

# SEONGJU LEE, PhD, DVM

Postdoctoral Researcher | Veterinarian | Theriogenology and Reproductive Biotechnology

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## RESEARCH PROFILE

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Veterinarian and postdoctoral researcher trained in veterinary obstetrics, theriogenology, and porcine reproductive biotechnology. Research interests focus on porcine oocyte and embryo biology, in vitro maturation (IVM), semen cryopreservation, CRISPR-based epigenetic editing, genome-edited animal models, and translational large-animal research. Experienced in managing independent national research grants and contributing to institutional agricultural and environmental projects.

## EDUCATION

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### Ph.D. in Veterinary Obstetrics (Theriogenology)

Jeonbuk National University, South Korea | *March 2022 – February 2026*

- Integrated MS/PhD Programme.
- Dissertation: Porcine reproductive biotechnology and CRISPR/Cas9-TET1-mediated epigenetic editing in cumulus-oocyte complexes.

### D.V.M. (Doctor of Veterinary Medicine)

Jeonbuk National University, South Korea | *March 2016 – January 2022*

- Professional veterinary medical degree.

## ACADEMIC APPOINTMENTS & RESEARCH EXPERIENCE

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### Postdoctoral Researcher

Biosafety Research Institute, Jeonbuk National University, South Korea | *March 2026 – Present*

- Conduct research on reproductive medicine, genome editing, and large-animal models of human diseases.
- Develop and review translational research concepts using porcine models and assisted reproductive technologies (ART).

### Graduate Researcher

Theriogenology and Biotechnology Laboratory, Jeonbuk National University, South Korea | *March 2022 – February 2026*

- Designed and executed epigenetic editing protocols via CRISPR/Cas9-TET1 systems to enhance porcine oocyte competence.
- Performed extensive research on porcine oocyte in vitro maturation (IVM), in vitro fertilisation (IVF), and embryo culture.

- Managed laboratory reproductive trials, including semen cryopreservation, quality assessments, and artificial insemination setups.

## GRANTS & FUNDED RESEARCH PROJECTS

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### As Principal Investigator (PI)

- **Epigenetic Editing via dCas9-TET1-Mediated Targeted DNA Demethylation of MTNR1A to Enhance Porcine Oocyte Competence and Developmental Capacity**  
Funded by the Ministry of Education / National Research Foundation of Korea (NRF) | Project Type: Ph.D. Student Research Fellowship | *September 2024 – August 2025*

### As Co-Investigator / Senior Researcher

- **Production of Transgenic Porcine Embryos Utilizing In Vitro Fertilization and CRISPR/Cas Systems**  
Funded by the Ministry of Science and ICT / National Research Foundation of Korea (NRF) | *June 2023 – February 2025*
- **Development and Management System of Customised Intravenous Fluid Therapy Tailored to Porcine Breeding Cycles**  
Funded by the Ministry of Agriculture, Food and Rural Affairs / IPET | *January 2022 – December 2023*

### As Research Assistant / Participant

- **Operational Program for Graduate School Specializing in Wildlife Disease Professional Training**  
Funded by the Ministry of Environment / National Institute of Wildlife Disease Control and Prevention | *September 2022 – August 2025*
- **Control Mechanisms of Vector-Borne Infectious Diseases in Response to Climate Change**  
Funded by the Ministry of Education / National Research Foundation of Korea (NRF) | *March 2023 – February 2024*
- **Development of Genome-Edited Animal Models for Human Disease Mechanisms**  
Funded by the National Research Foundation of Korea (NRF) | Contribution: Focused on molecular validation and target gene epigenetic modifications | *July 2021 – August 2025*
- **AI-Driven Regular Surveillance and Diagnostic Examination Protocols**  
Funded by the Korea Animal Health Products Association | *January 2021*
- **AI-driven Diagnostic and Optimization Protocols in Veterinary Theriogenology**  
National research initiative | Contribution: Collected reproductive parameters and established structured validation datasets | *January 2021 – August 2025*

## HONOURS, AWARDS, & SCHOLARSHIPS

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- **JBNU-G Researcher Award (President's Award)** | Jeonbuk National University (May 2025)
- **Outstanding Oral Presentation Award** | Korean Society of Animal Biotechnology (2024)

- **Research Grant & Fellowship for Healthcare Studies** | Health Fellowship Foundation (2024)
- **Research Scholarship for Integrated MS/PhD Programme** | Jeonbuk National University (2022 – 2026)
- **Specialization Scholarship for Academic Excellence** | Jeonbuk National University (2018)

## PEER-REVIEWED PUBLICATIONS

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### International Journals (SCIE)

1. **Lee, S.**, et al. (2024). Preliminary research on tailored fluid therapy in pigs: comparing customised ionic solutions with Hartmann's solution. *BMC Veterinary Research*, 20, 26. [First author]
2. **Lee, S.**, et al. (2024). Analysis of blood composition by porcine breeding cycle. *Veterinary Medicine and Science*, 10, 4. [First author]
3. **Lee, S.**, et al. (2023). Antioxidant effects of myo-inositol improve the function and fertility of cryopreserved boar semen. *Antioxidants*, 12, 4. [Co-first author]

### Domestic Journals (KCI)

4. **Lee, S.**, et al. (2025). CRISPR/Cas-based genome editing technology in animal models of human disease: mechanisms, advances, and prospects. *Journal of Animal Reproduction and Biotechnology*, 40, 4. [Co-first author]
5. **Lee, S.**, et al. (2022). Development of a new mini straw for cryopreservation of boar semen. *Journal of Animal Reproduction and Biotechnology*, 37, 4. [Third author]

## CONFERENCE PRESENTATIONS

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### International Presentations

1. **Lee, S.**, et al. (2024). CRISPR/dCas9-TET1-mediated targeted DNA demethylation of MTNR1A in porcine cumulus-oocyte complexes enhances oocyte maturation. *Society for the Study of Reproduction (SSR) 57th Annual Meeting*. [Poster, Co-first author]
2. **Lee, S.**, et al. (2024). The antioxidative effect of MnTBAP on boar sperm cryopreservation. *Society for the Study of Reproduction (SSR) 57th Annual Meeting*. [Poster]
3. **Lee, S.**, et al. (2024). Evaluation of a novel customised fluid therapy approach for pigs: comparing tailored ionic solutions with standard Hartmann's solution. *23rd Federation of Asian Veterinary Associations (FAVA) Congress*. [Poster, First author]

### Domestic Presentations

1. **Lee, S.**, et al. (2025). Evaluating the efficacy of culture medium supplements for extended in vitro culture of porcine blastocysts. *Korean Society of Animal Biotechnology 2025 Annual Meeting*. [Poster, First author]
2. **Lee, S.**, et al. (2024). Enhancing porcine oocyte maturation through CRISPR/dCas9-TET1-mediated demethylation of melatonin receptor 1A. *Korean Society of Animal Biotechnology 2024 Annual Meeting*. [Oral, First author]

3. **Lee, S.**, et al. (2024). Effects of MnTBAP against oxidative stress on Porcine Semen Cryopreservation. *Korean Society of Animal Biotechnology Annual Meeting*. [Poster]
4. **Lee, S.**, et al. (2023). Supplementing boar semen with myo-inositol before freezing enhances the quality of thawed semen and increases fertility. *Korean Society of Developmental Biology 42nd Annual Meeting*. [Poster, First author]
5. **Lee, S.**, et al. (2023). Evaluating the suitability of customised fluids for intravenous therapy in healthy pigs. *Korean Society of Animal Biotechnology 2023 Annual Meeting*. [Poster, First author]
6. **Lee, S.**, et al. (2022). The addition of K-carrageenan to the freezing diluent improves porcine sperm cryosurvival. *Korean Society of Animal Biotechnology 2022 Annual Meeting*. [Poster, First author]

## TEACHING & MENTORING

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- **Teaching Support, Veterinary Theriogenology Practical Training | 2022 – 2026**  
Jeonbuk National University, College of Veterinary Medicine: Supported practical teaching for veterinary undergraduate students, including artificial insemination, reproductive tract observation, semen collection/evaluation, vaginal cytology, and porcine IVM protocols.
- **Journal Club and Research Presentation Mentoring | 2022 – 2026**  
Theriogenology and Biotechnology Laboratory: Guided junior researchers and peers in presentation design and analysis for porcine oocyte maturation, genome editing, and reproductive biotechnology.

## TECHNICAL SKILLS

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- **Assisted Reproduction:** Porcine cumulus-oocyte complex (COC) handling, IVM, IVF, embryo culture, extended blastocyst culture, semen cryopreservation, sperm motility and morphology evaluation.
- **Genome Editing:** CRISPR/Cas9 systems, dCas9-TET1 epigenetic editing, targeted DNA demethylation, genome-edited animal model design.
- **Molecular Biology:** Gene expression analysis (qPCR), western blot interpretation, antibody validation planning, oxidative stress and mitochondrial function assays.
- **Animal Research:** Porcine reproductive surgeries, large-animal experimental design, veterinary clinical and laboratory procedures, welfare-aware study planning.
- **Data & Writing:** Literature review, manuscript preparation, figure and table planning, academic presentation, AI-assisted research workflow design.

## TRAINING, LICENSURE, & PROFESSIONAL ACTIVITIES

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- Licensed Veterinarian, Ministry of Agriculture, Food and Rural Affairs, South Korea (License No. 2022-02-10)
- SNU Data Analysis and AI Training Programme, Seoul National University (June 2024 – August 2024)

- Environmental Ministry 2030 Advisory Group, Natural Ecology Division (January 2025 – December 2025)
- UN SDSN Youth SDG Coordinator, UN Sustainable Development Solutions Network (March 2019 – February 2020)
- Co-representative, Veterinary Future Institute (VETFI)
- Contributor, Nongmin Newspaper: public commentary on animal medical policy (July 2023)

## **RESEARCH KEYWORDS**

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Porcine oocyte biology; in vitro maturation (IVM); cumulus-oocyte complex; embryo culture; blastocyst development; semen cryopreservation; CRISPR/dCas9-TET1; targeted DNA demethylation; MTNR1A; melatonin receptor; assisted reproductive technology (ART); genome-edited animal models; translational large-animal research; veterinary theriogenology.

*Last updated: May 2026*