Korea-Czech Forum on Genome Editing for Human Disease

May 8, 2022 | ARA I, Four Seasons Hotel Seoul

Time Slot	Speaker (affiliation)	Title
12:00-13:00(60) ARA II	Lunch	
13:00-13:10(10) ARA I	Je Kyung Seong (Director, Korea Mouse Phenotyping Center, Korea)	Welcome Remarks
13:10-13:15(5) ARA I	Young Hye Kim (Director, Bioscience Resources Division, Ministry of Science and ICT, Korea)	Congratulatory Remarks
13:15-13:20(5) ARA I	Gustav Slamečka (Ambassador, Embassy of the Czech Republic in Korea)	Congratulatory Remarks
Group Photo		
13:20-13:40(20) ARA I	Radislav Sedlacek (Czech Centre for Phenogenomics, Czech Republic)	Strategic development of CCP: Basic research reaches preclinical development: Towards modelling human diseases and their treatments and modelling infections in mouse models
13:40-14:00(20) ARA I	Hyongbum (Henry) Kim (Professor, Yonsei University College of Medicine)	Predicting the Efficiencies and Outcomes of Genome Editing and time-recording using Cas9
14:00-14:20(20) ARA I	Jan Prochazka (Head of Phenotyping Module and Preclinical Studies, Czech Centre for Phenogenomics, Czech Republic)	Phenotype analysis of biomineralized tissues and preclinical models
14:20-14:40(20) ARA I	Jeong Hun Kim (Professor, Seoul National University College of Medicine)	In Vivo Genome Editing for Vision
14:40-15:00(20)	Coffee Break	
15:00-15:20(20) ARA I	Petra Kralova-Viziova (Head of PDX and Cancer Models Unit, Czech Centre for Phenogenomics, Czech Republic)	Cancer models and preclinical approaches using PDX/CDX model for personalised medicine
15:20-15:40(20) ARA I	Kyoungmi Kim (Associate Professor, Korea University College of Medicine)	Targeted Mutagenesis in Mice with CRISPR/Cas9-based Base Editor and Enhanced Prime Editor
15:40-16:00(20) ARA I	Jan Rozman (Deputy Director, Czech Centre for Phenogenomics, Czech Republic)	Mice as experimental models for human metabolic disorders – insights from large-scale biology projects and in-depth metabolic phenotyping
16:00-17:00(60) ARA I	Discussion and Wrap Up	

About the KMPC

The Korea Mouse Phenotyping Center (KMPC) was established by the South Korean Ministry of Science and ICT in 2013 with the aim of developing genetically engineered mice (GEM), analyzing mouse phenotypes, and sharing mouse resource information. KMPC created the Mouse One Portal (MOP) in 2016, which is a one-stop online platform for mouse resources, with a focus on ease of use and a simple process. Through MOP, researchers are able to select and submit applications for various phenotype services in following specialties such as metabolism and exercise, sensory, in vivo molecular imaging, pathology, primary and secondary, cardiovascular, and immunophenotyping and resource services (banking, rederivation, health monitoring, and genetic monitoring) with ease. MOP is also a user-friendly platform for finding GEM information of domestic and international mouse communities at a glance, ordering bespoke mouse production, and sharing mouse resources with others.

Drawing upon KMPC's expertise on mouse resources and relevant data management, the South Korean government designated KMPC as the principal organization for preclinical trials using mice and hamsters as well as for a model animal bioresource cluster in 2021.

For more efficient and reliable preclinical trials, KMPC has established a research alliance by linking several BSL-3 facilities in its network and has created standardized protocol guidelines. KMPC has also created a laboratory information management system (LIMS) to store large-scale data; this database will enable Korean researchers to handle mutant viruses and disease X promptly and precisely in the future.

Diverse model animal resources play a vital role in improving research competence in biomedicine. To foster bioresources and accelerate the growth of bioresearch, the South Korean government has restructured 274 formerly scattered bioresource banks into 14 bioresource clusters, including the model animal cluster for which KMPC was designated the principal organization. Thanks to its rich experience with MOP, KMPC has been making efforts to develop the Korean Animal Model Archive (KAMA), an integrated system of model animal resource information.

KMPC has consistently contributed to the global leadership of research communities on mouse models and is actively involved in the International Mouse Phenotyping Consortium (IMPC) as the only institutional member in South Korea, the Asian Mouse Mutagenesis Resource Association (AMMRA), and Global Mouse Models for COVID-19 Consortium (GMMCC). KMPC plays a crucial role in building a fundamental infrastructure for mouse research, thereby contributing to advancing biomedical research in the world.

Hyongbum (Henry) KIM, MD, Ph.D

Avison Distinguished Professor, Department of Pharmacology, Yonsei University College of Medicine

Email: hkim1@yuhs.ac / aquamd@gmail.com

Website: https://sites.google.com/site/hyongbumkimlab/home

Dr. Kim received his M.D. in 2001 and Ph.D. in 2006 from Yonsei University, Seoul. During his Ph.D. programme, he studied tissue engineering. After postdoctoral training at Emory University, Atlanta, Georgia, USA, in the field of stem cell biology, he became an independent researcher in 2010, when he changed his research field to genome editing. His laboratory is interested in genome engineering in several types of cultured cells (including stem cells) and in mammals, as well as in the development of CRISPR-Cas-based high-throughput methods for genetic studies.

Talk: **Predicting the Efficiencies and Outcomes of Genome Editing and time-recording using Cas9**

Jeong Hun KIM, MD, Ph.D

- Professor, Department of Biomedical Sciences, Clinical Sciences and Ophthalmology, Seoul National University College of Medicine
- Director, FARB (Fight against Angiogenesis-Related Blindness) Laboratory, Clinical Research Institute, Seoul National University Hospital

Email: steph25@snu.ac.kr

Website: http://www.snuh.org/global/en/blog/00956/career.do?scsContCnt=3&dr_cd=00956

Dr. Jeong Hun Kim is a clinician-scientist and has led a translational research laboratory of Fight-against Angiogenesis-Related Blindness (FARB) Lab since 2009. As an ophthalmologist, he has specialized in pediatric retinal disease, childhood retinal disease, congenital eye disease, retinoblastoma, and retinopathy of prematurity. He earned his MD in 1998 and Ph.D in 2006 from the Seoul National University.

Talk: **In Vivo Genome Editing for Vision**

*Recent co-work of Hyongbum (Henry) Kim and Jeong Hun Kim as co-corresponding authors:

Jang, H., Jo, D.H., Cho, C.S. *et al.* Application of prime editing to the correction of mutations and phenotypes in adult mice with liver and eye diseases. *Nat Biomed Eng* **6,** 181–194 (2022). https://doi.org/10.1038/s41551-021-00788-9

Kyoungmi KIM, Ph.D

Associate Professor, Department of Physiology, Korea University College of Medicine

Email: kim0912@korea.ac.kr

Website: https://shorturl.at/lryDK

Dr. Kyoungmi Kim has a specialty in RNA-guided genome editing with Korea and PCT patent and has explored research on development of treatment using CRISPR and interchromosomal recombination in mouse embryos. She has also been invited to several talks in Korea and Netherlands and has published several studies in prestigious journals such as *Nature Biotechnology*, *Nature Communications*, *Genome Research*, *Genome Biology, Journal of Clinical Investigation*, and more. After receiving her Ph.D degree at the Ewha Womans University in 2013, she was a postdoctoral fellow at the Ewha Womans University and a research fellow at the Institute for Basic Science Center for Genome Engineering.

Talk: **Targeted Mutagenesis in Mice with CRISPR/Cas9-based Base Editor and Enhanced Prime Editor**

Czech Centre for Phenogenomics

Profiles of the representatives of the Czech Centre of the Phenogenomics

(Institute of Molecular Genetics of the Czech Academy of Sciences, Czech Republic)

Czech Centre for Phenogenomics (CCP) is a unique national large research infrastructure with approx. 140 employees and area of 9,000 sqm. CCP combines genetic engineering capabilities, advanced phenotyping, and preclinical research. CCP provides services using precise animal models to assess new compounds and therapeutic procedures. CCP is one of the largest centres for genetic engineering of mouse models that are a key tool in biomedical research.
CCP has established the state-of-the-art technologies of genome editing (e.g. CRISPR/Cas) and its ability to engineer the mouse genome has greatly transformed biomedical research in the last decade. The genome-editing technologies have become important tools for not only assigning functions to genes at the level of the whole complexity of organism, creating models of genetic disorders, evaluating effects of new promising drugs, but they also answer fundamental questions of applied research regarding the technologies to cure human genetic diseases.
https://www.phenogenomics.cz

Radislav Sedlacek, Assoc. Prof. PhD (PD. Dr. rer. nat. habil.)

Director of CCP
Head of Department of transgenic models of diseases
Chair of IMPC Steering committee
Past chair of Strategic Working Group for Health & Food, (European Strategy Forum for Research Infrastructures)

radislav.sedlacek@img.cas.cz

R. Sedlacek is focused on functional analysis of gene functions. Besides his strategic functions serving the scientific community, his research is devoted to utilization of cutting-edge genome editing technologies and deep phenotyping analysis of an animal model to uncover novel genetic mechanisms of human diseases.

Talk **"Strategic development of CCP: Basic research reaches preclinical development: Towards modelling human diseases and their treatments and modelling infections in mouse models"**

Jan Rozman, PhD
Deputy director of CCP
https://www.phenogenomics.cz/phenotyping/metabolism

jan.rozman@img.cas.cz

Jan Rozman's main research expertise is in the physiological, molecular, and genetic factors involved in energy balance regulation of endotherm vertebrates. Since 2012, J. Rozman is a guest scientist and lecturer at the Institute of Biology (Behavior & Ecology, Molecular Physiology). University of Siegen /Germany. Since 2011, he chairs IMPC Phenotyping Specialist Group for Metabolism. Since 2017, he is a member of The Foundation of Prader-Willi Research/Pre-Clinical Animal Network (PCAN).

Talk "**Mice as experimental models for human metabolic disorders – insights from large-scale biology projects and in-depth metabolic phenotyping**"

Jan Prochazka, PhD
Head of Phenotyping module and preclinical studies
https://www.phenogenomics.cz/phenotyping

jan.prochazka@img.cas.cz

During the last 10 years J. Prochazka focused to explore molecular and cellular mechanism of embryonic development. Beside working on molecular mechanisms of tooth development J. Prochazka has been also interested in other developmental systems. His expertise is in annotation and interpretation of developmental defects and in biomineralisation phenotypes with deeper focus on dental tissues. The most recently J. Prochazka devotes to deeper understanding of gene pleiotropy in development regulatory genes and their functions in rare diseases and possibilities for gene therapy.

Talk **"Phenotype analysis of biomineralized tissues and preclinical models"**

Petra Kralova-Viziova, D.V.M., Ph.D.
Head of PDX and cancer models unit
https://www.phenogenomics.cz/phenotyping/pdx-and-cancer-models

petra.kralova-viziova@img.cas.cz

P. Kralova-Viziova joined CCP in 2017. She leads a PDX (cancer models) unit, which provides services for experimental designing and conducting of in vivo oncology studies and develops guidelines for orthotopic cancer models, biosafety, PDX and humanised models.

Her research interests are: Orthotopic PDX/CDX models, humanised models, preclinical study design, and humane endpoints. Since 2019 she is a member of EuroPDX consortium.
Before she worked as Technical & Scientific Affairs Manager Europe/ Professional Education Specialist for Hill´s Pet Nutrition Manufacturing s.r.o, and as a surgeon for rodents and birds in Small Animal Hospital Ivet and Veterinary clinic Mada.

Talk **“Cancer models and preclinical approaches using PDX/CDX model for personalised medicine”**
