

SEONGJU LEE, PhD, DVM

Postdoctoral Researcher | Veterinarian | Theriogenology and Reproductive Biotechnology

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RESEARCH PROFILE

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, semen cryopreservation, CRISPR-based epigenetic editing, genome-edited animal models, and translational large-animal research. Admitted medical school matriculant for 2028.

EDUCATION

PhD in Veterinary Obstetrics (Theriogenology), Jeonbuk National University | 2022-2026

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

DVM, Doctor of Veterinary Medicine, Jeonbuk National University | 2016-2022

Professional veterinary medical degree.

ACADEMIC APPOINTMENTS AND RESEARCH EXPERIENCE

Postdoctoral Researcher, Biosafety Research Institute, Jeonbuk National University | 2026-present

Research on reproductive medicine, genome editing, and large-animal models of human disease.

Graduate Researcher, Theriogenology and Biotechnology Laboratory, Jeonbuk National University | 2022-2026

Porcine oocyte IVM, IVF, embryo culture, semen cryopreservation, and CRISPR/dCas9-TET1 epigenetic editing.

SELECTED FUNDED RESEARCH PROJECTS

- Principal investigator: Epigenetic editing via dCas9-TET1-mediated targeted DNA demethylation of MTNR1A to enhance porcine oocyte competence and developmental capacity. NRF PhD Student Research Fellowship, 2024-2025.
- Co-investigator / senior researcher: Production of transgenic porcine embryos utilizing IVF and CRISPR/Cas systems. NRF, 2023-2025.
- Co-investigator / senior researcher: Development and management system of customised intravenous fluid therapy tailored to porcine breeding cycles. IPET, 2022-2023.
- Research participant: genome-edited animal models, wildlife disease professional training, AI-assisted diagnostic protocols, and climate-related vector-borne disease projects.

HONOURS, AWARDS, AND SCHOLARSHIPS

- JBNU-G Researcher Award (President's Award), Jeonbuk National University, 2025.
- Outstanding Oral Presentation Award, Korean Society of Animal Biotechnology, 2024.
- Research Grant and Fellowship for Healthcare Studies, Health Fellowship Foundation, 2024.
- Outstanding Poster Award, Korean Society of Developmental Biology, 2023.
- Research Scholarship for Integrated MS/PhD Programme, Jeonbuk National University, 2022-2026.
- Specialization Scholarship for Academic Excellence, Jeonbuk National University, 2018.

PEER-REVIEWED PUBLICATIONS AND MANUSCRIPTS

1. Lee S, Yu I-J, Jeon Y. (2026). Fetal Bovine Serum Is Essential for Maintaining Viability of Porcine Blastocysts During Extended In Vitro Culture: A Comparative Study With Defined Supplements. *Reproduction in Domestic Animals* 61(3):e70195 doi:10.1111/rda.70195 PMID:41804032 [First author]
2. Lee S, Kim B, Ryu H, Park S, Hyun SH, Jeon Y, Park H. (2026). Epigenetic activation of MTNR1A via CRISPR/dCas9-Tet1 restores redox barrier and gap junction communication to rescue aged oocyte competence. *Manuscript under review* [Co-first author]
3. Lee S, et al. (co-first author). (2025). CRISPR/Cas-based genome editing technology in animal models of human disease: mechanisms, advances, and prospects. *Journal of Animal Reproduction and Biotechnology* 40(3):109 doi:10.12750/JARB.40.3.109 [Co-first author]

4. Lee S, Lee SC, Jeon Y. (2024). Analysis of blood composition by porcine breeding cycle. *Veterinary Medicine and Science* 10(2):e31376 doi:10.1002/vms3.1376 PMID:38358072 [First author]
5. Lee S, et al.. (2024). Preliminary research on tailored fluid therapy in pigs: comparing customized ionic solutions with Hartmann's solution. *BMC Veterinary Research* 20:278 doi:10.1186/s12917-024-04145-1 PMID:38926827 [First author]
6. Osman R, et al. (Lee S, co-first author). (2023). Antioxidant effects of myo-inositol improve the function and fertility of cryopreserved boar semen. *Antioxidants* 12(9):1673 doi:10.3390/antiox12091673 PMID:37759976 [Co-first author]
7. Almubarak A, et al.. (2022). Development of a new mini straw for cryopreservation of boar semen. *Journal of Animal Reproduction and Biotechnology* 37(2):113-120 doi:10.12750/JARB.37.2.113

CONFERENCE PRESENTATIONS

1. Lee S, et al. (2025). Evaluating the efficacy of culture medium supplements for extended in vitro culture of porcine blastocysts. KSARB 2025 Annual Meeting. South Korea. [Poster; First-author presenter]
2. 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. International. [Poster; First-author presenter]
3. Lee S, et al. (2024). The antioxidative effect of MnTBAP on boar sperm cryopreservation. Society for the Study of Reproduction (SSR) 57th Annual Meeting. Dublin, Ireland. [Poster; Co-author presentation]
4. 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. Dublin, Ireland. [Poster; First-author presenter]
5. Lee S, et al. (2024). Enhancing porcine oocyte maturation through CRISPR/dCas9-TET1-mediated demethylation of melatonin receptor 1A. KSARB 2024 Annual Meeting. South Korea. [Oral; First-author presenter; Outstanding Oral Presentation Award]
6. 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. South Korea. [Poster; First-author presenter; Outstanding Poster Award]
7. Lee S, et al. (2023). Evaluating the suitability of customised fluids for intravenous therapy in healthy pigs. KSARB 2023 Annual Meeting. South Korea. [Poster; First-author presenter]
8. Lee S, et al. (2022). The addition of K-carrageenan to the freezing diluent improves porcine sperm cryosurvival. KSARB 2022 Annual Meeting & International Symposium. South Korea. [Poster; Co-author presentation]

TEACHING AND MENTORING

- Teaching support, Veterinary Theriogenology Practical Training, Jeonbuk National University College of Veterinary Medicine, 2022-2026.
- Journal club and research presentation mentoring for junior researchers in porcine oocyte maturation, genome editing, and reproductive biotechnology, 2022-2026.

TECHNICAL SKILLS

- Assisted reproduction: porcine 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: qPCR, western blot interpretation, antibody validation planning, oxidative stress and mitochondrial function assays.
- Animal research: porcine reproductive procedures, large-animal experimental design, veterinary clinical and laboratory procedures, welfare-aware study planning.
- Data and writing: literature review, manuscript preparation, figure and table planning, academic presentation, AI-assisted research workflow design.

TRAINING, LICENSURE, AND PROFESSIONAL ACTIVITIES

- Licensed Veterinarian, Ministry of Agriculture, Food and Rural Affairs, South Korea.
- SNU Data Analysis and AI Training Programme, Seoul National University, 2024.
- Environmental Ministry 2030 Advisory Group, Natural Ecology Division, 2025.
- Co-representative, Veterinary Future Institute (VETFI).
- Builder, KVLE veterinary licensing exam study platform.

RESEARCH KEYWORDS

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