Sangwoo Lee

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RESEARCH FOCUSES

- Salivary gland development/morphogenesis
- Salivary gland tissue engineering
- Salivary gland regeneration
- Nanomaterials for salivary gland radioprotection
- Sjogren's syndrome and other salivary gland dysfunction
- General biomedical engineering and biomaterial fields

DEGREE & EDUCATION

B.S. in Biological Science Sep 2006 - Aug 2010

Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Republic of Korea

M.S. in Doctor of Dental Surgery Mar 2011 - Feb 2015

School of Dentistry, Seoul National University, Seoul, Republic of Korea

Ph.D. in Neurobiology Mar 2015 - Feb 2021

School of Dentistry, Seoul National University, Seoul, Republic of Korea

RESEARCH EXPERIENCE

Postdoctoral fellow **Mar 2021 – Aug 2021**
Department of Oral Physiology, School of Dentistry, Seoul National University

Research Professor **Sep 2021 – Feb 2022**
Department of Oral Physiology, School of Dentistry, Seoul National University

Assistant Professor **Mar 2022 – Present**
Department of Oral Physiology, School of Dentistry, Seoul National University

INDUSTRIAL EXPERIENCE

Chief Scientific Officer (as concurrent job) **Oct 2023 – Present**
SiALBIO

Outside Director (as concurrent job) **Mar 2022 – Present**
TECOZYME

PUBLICATIONS

First/Corresponding Authored Papers

1. Lee, Y., Kim, Y., Kwon, S., Park, O. K., Min, G. H., Chu, J., ... & Hyeon, T. G*, **Lee, S. W.*,** Han, S. I.* (2025). Orally Administered Nanoparticle Coacervate for Therapeutic Coating of Full Gastrointestinal Tract. *Advanced materials (Deerfield Beach, Fla.)*, e14708.

2. Lee, Y., Yoo, S., Kwon, S., Lee, J., Lee, S., Kim, Y., ... & **Lee, S. W.*** (2025). Microneedle Patch Loaded with Metabolized Elastin-Complexed Ceria Nanoparticles for Oral Ulcer Treatment. *ACS Applied Materials & Interfaces*.

3. Wang, L., Kwon, S., Park, S., Namkoong, E., Kim, J., Sim, H. Y., ... & **Lee, S. W.*** (2025). Biomimetic Salivary Gland Cancer Spheroid Platform for In Vitro Recapitulation of Three-Dimensional Tumor–Stromal Interactions. *Biomolecules*, *15*(12), 1634.

4. Ryu, H. S., Lee, E. H., Kwon, H. B., Lim, Y. J., **Lee, S. W*.**, & Kim, M. J.* (2025). The effects of fabrication methods and build orientation on Candida albicans adhesion on 3D-printed and conventional denture resin: an in vitro comparative study. *BMC Oral Health*, *25*(1), 1788.

5. Lee, Y. H., Seo, S., Kim, T. S., & **Lee, S. W.*** (2025). Oral Candidiasis Associated with Aging and Salivary Hypofunction in Stomatitis Patients. *Journal of Fungi*, 11(8), 574.

6. Kwon, S., Ryu, J. H., Kim, J., Shin, H. H., Chung, G., Taghizadeh, A., ... & **Lee, S. W.*** (2025). Biomimetic Catechol-Incorporated Polyacrylonitrile Nanofiber Scaffolds for Tissue Engineering of Functional Salivary Glands. *Biomaterials research*, 29, 0226.

7. Lee, E. H., Kim, H., Lee, J. H., Kim, Y., Kwon, H. B., Lim, Y. J., ... **Lee, S. W.*** & Kim, M. J*. (2025). Self-Powered Oxygen Microbubble Generator for Decontamination of Anaerobic Biofilm-Fouled Bioimplants. *ACS Biomaterials Science & Engineering*.

8. Kim, H. S., Kim, M., Kim, Y., Shin, H. H., **Lee, S. W*.**, & Ryu, J. H*. (2024). Antimicrobial adhesive self-healing hydrogels for efficient dental biofilm removal from periodontal tissue. *Dental Materials*.

9. Chang, F., Wang, L., Kim, Y., Kim, M., Lee, S., & **Lee, S. W.*** (2024). The Aryl Hydrocarbon Receptor Regulates Invasiveness and Motility in Acute Myeloid Leukemia Cells through Expressional Regulation of Non-Muscle Myosin Heavy Chain IIA. *International Journal of Molecular Sciences*, 25(15), 8147.

10. Lee, E. H., **Lee, S. W**., Seo, Y., Deng, Y. H., Lim, Y. J., Kwon, H. B., ... & Kim, M. J. (2022). Manganese Oxide Nanozyme-Doped Diatom for Safe and Efficient Treatment of Peri-Implantitis. *ACS Applied Materials & Interfaces*.

11. Lee, S. M., **Lee, S. W**., Kang, M., Choi, J. K., Park, K., Byun, J. S., & Kim, D. Y. (2021). FoxO1 as a Regulator of Aquaporin 5 Expression in the Salivary Gland. *Journal of Dental Research*, 100(11), 1281-1288.

12. **Lee, S. W.**, Kim, J., Cong, X., Yu, G. Y., Ryu, J. H., & Park, K. (2021). Efficient Surface Immobilization of Chemically Modified Hyaluronans for Enhanced Bioactivity and Survival of In Vitro-Cultured Embryonic

Salivary Gland Mesenchymal Cells. *Polymers*, 13(8), 1216.

13. Kim, J., **Lee, S. W.**, & Park, K. (2021). CXCR4 Regulates Temporal Differentiation via PRC1 Complex in Organogenesis of Epithelial Glands. *International journal of molecular sciences*, 22(2), 619.

14. **Lee, S. W.**, Kim, J., Do, M., Namkoong, E., Lee, H., Ryu, J. H., & Park, K. (2020). Developmental role of hyaluronic acid and its application in salivary gland tissue engineering. *Acta Biomaterialia*, 115, 275-287.

15. Han, S. I., **Lee, S. W.**, Cho, M. G., Yoo, J. M., Oh, M. H., Jeong, B., ... & Hyeon, T. (2020). Epitaxially strained CeO_2/Mn_3O_4 nanocrystals as an enhanced antioxidant for radioprotection. *Advanced Materials*, 32(31), 2001566.

16. **Lee, S. W.**, Ryu, J. H., Do, M. J., Namkoong, E., Lee, H., & Park, K. (2020). NiCHE platform: nature-inspired catechol-conjugated hyaluronic acid environment platform for salivary gland tissue engineering. *ACS Applied Materials & Interfaces*, 12(4), 4285-4294.

17. Shin, Y., **Lee, S. W.**, Namkoong, E., An, W., Lee, J. H., Brown, P. D., & Park, K. (2019). Epigenetic modification as a regulatory mechanism for spatiotemporal dynamics of ANO1 expression in salivary glands. *International journal of molecular sciences*, 20(24), 6298.

Co-authored Papers

1. Son, S. H., **Lee, S. W.**, & Chung, G. (2024). Loss of dental pulp potentially increased the risk of Alzheimer's dementia. *Journal of Dental Sciences*.

2. Kim, H., Lee, E. H., **Lee, S. W.**, Deng, Y. H., Kwon, H. B., Lim, Y. J., ... & Kim, M. J. (2023). Antimicrobial efficacy of self-locomotive manganese oxide nanozyme-doped diatom microbubbler on orthodontic brackets in vitro. *BMC Oral Health*, 23(1), 33.

3. Kim, M., **Lee, S. W.**, Kim, J., Shin, Y., Chang, F., Kim, J. M., ... & Park, K. (2021). LPS-induced epithelial barrier disruption via hyperactivation of CACC and ENaC. *American Journal of Physiology-Cell Physiology*, 320(3), C448-C461.

4. Choi, S., Han, S. I., Jung, D., Hwang, H. J., Lim, C., Bae, S., ... & Kim, D. H. (2018). Highly conductive, stretchable and biocompatible Ag–Au core–sheath nanowire composite for wearable and implantable bioelectronics. *Nature nanotechnology*, 13(11), 1048-1056.

5. Cong, X., Zhang, X. M., Zhang, Y., Wei, T., He, Q. H., Zhang, L. W., ... & Wu, L. L. (2018). Disruption of endothelial barrier function is linked with hyposecretion and lymphocytic infiltration in salivary glands of Sjögren's syndrome. *Biochimica et Biophysica Acta (BBA)-Molecular Basis of Disease*, 1864(10), 3154-3163.

6. Kim, J. M., Choi, S., **Lee, S. W.**, & Park, K. (2018). Voltage-dependent Ca^{2+} channels promote branching morphogenesis of salivary glands by patterning differential growth. *Scientific reports*, 8(1), 1-11.

7. Namkoong, E., **Lee, S. W.**, Kim, N., Choi, Y., & Park, K. (2017). Effect of anti-muscarinic autoantibodies on leukocyte function in Sjögren's syndrome. *Molecular Immunology*, 90, 136-142.

8. Shin, Y. H., **Lee, S. W.**, Kim, M., Choi, S. Y., Cong, X., Yu, G. Y., & Park, K. (2016). Epigenetic regulation of CFTR in salivary gland. *Biochemical and biophysical research communications*, 481(1-2), 31-37.

9. Lee, S. H., Lee, Y., **Lee, S. W.**, Ji, H. Y., Lee, J. H., Lee, D. S., & Park, T. G. (2011). Enzyme-mediated cross-linking of Pluronic copolymer micelles for injectable and in situ forming hydrogels. *Acta biomaterialia*, 7(4), 1468-1476.

AWARDS AND HONORS

2016 1st Place in senior researcher group, **Bumho-Hatton Award**, Korea Association of Dental Research held in Korea

2016 1st Place in Salivary gland researcher group, **Salivary Gland Research Award**, International Association of Dental Research held in Korea

2018 1st Place in senior researcher group, **Hatton Award**, International Association of Dental Research held in London (57 competitors from 26 countries / Korea's first ever win at IADR Hatton competition)

2019 2nd Place in senior researcher group, **JADR Award**, Korea Association of Dental Research held in Korea

2022 제41회 신인학술상 (41th Young Investigator Award), Korean Dental Association (KDA)

PATENTS

◦ '방사선 보호 나노입자' 국내 특허 등록 (등록일: 2020.4.13./등록번호: 10-2102535)

◦ '배아 타액선 배양용 플레이트 코팅방법 및 타액선 배양용 플레이트' 국내 특허 등록 (등록일: 2024.07.15 / 등록번호 10-2686252): **기술이전 완료**

◦ '히알루론산-카테콜 화합물을 포함한 조직재생 플랫폼 및 이의 제작방법' 국내 특허 등록 (등록일: 2022.01.03 / 등록번호: 10-2347929): **기술이전 완료**

◦ 재조합 세마포린 4D 차단항체를 유효성분으로 포함하는 쇼그렌 증후군 예방 또는 치료용 약학 조성물 국내 특허 출원 (출원일: 2024.01.12 / 출원번호 10-2024-0005193): **기술이전 완료**