectious Diseases, Samsung Medical Center

Academic Specialty

Antimicrobial Resistance, Antimicrobial Stewardship, Infection Control, Adult Immunization

Curriculum Vitae



Name **Eun Kyung Choi**
Institution School of Medicine, Kyungpook National University
Department Department of Medical Humanities and Medical Education
Position Associate Professor

▶ Biography

Education

1997-2004	College of Medicine, Seoul National University, B.A.
2006-2008	College of Medicine, Seoul National University, M.A.
2008-2011	College of Medicine, Seoul National University, Ph.D.

Career

2012-2018	Research Professor, Institute of Medical History and Culture, Seoul National University Hospital
2018-2020	Senior Researcher, Korea National Institute for Bioethics Policy
2020-Current	Associate Professor, Assistant Professor, Kyungpook National University, School of Medicine

Academic Specialty

History of Medicine, Medical Ethics, Bioethics

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SESSION V

Accelerating Next-Generation Antimicrobial Development

차세대 항균제 개발 가속화

Chair Sungpil Han (Professor, The Catholic University of Korea)
좌장 한성필 교수 (가톨릭대학교)

V-1 Early Prediction of Antimicrobial Efficacy for Difficult-to-treat Infections Caused by Multidrug Resistant Organisms: In Vitro to Clinical Translational Approach
난치성 감염에 대한 항균제 효능 조기 예측 기법
Eun Kyoung Chung

V-2 Challenges and Strategies in the Development of Antibiotics Using Small Molecules
저분자 항균제의 핵심 개발 이슈
Hyunjung Go

V-3 Challenges in Developing Bacteriophage Therapy as a Drug Product
박테리오파지 치료제의 의약품 개발 과제
Dongwoo Chae

V-4 Building a Multidisciplinary Support Network
다학제 통합적 기술지원 체계 구축안
Seunghoon Han

V-5 **[Panel Discussion]** Antimicrobial Development Strategies Responding to Domestic Demand
[전문가 논의] 국내 수요에 대응하는 항균제 개발 전략
Panelists: Seunghoon Han, Hyunjung Go, Dongwoo Chae, Eun Kyoung Chung, Hee-Jong Hwang, Jae-Ho Lee

Curriculum Vitae



Name **Sungpil Han**
Institution The Catholic University of Korea
Department Department of Pharmacology
Position Associate Professor

▶ Biography

Education

2007–2015	M.D., School of Medicine, Pusan National University
2009–2013	Ph.D., Molecular Cell Biology and Genetics, School of Medicine, Pusan National University
2000–2007	B.S., Electrical Engineering, Korea University

Career

2026–Present	Associate Professor, Department of Pharmacology, College of Medicine, The Catholic University of Korea
2019–2026	Lecturer, Research Assistant Professor, Assistant Professor, Department of Pharmacology, College of Medicine, The Catholic University of Korea
2019–Present	Faculty Member, PIPET, Pharmacometrics Institute for Practical Education & Training
2015–2019	Intern/Resident in Clinical Pharmacology and Therapeutics, Asan Medical Center, University of Ulsan
2010–2012	Predoctoral Fellow, Neuroimmunology Branch, NINDS, National Institutes of Health, USA

Academic Specialty

Clinical pharmacology; pharmacometrics (population PK/PD, PBPK, QSP); model-informed drug development and precision dosing; early-phase clinical trials; AI/LLM-assisted modeling

2026 INTERNATIONAL SYMPOSIUM on
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SESSION V-1

Early Prediction of Antimicrobial Efficacy for Difficult-to-treat Infections Caused by Multidrug Resistant Organisms: In Vitro to Clinical Translational Approach

난치성 감염에 대한 항균제 효능 조기 예측 기법

Eun Kyoung Chung
(Professor, Kyung Hee University)



Curriculum Vitae



Name **Eun Kyoung Chung**
Institution Kyung Hee University
Department College of Pharmacy, Department of Pharmacy
Position Professor

▶ Biography

Education

2010~2015	Ph.D. in Pharmacy Practice (concentration: Clinical Pharmaceutical Sciences), Purdue University, USA
2005~2010	Doctor of Pharmacy (Highest Distinction), Purdue University, USA
2000~2004	B.S. in Pharmacy, Sungkyunkwan University, Republic of Korea

Career

2026~Present	Professor, College of Pharmacy, Kyung Hee University
2021~2026	Director, Kyung Hee Drug Analysis Center, Kyung Hee University
2015~2026	Assistant Professor & Associate Professor, College of Pharmacy, Kyung Hee University
2021~2025	Chair, Department of Pharmacy, College of Pharmacy, Kyung Hee University
2021~2025	Chair, Department of Regulatory Science, College of Pharmacy, Kyung Hee University
2012~2014	Instructor/Course Coordinator, Department of Pharmacy Practice, College of Pharmacy, Purdue University, USA
2010~2014	Clinical Pharmacist Specialist, Infectious Diseases, Eskenazi Health (formerly, Wishard Memorial Hospital), IN, USA

Academic Specialty

Pharmacometrics, Hollow Fiber Infection Model, Infectious Diseases Pharmacotherapy, Antimicrobial Stewardship Program, Special Populations

Early Prediction of Antimicrobial Efficacy for Difficult-to-treat Infections Caused by Multidrug Resistant Organisms: In Vitro to Clinical Translational Approach

Eun Kyoung Chung
Kyung Hee University

Abstract

The emergence and spread of antimicrobial-resistant pathogens pose significant challenges to the treatment of refractory infections and highlight the need for more effective approaches to predict antimicrobial efficacy and optimize therapeutic strategies. Conventional in vitro susceptibility testing provides essential information on pathogen susceptibility; however, it may not adequately capture the dynamic relationship between antimicrobial exposure changes over time and bacterial response under clinically relevant conditions.

Hollow fiber infection models (HFIMs) offer a dynamic in vitro platform that simulates human pharmacokinetic profiles and enables the evaluation of antimicrobial activity under clinically relevant drug exposure conditions. By incorporating clinical isolates obtained from infected patients, HFIMs can characterize bacterial killing, regrowth, and the emergence of antimicrobial resistance in response to different antimicrobial exposures. Integration with pharmacometric modeling, particularly individualized pharmacokinetic/pharmacodynamic (PK/PD) modeling and simulation, enables quantitative characterization of antimicrobial exposure–response relationships, identification of key PK/PD targets, and prediction of antimicrobial efficacy across different treatment scenarios.

This integrated experimental and modeling approach provides a translational framework for early prediction of antimicrobial efficacy, optimization of dosing regimens, and identification of potentially effective treatment strategies against difficult-to-treat infections. Furthermore, it may facilitate the generation of evidence to support individualized antimicrobial therapy and more effective responses to antimicrobial resistance.

Ultimately, the integration of HFIMs and pharmacometrics offers a promising strategy to bridge in vitro findings and clinical applications, contributing to the development of evidence-based approaches for managing difficult-to-treat infections and addressing the growing challenges of antimicrobial resistance as a global public health threat.

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SESSION V-2

Challenges and Strategies in the Development of Antibiotics Using Small Molecules

저분자 항균제의 핵심 개발 이슈

Hyunjung Go
(COO, Peptoid)



Curriculum Vitae



Name **Hyunjung Go**
Institution Peptoide CO., Ltd
Department R&D institute
Position COO

▶ Biography

Education

2020-2022	Ajou University Graduate MS (Chemical Engineering)
1986-1990	Ajou University undergraduate BS(Chemical Engineering)

Career

Oct/2018-Present	Peptoide CO., Ltd / COO/ New drug discovery & Developemnt (antibiotics, anticancer TPD)
Jun/2016-Mar/2017	BR Pharm CO., Ltd / QA general manager / BGMP, KGMP
Dec/2012-May/2016	Oskorea Pharm CO.,Ltd / QC,QA general manager / KGMP
Oct/2009-Oct/2012	SH Pharm CO., Ltd / Lead researcher, PM / Drug Development
Feb/2002-Feb/2009	Korea Wales Pharm CO., Ltd/ Senior Researcher, team leader / KGMP
Mar/1990-Mar/1996	Daehan chemical CO., Ltd/ Researcher / R&D

Academic Specialty

New drug Discovery & Development (Antibiotics, Anticancer TPD, Immunology) & Regulatory affairs , QC/QA analysis

Challenges and Strategies in the Development of Antibiotics Using Small Molecules

Hyunjung Go
Peptoide CO., Ltd

Abstract

Small-molecule compounds play a significant role in new drug development; when developing antibiotics, it is essential to design and develop substances that serve as public goods and are effective in preventing the spread of infectious diseases.
The challenges in developing next-generation small-molecule antibiotics stem from a complex interplay of scientific, regulatory and economic barriers, making it difficult to supplement or replace existing treatments. In particular, Gram-negative bacteria possess a thick double outer membrane and efflux pumps, which make it extremely difficult even for small molecules to enter or remain within the cell.
The greatest scientific barrier is the issue of intracellular accumulation within Gram-negative pathogens; as this is restricted by the outer membrane, porin selectivity and multidrug-resistant efflux pumps, there are instances where efficacy demonstrated on isolated targets does not translate into overall cellular activity.
Other challenges include a lack of validated new targets; the rapid emergence of resistance through target modification and enzymatic inactivation; a narrow therapeutic index arising when bacterial targets resemble human proteins or when membrane-active amphiphilic substances induce host toxicity; and the pharmacokinetic and pharmacodynamic requirements for adequate penetration into bacteria embedded in infection sites and biofilms.
Development risks are further exacerbated by the difficulties in clinical trial design; whilst superiority over standard treatment must be demonstrated, comparative analysis is required when standard treatment is insufficiently effective, and the site of infection, pathogen, severity and comorbidities vary greatly. Furthermore, whilst patients with resistant bacteria are required for the development of new antibiotics, public health concerns necessitate the suppression of the spread of resistance, leading to a conflict between patient recruitment and infection control, as well as difficulties in conducting non-inferiority analyses.
From an economic perspective, revenue is constrained by prescription restrictions aimed at preventing the spread of infection—a public good—and by the significantly shorter treatment duration compared to therapies for chronic diseases or anti-cancer treatments, leading to a considerable decline in investment. Ultimately, due to low profitability, even big pharma companies sometimes opt to acquire substance technology from biotech firms where clinical proof of concept (POC) has been well established, rather than undertaking direct development; however, it appears that even this approach has failed to foster an active market due to declining profitability.

Abstract *(continued)*

Among the scientific approaches proposed to overcome these obstacles, a promising and feasible strategy involves the simultaneous optimisation of permeability, avoidance of efflux, target binding and selectivity, in addition to target efficacy.
1. Small molecules capable of limiting resistance through the discovery of new scaffolds are required.
For example, molecular design is required that incorporates a small molecule weight for the main scaffold to enhance outer membrane permeability, a structure with high binding affinity from a thermodynamic perspective, an appropriate combination of positive charge and hydrophobicity, and an optimal logP value for the functional ligand, amongst other factors.
2. Combination therapy with beta-lactamase inhibitors and other adjunctive approaches are also necessary.
3. A recent example is cefiderocol, which utilises the iron transport pathway via an antibiotic-conjugated siderophore to penetrate the bacterial outer membrane and has been approved as a treatment for Gram-negative bacteria.
4. In addition, research is underway into the development of adjuvants that promote outer membrane permeability, as well as methods targeting the outer membrane biosynthesis pathways of BAM, Lpt and LpxH.
Taking these points into account, Peptoide Co., Ltd. has developed the small-molecule antibiotic PDL16, which, as a novel scaffold, significantly reduces the risk of resistance development. As a candidate compound for which preclinical trials were completed in 2026, a clinical protocol targeting US patients was established in 2027; Its outer membrane permeability and binding affinity are superior to those of colistin, and with its novel mechanism of action targeting the outer membrane, it demonstrates superior efficacy against the mutant strains of multidrug-resistant Gram-negative bacteria, such as Klebsiella pneumoniae NCCP16208 (OXA-232/NDM-1), NCCP16700 (KPC-4/NDM-1)—mutant strains of Gram-negative multidrug-resistant bacteria—demonstrating superior efficacy compared to ceftazime plus avibactam and cefiderocol, and will thus make a significant contribution to the development of next-generation antibiotics.
From an economic perspective, the establishment of an AMR fund within South Korea is urgently required, and collaboration with various countries on international R&D funding appears necessary. In particular, antibiotics require sustained public R&D funding during the early development and clinical trial phases; following new drug approval, securing a certain proportion of annual production capacity in each country is expected to ensure a sustainable cycle of research and development for biotech firms whilst safeguarding global public health and safety. Furthermore, considerable effort must be devoted to supplying affordable small-molecule antibiotics to LMICs to address inequalities in public health and safety.

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SESSION V-3

Challenges in Developing Bacteriophage Therapy as a Drug Product

박테리오파지 치료제의 의약품 개발 과제

Dongwoo Chae

(Professor, Yonsei University)



Curriculum Vitae



Name **Dongwoo Chae**
Institution Yonsei university college of medicine
Department Department of pharmacology
Position Associate professor

▶ Biography

Education

Mar/2013~ Feb/2017	PhD, Yonsei University Graduate college of medicine, Korea
Mar/2000~ Feb/2006	MD, Yonsei University Graduate college of medicine, Korea

Career

2025.3~present	Department of Pharmacology, Yonsei University, Associate professor
2019.3~2025.2	Department of Pharmacology, Yonsei University, Assistant professor
2017.3~2019.2	Department of Pharmacology, Yonsei University, Instructor
2013.3~2017.2	Clinical Pharmacology, Yonsei University Health System, Resident
2011.3~2012.6	Neurosurgery, Severance Hospital, Korea, Resident
2010.3~2011.2	Severance Hospital, Korea, Intern

Academic Specialty

Member of the Korean Society of Clinical Pharmacology and Therapeutics (KSCPT)
President of the Population Approach Group Korea (PAGK) (2025. 03 – present)

Challenges in Developing Bacteriophage Therapy as a Drug Product

Dongwoo Chae
Yonsei University

Abstract

More than a century after their discovery, bacteriophages remain unlicensed as antibacterial medicines in the United States and Europe. Compassionate-use series report high rates of clinical improvement, yet randomized trials of fixed phage products have been inconclusive. This gap is commonly described as a shortage of evidence. It is more usefully read as a set of distinct development problems, each requiring a different remedy.

The biological obstacles begin with host range. Specificity is strain-level, and the receptor conferring it is dispensable, so the same molecule is both the target and the escape route: narrow spectrum and rapid resistance are one problem rather than two. Beneath receptor-mediated escape lies the bacterial pan-immune system — restriction–modification, CRISPR–Cas, abortive infection and related defences can terminate an infection after entirely normal adsorption, a mechanism invisible to conventional susceptibility testing. Replication further requires an actively metabolising host, so dormant, nutrient-limited and biofilm-embedded populations show tolerance without resistance, placing a ceiling on achievable kill.

The pharmacological obstacles follow from self-amplification. Exposure is generated by the target rather than set by the dose; dose–response is non-monotonic and governed by proliferation and inundation thresholds; no PK/PD index has been established. Particle size precludes passive tissue distribution, so delivery must be organ-directed, and each route introduces constraints of its own. Anti-phage antibodies bound the duration of a course.

The product obstacles are the most often underestimated. Regulatory experience indicates that chemistry, manufacturing and control — endotoxin and host-cell residuals, characterization of the propagation strain, exclusion of lysogeny and transduction, potency specified for each cocktail component — accounts for a substantial share of programme delay. Susceptibility testing, on which patient eligibility depends, remains unstandardized. Narrow spectrum constrains the eligible population for any fixed product, shaping trial feasibility and commercial viability alike.

I will argue that these problems are tractable but not interchangeable, and end by briefly presenting our company's experience in developing the first phage therapy product in Korea, currently in phase 1 clinical trial.

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SESSION V-4

Building a Multidisciplinary Support Network

다학제 통합적 기술지원 체계 구축안

Seunghoon Han
(CEO, AIMS BioScience)



Curriculum Vitae



Name	**Seunghoon Han**
Institution	The Catholic University of Korea AIMS BioScience Co., Ltd.
Department	Pharmacology, College of Medicine
Position	Professor; Co-founder and CEO

▶ Biography

Education

Aug 2014	PhD, Graduate School The Catholic University of Korea
Feb 2007	MD, College of Medicine The Catholic University of Korea
Mar 2007 – Feb 2011	Clinical Pharmacology Residency Seoul St. Mary's Hospital

Career

Apr 2025 – present	Professor, Department of Pharmacology The Catholic University of Korea
2026 – present	Co-founder and CEO AIMS BioScience Co., Ltd.
Mar 2020 – present	Head, Department of Clinical Pharmacology & Therapeutics Seoul St. Mary's Hospital
Mar 2020 – Mar 2025	Associate Professor, Department of Pharmacology The Catholic University of Korea
Mar 2016 – Feb 2020	Assistant Professor, Department of Pharmacology The Catholic University of Korea
Mar 2014 – Feb 2016	Research Assistant Professor, Department of Pharmacology The Catholic University of Korea
Mar 2011 – Feb 2014	Lecturer, Department of Pharmacology The Catholic University of Korea

Academic Specialty

Clinical pharmacology; pharmacometrics; pharmacokinetic/pharmacodynamic modeling and simulation; translational and early-phase drug development

Building a Multidisciplinary Support Network

Seunghoon Han

AIMS BioScience Co., Ltd.

Abstract

Antibacterial drug development requires coordinated assessment of efficacy, exposure, safety, manufacturing, and clinical relevance. We propose a multidisciplinary technical support unit for Korea that links distributed expertise and infrastructure around specific development questions.

An internal core would retain responsibility for problem definition, support design, and evidence integration. A technical director would approve the scientific scope. A case lead would guide technical design and interpretation throughout each engagement. A project manager would coordinate activities, timelines, and data flows, while a service coordinator would support intake, contracts, and administration. These functions may be combined when appropriate expertise and capacity are available.

External experts would provide specialist judgments in microbiology and infection models, pharmacokinetics and pharmacodynamics, toxicology, manufacturing and quality, and clinical and regulatory development. Intellectual property and commercialization expertise could be added as needed. Laboratories and manufacturing organizations would generate new evidence when required, with expert advice distinguished from contracted execution.

Support would combine readiness assessment, development planning, study design, bottleneck resolution, and integrated recommendations according to each case. Agreed responsibilities and deliverables would link individual activities to the development question. Recommendations would state the evidence, remaining uncertainty, and conditions for the next action. Applicants would retain final development authority. Technical review and public-funding decisions would remain separate. Case agreements would define confidentiality, data-use rights, and management of conflicts of interest.

This model aims to make existing capabilities more accessible and useful to development teams while retaining accountability for integration and building experience for subsequent antibacterial development projects.

2026 INTERNATIONAL SYMPOSIUM on

ONE HEALTH ANTIMICROBIAL RESISTANCE

SESSION V-5

PANEL DISCUSSION

Antimicrobial Development Strategies Responding to Domestic Demand

국내 수요에 대응하는 항균제 개발 전략

Seunghoon Han (CEO, AIMS BioScience)
Hyunjung Go (COO, Peptoid)
Dongwoo Chae (Professor, Yonsei University)
Eun Kyoung Chung (Professor, Kyung Hee University)
Hee-Jong Hwang (CEO, A&J Science)
Jae-Ho Lee (Team Leader, LigaChem Bioscience)



Curriculum Vitae



Name **Seunghoon Han**
Institution The Catholic University of Korea
AIMS BioScience Co., Ltd.
Department Pharmacology, College of Medicine
Position Professor; Co-founder and CEO

▶ Biography

Education

Aug 2014	PhD, Graduate School The Catholic University of Korea
Feb 2007	MD, College of Medicine The Catholic University of Korea
Mar 2007 – Feb 2011	Clinical Pharmacology Residency Seoul St. Mary's Hospital

Career

Apr 2025 – present	Professor, Department of Pharmacology The Catholic University of Korea
2026 – present	Co-founder and CEO AIMS BioScience Co., Ltd.
Mar 2020 – present	Head, Department of Clinical Pharmacology & Therapeutics Seoul St. Mary's Hospital
Mar 2020 – Mar 2025	Associate Professor, Department of Pharmacology The Catholic University of Korea
Mar 2016 – Feb 2020	Assistant Professor, Department of Pharmacology The Catholic University of Korea
Mar 2014 – Feb 2016	Research Assistant Professor, Department of Pharmacology The Catholic University of Korea
Mar 2011 – Feb 2014	Lecturer, Department of Pharmacology The Catholic University of Korea

Academic Specialty

Clinical pharmacology; pharmacometrics; pharmacokinetic/pharmacodynamic modeling and simulation; translational and early-phase drug development

Curriculum Vitae



Name **Hyunjung Go**
Institution Peptoide CO., Ltd
Department R&D institute
Position COO

▶ Biography

Education

2020-2022	Ajou University Graduate MS (Chemical Engineering)
1986-1990	Ajou University undergraduate BS(Chemical Engineering)

Career

Oct/2018-Present	Peptoide CO., Ltd / COO/ New drug discovery & Developemnt (antibiotics, anticancer TPD)
Jun/2016-Mar/2017	BR Pharm CO., Ltd / QA general manager / BGMP, KGMP
Dec/2012-May/2016	Oskorea Pharm CO.,Ltd / QC,QA general manager / KGMP
Oct/2009-Oct/2012	SH Pharm CO., Ltd / Lead researcher, PM / Drug Development
Feb/2002-Feb/2009	Korea Wales Pharm CO., Ltd/ Senior Researcher, team leader / KGMP
Mar/1990-Mar/1996	Daehan chemical CO., Ltd/ Researcher / R&D

Academic Specialty

New drug Discovery & Development (Antibiotics, Anticancer TPD, Immunology) & Regulatory affairs , QC/QA analysis

Curriculum Vitae



Name **Dongwoo Chae**
Institution Yonsei university college of medicine
Department Department of pharmacology
Position Associate professor

▶ Biography

Education

Mar/2013~ Feb/2017	PhD, Yonsei University Graduate college of medicine, Korea
Mar/2000~ Feb/2006	MD, Yonsei University Graduate college of medicine, Korea

Career

2025.3~present	Department of Pharmacology, Yonsei University, Associate professor
2019.3~2025.2	Department of Pharmacology, Yonsei University, Assistant professor
2017.3~2019.2	Department of Pharmacology, Yonsei University, Instructor
2013.3~2017.2	Clinical Pharmacology, Yonsei University Health System, Resident
2011.3~2012.6	Neurosurgery, Severance Hospital, Korea, Resident
2010.3~2011.2	Severance Hospital, Korea, Intern

Academic Specialty

Member of the Korean Society of Clinical Pharmacology and Therapeutics (KSCPT)
President of the Population Approach Group Korea (PAGK) (2025. 03 – present)

Curriculum Vitae



Name **Eun Kyoung Chung**
Institution Kyung Hee University
Department College of Pharmacy, Department of Pharmacy
Position Professor

▶ Biography

Education

2010~2015	Ph.D. in Pharmacy Practice (concentration: Clinical Pharmaceutical Sciences), Purdue University, USA
2005~2010	Doctor of Pharmacy (Highest Distinction), Purdue University, USA
2000~2004	B.S. in Pharmacy, Sungkyunkwan University, Republic of Korea

Career

2026~Present	Professor, College of Pharmacy, Kyung Hee University
2021~2026	Director, Kyung Hee Drug Analysis Center, Kyung Hee University
2015~2026	Assistant Professor & Associate Professor, College of Pharmacy, Kyung Hee University
2021~2025	Chair, Department of Pharmacy, College of Pharmacy, Kyung Hee University
2021~2025	Chair, Department of Regulatory Science, College of Pharmacy, Kyung Hee University
2012~2014	Instructor/Course Coordinator, Department of Pharmacy Practice, College of Pharmacy, Purdue University, USA
2010~2014	Clinical Pharmacist Specialist, Infectious Diseases, Eskenazi Health (formerly, Wishard Memorial Hospital), IN, USA

Academic Specialty

Pharmacometrics, Hollow Fiber Infection Model, Infectious Diseases Pharmacotherapy, Antimicrobial Stewardship Program, Special Populations

Curriculum Vitae



Name **Hee-Jong Hwang**
Institution A&J Science Co., Ltd.
Department Management
Position CEO

▶ Biography

Education

2019 – 2022	The University of British Columbia, Ph.D. in Chemistry
2012 – 2015	The University of British Columbia, M.Sc in Chemistry
2007 – 2012	The University of British Columbia, B. Sc in Chemistry, minor in Commerce

Career

2021 – current	Founder & CEO of A&J Science
2018 – 2021	Research Director, Samhyun New Drug Development Co., Ltd.
2015 – 2018	Researcher at K-Medi Hub (DGMIF)

Academic Specialty

Synthetic Organic Chemistry, Natural Product, Medicinal Chemistry

Curriculum Vitae



Name **Jae-Ho Lee**
Institution LigaChem Biosciences, Inc
Department Antibiotics Team
Position Project Leader

▶ Biography

Education

2018	Ph.D. School of Life Sciences, Gwangju Institute of Science and Technology (GIST)
2011	MS. School of Life Sciences, Gwangju Institute of Science and Technology (GIST)
2009	BS. School of Life Science, Handong Global University

Career

2018–Present	LigaChem Biosciences, Inc. Antibiotics Team, Project Leader
Research Expertise	Two preclinical antibiotic development programs led Small-molecule antibiotics Antibody–antibiotic conjugates (AACs) Bacteriophage
Patent	2 Korean patent applications (1 granted); 1 PCT application
Publications	Nature Communications (2025); Communications Biology (2022)

Academic Specialty

Antimicrobial Drug Discovery and Development



Korea Disease Control and Prevention Agency

National Institute of Health