

BIOGRAPHICAL SKETCH (last updated; Aug/26/2026)

NAME Lim, Ki-Taek	POSITION TITLE Professor Dept. of Biosystems Engineering Kangwon National University, Chuncheon, Gangwondo, South Korea Biorobotics group (www.bioroboticseng.com) Founder, Biomechagen, Co., Ltd.
ktlim@kangwon.ac.kr; ktlim74@gmail.com	

EDUCATION

INSTITUTION AND LOCATION	DEGREE (in Engr.)	MM/YY	FIELD OF STUDY
University of Arkansas Institute for Nanoscience and Engineering	Postdoc	02/15	Bio/Nano-Technology
Seoul National University Dental Research Institute	Postdoc	02/14	Tooth Tissue Engineering
Seoul National University	Ph.D.	02/13	Biosystems Engineering
Sungkyunkwan University	M.S.	02/99	Biomechatronics Engineering
Konkuk University	B.S.	02/97	Biomechatronics Engineering

Author ID

ORCID identifier	0000-0003-2091-788X
Scopus Author Identifier	26029923900
Web of Science ResearchID (Publons)	AAI-9518-2021

A. Personal Statement

Dr. Ki-Taek Lim is a Professor in the Department of Biosystems Engineering at Kangwon National University, where he leads the Biological inspired nanorobotics Group as Principal Investigator and also serves as the founder of Biomechagen, Co., Ltd. He earned his B.S. and M.S. degrees in Biomechatronics Engineering from Konkuk University and Sungkyunkwan University, respectively, received his Ph.D. in Biosystems Engineering from Seoul National University, and completed extensive postdoctoral training at both the Seoul National University Dental Research Institute and the Institute for Nanoscience and Engineering at the University of Arkansas. His multidisciplinary research focuses on bio-convergence engineering across key areas, including 3D bioprinting and advanced bioinks utilizing nanocellulose, conductive hydrogels, and customized crosslinking networks for high-resolution tissue scaffolds and organ models; biocompatible, piezoionic, and stretchable electronic skin (E-skin) and bioelectronics for wireless human-machine interfaces, health monitoring, and electro-metabolic cellular regulation; immuno-engineering and nano-biomaterials utilizing spatiotemporally responsive nanoplateforms, carbon quantum dots, engineered exosomes, and micro/nanorobots to orchestrate macrophage polarization and eradicate multi-drug-resistant biofilms; and automated perfusion, electromagnetic-wave, and fluid-shear bioreactor systems for scalable stem cell manufacturing, transcriptomic modulation, and accelerated tissue regeneration. Throughout his academic career, Dr. Lim has published over 250 peer-reviewed articles in prestigious international journals such as *Progress in Materials Science*, *Bioactive Materials*, *Advanced Functional Materials*, *Biomaterials*, *Small*, and *Carbohydrate Polymers*, and holds more than 50 registered and pending patents covering 3D-printable conductive nanocomposites, smart biomaterials, exosome therapies, and automated bioreactors. Additionally, he has authored, edited, and contributed to authoritative textbooks and chapters published by world-renowned academic publishers, including Springer (such as *Nanorobotics and Nanodiagnostics in Integrative Biology and Biomedicine* and *Handbook of Single Cell Technology*), Elsevier (such as *CRISPR and RNAi Systems* and *Multifunctional Hybrid Nanomaterials*), and Taylor & Francis. Globally recognized for his scientific impact, Dr. Lim is named among the World's Top 2% Scientists by Stanford University and ranked in the Top 0.05% of Highly Ranked Scholars (ScholarGPS) in Biomedical Engineering, while actively contributing to the academic community as an editorial board member for over +10 international journals, including the *International Journal of Bioprinting*, *European Cells and Materials*, *Nano Fiber*, *Biosensing and Biomedicine*, and *Biofunctional Materials*.

B. Positions and Honors

Positions and Employment

2020- Associate Professor, Department of Biosystems Engineering, Kangwon National University
 2015- Assistant Professor, Department of Biosystems Engineering, Kangwon National University
 2015- Visiting Scholar, Research Institute for Agriculture and Life Sciences, Seoul National University
 2014-2015 Postdoctoral Fellow, Dept. of Biological and Agriculture Engineering, Institute for Nanoscience and Engineering, University of Arkansas, Fayetteville, USA (Prof. Jin-Woo Kim)
 2013-2014 Senior Researcher, Tooth-Bioengineering Group, Dental Research Institute, Seoul National University (Prof. Phill-Hoon Choung)

Other Experience and Professional Memberships

2026- Editorial Board Member, **Gels** | <https://www.mdpi.com/journal/gels/editors> | IF 6.5
 2026- Editorial Board Member, **Micromachines** | <https://www.mdpi.com/journal/micromachines/editors> | IF 3.1
 2026- Editorial Board Member, **Nano Fiber** | <https://www.sciltp.com/journals/nf/editorial-board>
 2026- Editorial Board Member, **Biosensing and Biomedicine** | <https://www.sciltp.com/journals/bab>
 2026- Editorial Board Member, **Journal of Optoelectronic and Biomedical Materials** | <https://chalcogen.ro/index.php/journals/journal-of-optoelectronic-and-biomedical-materials> | IF 1.1
 2026- Editorial Board Member, **European Cells & Materials** | <https://www.ecmjournal.org/journal/ECM> | IF 3.1
 2025- Editorial Board Member, **Medicine Bulletin** | <https://onlinelibrary.wiley.com/journal/30652731>
 2025- Editorial Board Member, **Regenerative Medicine Reports** | <https://journals.lww.com/rmr>
 2025- Editorial Board Member, **AIMS Bioengineering** | <https://www.aimspress.com/journal/Bioengineering> | IF 1.0
 2025- Editorial Board Member, **Organoid Research** | <https://accscience.com/journal/OR>
 2025- Editorial Board Member, **Biofunctional Materials** | <https://www.elsevier.com/journals/biofunctional-materials>
 2024- Editorial Board Member, **International Journal of Bioprinting** | <https://accscience.com/journal/IJB> | IF 7.5
 2024- Elected by ScholarGPS, representing the top 0.05% of the most-cited scientists with 2024 Highly Ranked Scholar - Prior Five Years: in Biomedical Engineering
 2023- Elected by Stanford University, representing the **top 2% of the most-cited scientists** with a single-year impact in (1) Biomedical Engineering, (2) Nanoscience & Nanotechnology, (3) Engineering disciplines
 2022-2023 Special Editor, International Journal of Bioprinting, IF 7.422
 2020-2022 Committee Member, Korea Biomaterials Society
 2020-2022 Committee Member, Korea Tissue Engineering & Regenerative Medicine Society
 2018-2020 Committee Member, Korea Organoid Society
 2018-2020 Committee Member, International Conference on Bioresources, Energy, Environment, and Materials Technology
 2017-2022 Committee Member, Institutional Animal Care and Use Committee, KNU.
 2017-2019 Editorial Board, Advances in Biomaterials Research (ABR)
 2015 Committee Member, The delegation of the 12th US-Korea Nano Forum
 2015 Committee Member, Korea National Industrial Convergence Center
 2015 Committee Member, Korea Institute of Planning & Evaluation for Tech. in Food, Agriculture, Forestry & Fisheries
 2015-2016 Editorial Board, Journal of Biosystems Engineering
 2015-2016 Technical Program Committee Member, IEEE NANOMED
 2015-2018 Associate Editor, Engineering in Agriculture, Environment and Food Journal (Elsevier)
 2010-2014 Instructor, Seoul National University; Konkuk University

C. Research areas

- **3D/4D Bioprinting & Functional Bioinks for Tissue Regeneration**
Formulation of high-resolution, stimulus-responsive bioinks by integrating natural biopolymers—such as nanocellulose, chitosan, alginate, and GelMA—with functional nanomaterials for engineered tissue constructs and 4D shape-morphing architectures. Key advances include direct ink writing (DIW) technologies for bone-specific implantable scaffolds and devices (*Progress in Materials Science*, 2027; *Biomaterials*, 2023), alongside dynamically crosslinked (semi-IPN) and photocurable hydrogel matrices tailored for osteogenic repair, cardiac patches, and scalable cultured meat engineering.
- **Intelligent Skin with Biosensing & Integrated Theranostics**
Development of tissue-conformable, skin-interfaced electronic skin (E-skin) platforms capable of synchronized biophysical monitoring and multiplexed biochemical biomarker profiling. This includes 3D-printable, piezoionic, and conductive hydrogel patches for wireless human-machine interfaces and real-time motion sensing (*Advanced Functional Materials*, 2026, 2025 Front Cover), as well as the continuous decoding of sweat metabolites, inflammatory cytokines, and electro-mechanical microenvironments integrated with responsive transdermal drug delivery modules for closed-loop "sense-and-treat" regimens (*Biomaterials*, 2026).
- **Brain-Computer Interfaces (BCIs) & Soft Bioelectronics**
Engineering ultra-flexible, biocompatible conductive hydrogel interfaces designed to minimize mechanical and impedance mismatches with neural tissue for high-fidelity Brain-Computer Interfaces (BCIs). These bioelectronic systems combine conductive polymers (polypyrrole, PEDOT:PSS) and carbon nanomaterials with wireless telemetry to enable real-time recording, high-resolution decoding of neuro-electrophysiological signals (e.g., EEG, ECoG, EMG), and targeted electrical stimulation to accelerate neural regeneration.
- **Stem Cell Manufacturing Automation Systems & Bioreactor Engineering**
Design and implementation of fully automated, sensor-integrated closed-loop bioreactor systems equipped with precision fluidic control and real-time metabolic tracking (e.g., glucose/lactate metabolism) for scalable stem cell biomanufacturing. By precisely applying physical stimuli—including fluid dynamic shear stress, pulsatile pressure, and pulsed electromagnetic fields (PEMF)—these systems direct stem cell fate, modulate transcriptomic profiles, and drive high-yield production and standardized harvesting of therapeutic secretomes and M2-polarized macrophage exosomes (*Biomaterials*, 2025; *Bioactive Materials*, 2025; *Biochemical Engineering Journal*, 2019).
- **Immuno-Engineering, Bio-Nanorobotics & Targeted Theranostics**
Creation of smart nanobiomaterials and bioinspired micro/nanorobots that actively program the immune microenvironment and deliver targeted therapy. This domain spans amide-functionalized nanocellulose to drive Ion channel/Stat6-mediated macrophage switching from the pro-inflammatory M1 to pro-healing M2 phenotype (*Bioactive Materials*, 2026), near-infrared (NIR)/magnetic-actuated pollen-inspired spiky nanomotors for biofilm eradication and deep-tissue oncotherapy (*Nano Today*, 2024), and microfluidic lab-on-a-chip platforms for single-cell metabolic profiling and real-time disease diagnostics (*Small*, 2026; *ACS AMI*, 2023).

D. Selected Peer-reviewed Publications (Selected from 200 peer-reviewed publications)

Most relevant to the current publications (10)

1. 3D-printable, biodegradable, and conductive/piezoionic hydrogel 'E-Skin' with robust antibacterial properties for wound healing and wireless human-machine interface sensing
Myoungjoon Jeon; Sayan Deb Dutta; Md. Moniruzzaman; Jeong Man An; Youjin Seol; Gyuhun Son; Sung Ha Jo; Hyun Chang Jung; Beom-Soo Shin; Jongsung Kim* ; Yong-kyu Lee* ; Ki-Taek Lim*
Advanced Functional Materials 2026 | IF 19.90 JCR 4% | JCI 4% | <https://doi.org/10.1002/adfm.77075>
2. 3D printed multifunctional bioadhesive patch with intrinsic bioelectronic properties for decoding electromechanical and anisotropic cardiac microenvironment
Sayan Deb Dutta; Jeong Man An; Tejal V. Patil; Hojin Kim; Tuhin Subhra Santra; Yong-kyu Lee*; Ki-Taek Lim*
Biomaterials 2026
IF 12.90 JCR 5% | JCI 5% | Volume 333, October 2026, 124175 | <https://doi.org/10.1016/j.biomaterials.2026.124175>
3. Ion channel/stat6-driven nano-immune programming of tissue-resident macrophages by amide-functionalized nanocellulose
Sayan Deb Dutta; Jeong Man An; Jagannath Mondal; Subhankar Bose; Santosh Kumar Jana; Youjin Seol; Chandan Kuman Maity*; Yong-kyu Lee*; Ki-Taek Lim*
Bioactive Materials 2026
IF 23.60 | JCR 2% | JCI 1% | Volume 62, August 2026, Pages 883-898 | <https://doi.org/10.1016/j.bioactmat.2026.03.038>
4. Skin-inspired phototherapeutic cryogel ameliorates infected wound healing by orchestrating mechanotransduction and immunomodulation
Sayan Deb Dutta; Jeong Man An; Jin Hexiu; Aayushi Randhawa; Keya Ganguly; Tejal V. Patil; Thavasyappan Thambi; Jangho Kim; Yong-kyu Lee; Ki-Taek Lim*
Bioactive Materials 2026 | IF 18.90 JCR 1% | JCI 1% | <https://doi.org/10.1016/j.bioactmat.2025.11.028>
5. Bioinspired shape reconfigurable, printable, and conductive 'E-skin' patch with robust antibacterial properties for human health sensing
Hojin Kim; Sayan Deb Dutta; Myoung Joon Jeon; Hyeonseo Park; Jieun Lee; Youjin Seol; Tejal V. Patil; Aayushi Randhawa; Rumi Acharya; Keya Ganguly; Ki-Taek Lim*
Advanced Functional Materials 2025
IF 19.70 JCR 5% | JCI 5% | <https://doi.org/10.1002/adfm.202504088> | **Selected for the front cover**
6. Transcriptomic profiling of human mesenchymal stem cells using a pulsed electromagnetic-wave motion bioreactor system for enhanced osteogenic commitment and therapeutic potentials
Aayushi Randhawa; Keya Ganguly; Sayan Deb Dutta; Tejal V. Patil; Ki-Taek Lim*
Biomaterials 2025 Volume 312, January 2025, 122713 IF 12.8 JCR 3% | JCI 2% | <https://doi.org/10.1016/j.biomaterials.2024.122713>
7. Tailoring osteoimmunity and hemostasis by 3D-printed nano-photocatalytic bactericidal scaffold for augmented bone regeneration
Sayan Deb Dutta; Jin Hexiu; Md Moniruzzaman; Tejal V. Patil; Rumi Acharya; Jong Sung Kim; Ki-Taek Lim*
Biomaterials 2025 Volume 316, May 2025, 122991 IF 12.8 JCR 3% | JCI 2% | <https://doi.org/10.1016/j.biomaterials.2024.122991>
8. 3D bioprinting of engineered exosomes secreted from M2-polarized macrophages through immunomodulatory biomaterial promotes in vivo wound healing and angiogenesis
Sayan Deb Dutta; Jeong Man An; Jin Hexiu; Aayushi Randhawa; Keya Ganguly; Tejal V. Patil; Thavasyappan Thambi; Jangho Kim; Yong-kyu Lee; Ki-Taek Lim*
Bioactive Materials 2025 Volume 45, March, 345-362 | IF 18.90 JCR 1% | JCI 1% | <https://doi.org/10.1016/j.bioactmat.2024.11.026>
9. Zn@TA assisted dual cross-linked 3D printable glycol grafted chitosan hydrogels for robust antibiofilm and wound healing
Tejal V. Patil; Hexiu Jin; Sayan Deb Dutta; Rumi Acharya; Kehan Chen; Keya Ganguly; Aayushi Randhawa; Ki-Taek Lim*
Carbohydrate Polymers 2024 Volume 344, 15 November, 122522 IF 10.70 JCR 1% | JCI 1% | <https://doi.org/10.1016/j.carbpol.2024.122522>
10. Electrically stimulated 3D bioprinting of gelatin-polypyrrole hydrogel with dynamic semi-IPN network induces osteogenesis via collective signaling and immunopolarization
Sayan Deb Dutta; Keya Ganguly; Aayushi Randhawa; Tejal V. Patil; Dinesh K. Patel; Ki-Taek Lim*
Biomaterials 2023 Mar;294:121999 IF 15.304 JCR 5% JCI 1% | <https://doi.org/10.1016/j.biomaterials.2023.121999>

Publications (Include both current and previous affiliations)

1. Direct ink writing of bone-specific implantable scaffolds and devices
Sayan Deb Dutta; Ki-Taek Lim*
Progress in Materials Science 2027
IF 42.90 JCR 0.7% | JCI 5%
Volume 164, February 2027, 101796
<https://doi.org/10.1016/j.pmatsci.2026.101796>
2. Nanocellulose as an active biointerfaces: Design principles for infection-adaptive and regenerative biomaterials
Tejal V. Patil; Rumi Acharya; Ki-Taek Lim*
Small 2026
IF 11.80 JCR 8% | JCI 8%
<https://doi.org/10.1002/sml.74933>
3. 3D-printable, biodegradable, and conductive/piezoionic hydrogel 'E-Skin' with robust antibacterial properties for wound healing and wireless human-machine interface sensing
Myoungjoon Jeon; Sayan Deb Dutta; Md. Moniruzzaman; Jeong Man An; Youjin Seol; Gyuhun Son; Sung Ha Jo; Hyun Chang Jung; Beom-Soo Shin; Jongsung Kim*; Yong-kyu Lee*; Ki-Taek Lim*
Advanced Functional Materials 2026
IF 19.90 JCR 4% | JCI 4%
<https://doi.org/10.1002/adfm.77075>
4. 3D printed multifunctional bioadhesive patch with intrinsic bioelectronic properties for decoding electromechanical and anisotropic cardiac microenvironment
Sayan Deb Dutta; Jeong Man An; Tejal V. Patil; Hojin Kim; Tuhin Subhra Santra; Yong-kyu Lee*; Ki-Taek Lim*
Biomaterials 2026
IF 12.90 JCR 5% | JCI 5% | Volume 333, October 2026, 124175
<https://doi.org/10.1016/j.biomaterials.2026.124175>
5. Ion channel/stat6-driven nano-immune programming of tissue-resident macrophages by amide-functionalized nanocellulose
Sayan Deb Dutta; Jeong Man An; Jagannath Mondal; Subhankar Bose; Santosh Kumar Jana; Youjin Seol; Chandan Kuman Maity*; Yong-kyu Lee*; Ki-Taek Lim*
Bioactive Materials 2026
IF 23.60 | JCR 2% | JCI 1% | Volume 62, August 2026, Pages 883-898
<https://doi.org/10.1016/j.bioactmat.2026.03.038>
6. Skin-inspired phototherapeutic cryogel ameliorates infected wound healing by orchestrating mechanotransduction and immunomodulation
Sayan Deb Dutta; Jeong Man An; Jin Hexiu; Aayushi Randhawa; Keya Ganguly; Tejal V. Patil; Thavasyappan Thambi; Jangho Kim; Yong-kyu Lee; Ki-Taek Lim*
Bioactive Materials 2026 | IF 18.90 JCR 1% | JCI 1% |
<https://doi.org/10.1016/j.bioactmat.2025.11.028>
7. Spatiotemporally activated gelatin/unzipped carbon nanotubes/chitosan-based conductive hydrogel via dual stimuli for robust methicillin-resistant Staphylococcus aureus biofilm eradication
Tejal V. Patil; Aayushi Randhawa; Hyeonseo Park; Rumi Acharya; Sayan Deb Dutta; Ki-Taek Lim*
International Journal of Biological Macromolecules 2026
IF 08.50 JCR 5% | JCI 5% | Volume 339, Part 1, January 2026, 149845
<https://doi.org/10.1016/j.ijbiomac.2025.149845>
8. Electrically stimulated skin-biomimetic double-layer asymmetric patches for superior antibacterial efficacy and enhanced wound healing
Jieun Lee; Aayushi Randhawa; Hyeonseo Park; Hojin Kim; Ki-Taek Lim*
Journal of Nanobiotechnology 2026
IF 12.9 JCR 2% | JCI 5%
Volume 24, article number 233, (2026)
<https://doi.org/10.1186/s12951-025-03938-2>
9. 3D-printed piezoionic/bioelectronic hydrogel for electro-metabolic regulation of osteogenic differentiation
Sayan Deb Dutta; Myoung Joon Jeon; Youjin Seol; Ki-Taek Lim*
Advanced Healthcare Materials 2026
IF 11.0 JCR 10% | JCI 10%
<https://doi.org/10.1002/adhm.71263>
10. biomimetic microfluidic triple-compartment periodontium-on-chip model for investigation of inflammatory responses in periodontitis
Abinaya. R; Kavitha Govarthan; Lakshmi Krishnan; Ki-Taek Lim; Moeto Nagai; Suresh Rao; Tuhin Subhra Santra*
Small 2026
IF 11.80 JCR 8% | JCI 8%

<https://doi.org/10.1002/sml.73973>

11. Multifunctional hydrogel-based scaffolds: integrating conductive nanomaterials for smart wound healing applications
Myoungjoon Jeon; Youjin Seol; Youjin Jeong; Sayan Deb Dutta; Ki-Taek Lim*
Gels 2026
IF 06.40 | JCR 12% | JCI 20%
<https://doi.org/10.3390/gels12060501>
12. Bioinspired 3D printing of lignocellulose-based multi-material composites for ECM-mimicking architectures
Youjin Seol; Youjin Jeong; Sayan Deb Dutta; Myoungjoon Jeon; Ki-Taek Lim*
Biomimetics 2026
IF 4.20 | JCR 20% | JCI 30%
<https://doi.org/10.3390/biomimetics11060429>
13. 3D printed magnesium/nanodiamond dual-doped hydroxyapatite composite hydrogels with anti-bacterial and in vitro bioactive properties for bone tissue engineering
Rumi Acharya; Sayan Deb Dutta; Tejal V. Patil; Hojin Kim; Jieun Lee; Myoungjoon Jeon; Aayushi Randhawa; Ki-Taek Lim*
Journal of the American Ceramic Society 2025
IF 04.10 JCR 10% | JCI 10%
<https://doi.org/10.1111/jace.70121>
14. Pro/anti-inflammatory ECM-inspired 3D-printed L-arginine coated PCL nanofibrous via osteomodulation with cationic ion channel activation for enhanced osteogenesis
Keya Ganguly; Aayushi Randhawa; Sayan Deb Dutta; Jieun Lee; Youjin Seol; Tejal V. Patil; Rumi Acharya; Ki-Taek Lim*
Advanced Healthcare Materials 2025
IF 10.8 JCR 5% | JCI 5%
<https://doi.org/10.1002/adhm.202500404>
15. Ultra-thin, stimuli-responsive, antimicrobial, self-cleaning, reusable, and biodegradable, micro/nanofibrous electrospun mat as an efficient face mask filter for airborne disease prevention
Ganguly, Keya; Randhawa, Aayushi; Dutta, Sayan; Park, Hyeonseo; Mohammad Hossein Pour, Mehran; Kim, Hojin; Acharya, Rumi; Patil, Tejal; Shin, Beom-Soo; Kim, Dae Hyun; Ki-Taek Lim*
Nano Letters 2025
IF 09.60 JCR 10% | JCI 9%
<https://doi.org/10.1021/acs.nanolett.4c04525>
16. Nanodiamond: a multifaceted exploration of electrospun nanofibers for antibacterial and wound healing applications
Hyeonseo Park; Tejal V. Patil; Ki-Taek Lim*
Journal of Nanobiotechnology 2025
IF 10.70 JCR 5% | JCI 5%
09 April 2025 23:285
<https://doi.org/10.1186/s12951-025-03351-9>
17. Bioinspired shape reconfigurable, printable, and conductive 'E-skin' patch with robust antibacterial properties for human health sensing
Hojin Kim; Sayan Deb Dutta; Myoung Joon Jeon; Hyeonseo Park; Jieun Lee; Youjin Seol; Tejal V. Patil; Aayushi Randhawa; Rumi Acharya; Keya Ganguly; Ki-Taek Lim*
Advanced Functional Materials 2025
IF 19.70 JCR 5% | JCI 5%
<https://doi.org/10.1002/adfm.202504088>
Front Cover
18. Zinc oxide@tetracycline spiky microparticles design for persistent antibacterial therapy
Youjin Seol; Keya Ganguly; Tejal V. Patil; Sayan Deb Dutta; Aayushi Randhawa; Hojin Kim; Rumi Acharya; Ki-Taek Lim*
Journal of Biomedical Materials Research Part A 2025
IF 03.90 | JCR 30% | JCI 50%
19. Physical stimuli-responsive 3D printable hydrogels for scalable manufacturing of bioengineered meat analogs
Jieun Lee; Sayan Deb Dutta; Seong-Jun Cho; Ki-Taek Lim*
Trends in Food Science & Technology 2025
Available online 4 January 2025, 104867
IF 15.1 JCR 1% | JCI 1% |
<https://doi.org/10.1016/j.tifs.2025.104867>
20. Physical stimuli-responsive DNA hydrogels: design, fabrication strategies, and biomedical applications
Rumi Acharya; Sayan Deb Dutta; Hemadri Malik; Keya Ganguly; Tejal V. Patil; Aayushi Randhawa; Ki-Taek Lim*
Journal of Nanobiotechnology 2025
22 March 2025 23:233
IF 10.60 JCR 4% | JCI 6%

<https://doi.org/10.1186/s12951-025-03237-w>

21. NIR-activated catechol-functionalized nanodiamond nanofibers for accelerating on-demand MRSA and E. coli biofilm eradication
Hyeonseo Park; Tejal V. Patil; Jieun Lee; Hojin Kim; Seong-Jun Cho; [Ki-Taek Lim*](#)
Journal of Biological Engineering 2025
IF 05.70 JCR 7% | JCI 10%
<https://doi.org/10.1186/s13036-024-00469-6>
22. 3D bioprinting of engineered exosomes secreted from M2-polarized macrophages through immunomodulatory biomaterial promotes in vivo wound healing and angiogenesis
Sayan Deb Dutta; Jeong Man An; Jin Hexiu; Aayushi Randhawa; Keya Ganguly; Tejal V. Patil; Thavasyappan Thambi; Jangho Kim; Yongkyu Lee; [Ki-Taek Lim*](#)
Bioactive Materials 2025 Volume 45, March, Pages 345-362
IF 18.90 JCR 1% | JCI 1% |
<https://doi.org/10.1016/j.bioactmat.2024.11.026>
23. In vitro osteogenic response to copper-doped eggshell derived hydroxyapatite with macrophage supplements
Tejal V. Patil; Dinesh K. Patel; [Ki-Taek Lim*](#)
Journal of Biomedical Materials Research Part A 2025 Volume 113, Issue 1 January
IF 03.90 | JCR 30% | JCI 50%
<https://doi.org/10.1002/jbm.a.37838>
24. Tailoring osteoimmunity and hemostasis by 3D-printed nano-photocatalytic bactericidal scaffold for augmented bone regeneration
Sayan Deb Dutta; Jin Hexiu; Md Moniruzzaman; Tejal V. Patil; Rumi Acharya; Jong Sung Kim; [Ki-Taek Lim*](#)
Biomaterials 2025 Volume 316, May 2025, 122991
IF 12.8 JCR 3% | JCI 2%
<https://doi.org/10.1016/j.biomaterials.2024.122991>
25. Transcriptomic profiling of human mesenchymal stem cells using a pulsed electromagnetic-wave motion bioreactor system for enhanced osteogenic commitment and therapeutic potentials
Aayushi Randhawa; Keya Ganguly; Sayan Deb Dutta; Tejal V. Patil; [Ki-Taek Lim*](#)
Biomaterials 2025 Volume 312, January 2025, 122713
IF 12.8 JCR 3% | JCI 2%
<https://doi.org/10.1016/j.biomaterials.2024.122713>
26. Electroconductive nanocellulose, a versatile hydrogel platform: from fabrication to biomedical engineering applications
Myungjoon Cheon; Aayushi Randhawa; Keya Ganguly; Sayan Deb Dutta; Tejal V. Patil; Rumi Acharya; Hojin Kim; Jieun Lee; Hyeonseo Park; Youjin Seol; [Ki-Taek Lim*](#)
Advanced Healthcare Materials 2025
IF 10.00 JCR 10% | JCI 10%
<https://doi.org/10.1002/adhm.202403983>
27. Zn@TA assisted dual cross-linked 3D printable glycol grafted chitosan hydrogels for robust antibiofilm and wound healing
Tejal V. Patil; Hexiu Jin; Sayan Deb Dutta; Rumi Acharya; Kehan Chen; Keya Ganguly; Aayushi Randhawa; [Ki-Taek Lim*](#)
Carbohydrate Polymers 2024
IF 10.70 JCR 1% | JCI 1%
<https://doi.org/10.1016/j.carbpol.2024.122522>
28. Stimuli-triggered pollen inspired micro-/nanorobots for advanced therapeutics
Youjin Seol; Keya Ganguly; Tejal V. Patil; Sayan Deb Dutta; Aayushi Randhawa; Hojin Kim; Rumi Acharya; [Ki-Taek Lim*](#)
Nano Today 2024 Volume 57, August, 102337
IF 17.30 JCR 5% | JCI 5%
<https://doi.org/10.1016/j.nantod.2024.102337>
29. Sunflower pollen-morphology mimicked spiky zinc nanomotors as a photosensitizer for killing bacteria and cancer cells
Sayan Deb Dutta; Rachmi Luthfikasari; Tejal V. Patil; Keya Ganguly; Youjin Seol; Aayushi Randhawa; [Ki-Taek Lim*](#)
ACS Applied Bio Materials 2024
IF 04.70 JCR 25% | JCI 25%
<https://doi.org/10.1021/acsabm.4c00092>
30. NIR-responsive carbon dots as an oxidative-stress amplifier and hyperthermia-induced superior photothermal in-vitro anticancer activity
Md Moniruzzaman; Sayan Deb Dutta; [Ki-Taek Lim*](#); Jongsung Kim*
Colloids and Surfaces A: Physicochemical and Engineering Aspects 2024
IF 05.20 | JCR 25% | JCI 25%
<https://doi.org/10.1016/j.colsurfa.2024.134266>
31. Stimuli-mediated macrophage switching: unraveling the dynamics at nanoplateforms-macrophage interface
Keya Ganguly; Sayan Deb Dutta; Tejal V Patil; Aayushi Randhawa; Rumi Acharya; [Ki-Taek Lim*](#)

Advanced Healthcare Materials 2024

IF 10.00 JCR 10% | JCI 10%

<https://doi.org/10.1002/adhm.202400581>

32. Unzipped carbon nanotubes assisted 3D printable functionalized chitosan hydrogels for strain sensing applications
Dinesh K. Patel; So-Yeon Won; Sayan Deb Dutta; Tejal V. Patil; Ki-Taek Lim*; Sung Soo Han*
International Journal of Biological Macromolecules 2024 Volume 265, Part 2, 131025
IF 08.20 | JCR 5% | JCI 5% <https://doi.org/10.1016/j.ijbiomac.2024.131025>
33. PAI-1 transfected-conditioned media promotes osteogenic differentiation of hBMSCs
Zhang Li; Hou Kegui; Wang Piao; Wang Xuejiu; Ki-Taek Lim*; Hexiu Jin*
Cell Biology International 2024
IF 3.90 | JCI 25%
<https://doi.org/10.1002/cbin.12166>
34. Single-walled carbon nanotube-based optical nano/biosensors for biomedical applications: role in bioimaging, disease diagnosis, and biomarkers detection
Rumi Acharya; Sayan Deb Dutta; Keya Ganguly; Tejal V. Patil; Aayushi Randhawa; Ki-Taek Lim*
Advanced Materials Technologies 2024
IF 06.80 JCR 25% | JCI 25%
<https://doi.org/10.1002/admt.202400279>
35. Recent advances in biomedical application of 3D printed Nanocellulose-based adhesive hydrogels: A review
Hojin Kim; Sayan Deb Dutta; Aayushi Randhawa; Tejal V. Patil; Keya Ganguly; Rumi Acharya; Jieun Lee; Ki-Taek Lim*
International Journal of Biological Macromolecules 2024
IF 08.20 | JCR 5% | JCI 5%
<https://doi.org/10.1016/j.ijbiomac.2024.130732>
36. Assessment of the biocompatibility and bioimaging potential of fluorescent carbon dots derived from waste biomass
Dinesh K. Patel; Eunseo Jung; Sayan Deb Dutta; Tejal V. Patil; Ki-Taek Lim; Sung Soo Han*
Materials Letters 2024
IF 3.00
<https://doi.org/10.1016/j.matlet.2024.136152>
37. Manufacturing 3D biomimetic tissue: a strategy involving the integration of electrospun nanofibers with a 3D printed framework for enhanced tissue regeneration
Aayushi Randhawa; Sayan Deb Dutta; Keya Ganguly; Tejal V. Patil; Ki-Taek Lim*
Small 2024
IF 13.30 JCR 5% | JCI 5%
<https://doi.org/10.1002/sml.2023092694>
38. 3D printable hydrogel bioelectronic interfaces for healthcare monitoring and diagnosis: materials, design strategies, and applications
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Advanced Materials Technologies 2024
IF 06.80 JCR 25% | JCI 25%
<https://doi.org/10.1002/admt.202301874>
39. Extracellular matrix-bioinspired anisotropic topographical cues of electrospun nanofibers: a strategy of wound healing through macrophage polarization
Hyeonseo Park; Tejal V. Patil; Sayan Deb Dutta; Jieun Lee; Keya Ganguly; Aayushi Randhawa; Hojin Kim; Ki-Taek Lim*
Advanced Healthcare Materials 2024
IF 10.00 JCR 10% | JCI 10%
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40. Stimuli-responsive 3D printable conductive hydrogel: a step towards regulating macrophage polarization and wound healing
Jieun Lee; Sayan Deb Dutta; Rumi Acharya; Hyeonseo Park; Hojin Kim; Aayushi Randhawa; Tejal V. Patil; Keya Ganguly; Rachmi Luthfikasari; Ki-Taek Lim*
Advanced Healthcare Materials 2023 2302394 2023 November
IF 10.00 JCR 8% | JCI 10%
<https://doi.org/10.1002/adhm.202302394>
41. Polyphenolic carbon quantum dots with intrinsic ROS amplification for melanoma-specific chemodynamic therapy
Sayan Deb Dutta; Md Moniruzzaman; Jin Hexiu; Sourav Sarkar; Keya Ganguly; Dinesh K. Patel; Jagannath Mondal; Yong-Kyu Lee; Rumi Acharya; Jongsung Kim*; Ki-Taek Lim*
ACS Applied Materials & Interfaces 2023 15(45): 52083–52099 October
IF 9.50 JCR 15% | JCI 13%
<https://doi.org/10.1021/acsami.3c07547>

42. Trackable and highly fluorescent nanocellulose-based printable bio-resins for image-guided tissue regeneration
 Sayan Deb Dutta; Tejal V Patil; Keya Ganguly; Rumi Acharya; Md Moniruzzaman; [Ki-Taek Lim*](#)
Carbohydrate Polymers 2023 Volume 320, 15 November 121232
 IF 11.20 | JCR 3% | JCI %
<https://doi.org/10.1016/j.carbpol.2023.121232>
43. Unraveling the potential of 3D bioprinted immunomodulatory materials for regulating macrophage polarization: state-of-the-art in bone and associated tissue regeneration
 Sayan Deb Dutta; Tejal V Patil; Keya Ganguly; Aayushi Randhawa; [Ki-Taek Lim*](#)
Bioactive Materials 2023 Volume 28, October 2023, Pages 284-310
 IF 18.90 JCR 2%
<https://doi.org/10.1016/j.bioactmat.2023.05.014>
44. Nanocellulose-assisted 3D-printable, transparent, bio-adhesive, conductive, and biocompatible hydrogels as sensors and moist electric generators
 Dinesh K. Patel; Keya Ganguly; Sayan Deb Dutta; Tejal V. Patil; [Ki-Taek Lim*](#)
Carbohydrate Polymers 2023 Volume 315, 1 September 2023, 120963
 IF 11.20 | JCR 3% | JCI %
<https://doi.org/10.1016/j.carbpol.2023.120963>
45. A 3D-bioprinted nanoengineered hydrogel with photo-activated drug delivery for tumor apoptosis and simultaneous bone regeneration via dynamic macrophage immunomodulation
 Sayan Deb Dutta; Keya Ganguly; Jin Hexiu; Aayushi Randhawa; Md Moniruzzaman; [Ki-Taek Lim*](#)
Macromolecular Bioscience 2023 23 April 2300096
 IF 5.922 JCR 12%
<https://doi.org/10.1002/mabi.202300096>
46. Electrically stimulated 3D bioprinting of gelatin-polypyrrole hydrogel with dynamic semi-IPN network promotes bone regeneration through activating NOTCH/MAPK/SMAD signaling and immunopolarization
 Sayan Deb Dutta; Keya Ganguly; Dinesh K. Patel; Tejal V. Patil; [Ki-Taek Lim*](#)
Biomaterials 2023 Mar;294:121999
 IF 15.304 JCR 5% | JCI 1%
<https://doi.org/10.1016/j.biomaterials.2023.121999>
47. Transcriptomic changes towards osteogenic differentiation of mesenchymal stem cells on 3D printed GelMA/CNC hydrogel under pulsatile pressure environment
 Keya Ganguly; Sayan Deb Dutta; Aayushi Randhawa; Dinesh K Patel; Tejal V Patil; [Ki-Taek Lim*](#)
Advanced Healthcare Materials 2023 April 26; 12(11) 2202163
 IF 11.092 JCR 8%
<https://doi.org/10.1002/adhm.202202163> Science News
48. Cellulose nanocrystals vs. cellulose nanosphere: A comparative study on cytotoxicity and macrophage polarization potential
 Dinesh K. Patel; Keya Ganguly; Sayan Deb Dutta; Tejal V. Patil; [Ki-Taek Lim*](#)
Carbohydrate Polymers 2023 303 1 120435
 IF 10.723 JCR 3% | JCI 1%
<https://doi.org/10.1016/j.carbpol.2022.120464>
49. Electrospinning near infra-red light-responsive unzipped CNT/PDA nanofibrous membrane for enhanced antibacterial effect and rapid drug release
 Tejal V. Patil; Sayan Deb Dutta; Dinesh K. Patel; Keya Ganguly; [Ki-Taek Lim*](#)
Applied Surface Science 2023 612(1): 155949
 IF 7.392 JCR 3% | JCI 3%
<https://doi.org/10.1016/j.apsusc.2022.155949>
50. Highly stretchable, adhesive, and biocompatible hydrogel platforms of tannic acid functionalized spherical nanocellulose for strain sensors
 Dinesh K. Patel; Keya Ganguly; Sayan Deb Dutta; Tejal V. Patil; Aayushi Randhawa; [Ki-Taek Lim*](#)
International Journal of Biological Macromolecules 2023 229 28 105-122
 IF 8.025 JCR 7% | JCI 9%
<https://doi.org/10.1016/j.ijbiomac.2022.12.286>
51. Recent advances in 3D printing of photocurable polymers: types, mechanism, and tissue engineering application
 Aayushi Randhawa; Sayan Deb Dutta; Keya Ganguly; Dinesh K. Patel; Tejal V. Patil; [Ki-Taek Lim*](#)
Macromolecular bioscience 2023 Jan;23(1):e2200278
 IF 5.859 JCR 12%
<https://doi.org/10.1002/mabi.202200278>
52. Multifunctional 3D platforms for rapid hemostasis and wound healing: structural and functional prospects at biointerfaces
 Keya Ganguly; Mercedes Espinal; Sayan Deb Dutta; Dinesh K. Patel; Tejal V. Patil; [Ki-Taek Lim*](#)
International Journal of Bioprinting 2023 9(1): 648

IF 8.40 | Special issue as a guest editor
<http://dx.doi.org/10.18063/ijb.v9i1.648>

53. Size-wise effect of agricultural by-product-derived calcium phosphate composites on stem cell osteogenesis
 Kyoung-Je Jang; Sangbae Park; Juo Lee; Yeonggeol Hong; Hoon Seonwoo; Ki-Taek Lim; Jangho Kim; Jong Hoon Chung
Journal of Biosystems Engineering 2023 October, Scopus indexed
<https://link.springer.com/article/10.1007/s42853-023-00199-5>
54. A review on electroactive polymer-metal composites: development and applications for tissue regeneration
 Rumi Acharya; Sayan Deb Dutta; Tejal V. Patil; Keya Ganguly; Aayushi Randhawa; Ki-Taek Lim*
Journal of Functional Biomaterials 2023 14(10): 523
 IF 4.80 | Invited as a viewpoint article
<https://doi.org/10.3390/jfb14100523>
55. Understanding cell-extracellular matrix interactions for topology-guided tissue regeneration
 Aayushi Randhawa; Sayan Deb Dutta; Keya Ganguly; Tejal V. Patil; Rachmi Luthfikasari; Ki-Taek Lim*
Biocell 2023 47(4): 789-808
 IF 1.20 | Invited as a viewpoint article
<https://doi.org/10.32604/biocell.2023.026217>
56. Perylene-derived hydrophilic carbon dots with polychromatic emissions as superior bioimaging and NIR-responsive photothermal bactericidal agent
 Md Moniruzzaman; Sayan Deb Dutta; Ki-Taek Lim*; Jongsung Kim*
ACS Omega 2022 7(42) 37388–37400
 IF 4.132
<https://doi.org/10.1021/acsomega.2c04130>
57. Multifunctional hydrogels of polyvinyl alcohol/polydopamine functionalized with carbon nanomaterials as flexible sensors
 Dinesh K. Patel; Keya Ganguly; Sayan Deb Dutta; Tejal V. Patil; Ki-Taek Lim*
Materials Today Communications 2022 32 103906
 IF 3.383
<https://doi.org/10.1016/j.mtcomm.2022.103906>
58. Plant-actuated micro/nanorobotics platform: structural design, functional prospects, and biomedical applications
 Rachmi Luthfikasari; Tejal V. Patil; Dinesh K. Patel; Keya Ganguly; Sayan Deb Dutta; Ki-Taek Lim*
Small 2022 Jul;18(30):e2201417
 IF 15.153 JCR 5%
<https://doi.org/10.1002/sml.202201417>
59. Bioengineered lab-grown meat-like constructs through 3D printing of antioxidative protein hydrolysates
 Sayan Deb Dutta; Keya Ganguly; Min-Soo Cheong; Dinesh K. Patel; Tejal V. Patil; Seong-Jun Cho; Ki-Taek Lim*
ACS Applied Materials & Interfaces 2022 14, 30, 34513–34526
 IF 10.383 Selected as a Supplementary Cover
<https://doi.org/10.1021/acsmi.2c10620>
60. Controlled and localized drug delivery using titania nanotubes
 Amogh Kumara; G. Keerthiga; L. Mohana; Sayan Deb Dutta; Pallavi Gupta; Ki-Taek Lim; Tuhin Subhra Santra
Materials Today Communications 2022 July 2022 103843
 IF 3.662
<https://doi.org/10.1016/j.mtcomm.2022.103843>
61. Polyphenol-derived bioactive carbon quantum dot-incorporated multifunctional hydrogels as oxidative stress attenuator for antiaging and in vivo wound-healing applications
 Md Moniruzzaman; Sayan Deb Dutta; Jin Hexiu; Keya Ganguly; Ki-Taek Lim*; Jongsung Kim*
Biomaterials Science 2022 July 2022 Jun 28;10(13):3527-3539
 IF 7.590
<https://doi.org/10.1039/d2bm00424k>
62. Reduced graphene oxide-incorporated calcium phosphate cements with pulsed electromagnetic fields for bone regeneration
 Seonwoo, Hoon; Choung, Han-Wool; Park, Sangbae; Choi, Kyoung Soon; Jang, Kyoung Je; Kim, Jangho; Lim, Ki Taek; Kim, Yeonju; Garg, Pankaj; Pandey, Shambhavi; Lee, Juo; Park, Joo-Cheol ; Choung, Yun-Hoon; Choung, Pill-Hoon; Kim, Soo Young; Chung, Jong Hoon
RSC Advances 2022, 12, 5557-5570
 IF 4.036
<https://doi.org/10.1039/d1ra05717k>
63. A review of properties of nanocellulose, its synthesis, and potential in biomedical applications
 Aayushi Randhawa; Sayan Deb Dutta; Keya Ganguly; Dinesh K. Patel; Tejal V. Patil; Ki-Taek Lim*
Applied Sciences 2022 12(14), 7090
 IF 2.838 | Invited as a special issue

<https://doi.org/10.3390/app12147090>

64. Wet chemistry-based processing of tunable polychromatic carbon quantum dots for multicolor bioimaging and enhanced NIR-triggered photothermal bactericidal efficacy
Md Moniruzzaman; Sayan Deb Dutta; Ki-Taek Lim*; Jongsung Kim*
Applied Surface Science **2022** Volume 597, 30 September 2022, 153630
IF 7.392 JCR 3%
<https://doi.org/10.1016/j.apsusc.2022.153630>
65. Functionalized chitosan/spherical nanocellulose-based injectable hydrogels with superior antibacterial efficiency for improved wound healing
Dinesh K. Patel; Keya Ganguly; Jin Hexiu; Sayan Deb Dutta; Tejal V. Patil; Ki-Taek Lim*
Carbohydrate Polymers **2022**, 284, 119202-119217
IF 10.723 JCR 3%
<https://doi.org/10.1016/j.carbpol.2022.119202>
66. Magnetic field-assisted aligned patterning in an alginate-silk fibroin/nanocellulose composite for guided wound healing
Keya Ganguly; Jin Hexiu; Sayan Deb Dutta; Dinesh K. Patel; Tejal V. Patil; Ki-Taek Lim*
Carbohydrate Polymers **2022** Jul 1;287:119321
IF 10.723 JCR 3%
<https://doi.org/10.1016/j.carbpol.2022.119321> | NANO NEWS
67. Two-photon excitable membrane targeting polyphenolic carbon dots for long-term imaging and pH-responsive chemotherapeutic drug delivery for synergistic tumor therapy
Sayan Deb Dutta; Jin Hexiu; Jongsung Kim; Sourav Sarkar; Jagannath Mondal; Yong-Kyu Lee; Jeong Man An; Md Moniruzzaman; Ki-Taek Lim*
Biomaterials Science **2022** 10(7) 1680-1696
IF 7.590 | Selected as a front cover
<https://doi.org/10.1039/D1BM01832A>
68. 3D-printable chitosan/silk fibroin/cellulose nanoparticle scaffolds for bone regeneration via M2 macrophage polarization
Dinesh K. Patel; Sayan Deb Dutta; Jin Hexiu; Keya Ganguly; Ki-Taek Lim*
Carbohydrate Polymers **2022**, 281, 119077-119095
IF 10.723 JCR 3%
<https://doi.org/10.1016/j.carbpol.2021.119077>
69. Nanocellulose, a versatile platform: from the delivery of active molecules to tissue engineering applications
Tejal V. Patil; Dinesh K. Patel; Sayan Deb Dutta; Keya Ganguly; Tuhin Subhra Santra; Ki-Taek Lim*
Bioactive Materials **2022**, 9, 566-589
IF 16.874 JCR 5%
<https://doi.org/10.1016/j.bioactmat.2021.07.006>
70. A review on microfluidic nanomaterials: from synthesis to biomedical applications
Kavitha Illath; Srabani Kar; Pallavi Gupta; Ashwini Shinde; Syrpailyne Wankhar; Fan-Gang Tseng; Ki-Taek Lim; Moeto Nagai; Tuhin Subhra Santra*
Biomaterials **January 2022**, 280, 121247-121280
IF 15.304 JCR 3%
<https://doi.org/10.1016/j.biomaterials.2021.121247>
71. Mesenchymal stem cells, the secretome and biomaterials: regenerative medicine applications
Ki-Taek Lim*; Tejal V. Patil; Sayan Deb Dutta; Keya Ganguly; Dinesh K. Patel
Biocell **2022**, 46(10), 2201-2208
IF 1.110 | Invited as a viewpoint article
<https://doi.org/10.32604/biocell.2022.020013>
72. Carbon nanotubes-based hydrogels for bacterial eradication and wound dressing applications
Tejal V. Patil, Dinesh K. Patel, Sayan Deb Dutta, Keya Ganguly, Aayushi Randhawa and Ki-Taek Lim*
Applied Sciences **2021**,
IF 2.679 | Invited as a feature article
<https://doi.org/10.3390/app11209550>
73. Fluid flow mechanical stimulation-assisted a cartridge device for osteogenic differentiation of human mesenchymal stem cells
Ki-Taek Lim*, Dinesh K. Patel, Sayan Deb Dutt and Keya Ganguly
Micromachines **2021**, 12(8), 927
IF 2.891
<https://doi.org/10.3390/mi12080927>
74. Evaluation of the sensing potential of stem cell-secreted proteins via a micro-chip device under electromagnetic field stimulation
SD Dutta; T Park; K Ganguly; DK Patel; Bin J; MC Kim; KT Lim*
ACS Applied Bio Materials **2021** 4(9) 6853-6864 August | Journal Cover

<https://doi.org/10.1021/acsabm.1c00561>

75. Graphene oxide-based stimuli-responsive platforms for biomedical application
Tejal V. Patil, Dinesh K. Patel, Sayan Deb Dutta, Keya Ganguly and Ki-Taek Lim*
Molecules **2021**, 26,0,
IF 4.411 | Invited as a feature article
<https://doi.org/10.3390/molecules26092797>
76. Electromagnetic-field-assisted cell-laden 3D printed poloxamer-407 hydrogel for enhanced osteogenesis
Sayan D. Dutta, Jin Bin, Keya Ganguly, Dinesh K. Patel and Ki-Taek Lim*
RSC Advances **2021**, 11, 20342
IF 3.361
<https://doi.org/10.1039/D1RA01143J>
77. A review of single-cell adhesion force kinetics and applications
Ashwini Shinde, Kavitha Illath, Pallavi Gupta, Pallavi Shinde, Ki-Taek Lim, Moeto Nagai, Tuhin Subhra Santra
Cells **2021**, 10 (3): 577
IF 6.600
<https://doi.org/10.3390/cells10030577>
78. Fabrication and characterization of 3D printable nanocellulose-based hydrogel for tissue engineering
Dinesh K. Patel+, Sayan Deb Dutta+, Woonchul Shin, Keya Ganguly, and Ki-Taek Lim*
RSC Advances **2021**, 11, 7466 - 7478,
IF 3.361
<https://doi.org/10.1039/D0RA09620B>
79. Enhanced osteogenic potential of unzipped carbon nanotubes for tissue engineering
Patel DK, SD Dutta, G Keya and Lim KT*
Journal of Biomedical Materials Research Part A **2021** Oct, 109(10): 1869-1880
IF 4.396
<https://doi.org/10.1002/jbm.a.37179>
80. Effects of GABA/β-glucan supplements on melatonin and serotonin content extracted from natural resources
SD Dutta, DK Patel, K Ganguly and KT Lim*
PLoS ONE **2021** Mar, 16(3): 0247890
IF 3.20
<https://doi.org/10.1371/journal.pone.0247890>
81. Multifunctional bioactive chitosan/cellulose nanocrystals scaffolds for the eradication of bacterial growth and sustained drug delivery
Dinesh K. Patel, Sayan Deb Dutta, Keya Ganguly and Ki-Taek Lim*
International Journal of Biological Macromolecules **2021**, 170 (15), 178-188,
IF 6.953 JCR 10% <https://doi.org/10.1016/j.ijbiomac.2020.12.145>
82. TEMPO-CNCs-capped gold nanoparticles for colorimetric detection of pathogenic DNA
K Ganguly, DK Patel, SD Dutta and KT Lim*
ACS Omega **2021**, 16 (19): 12382-12930
IF 3.512 A front cover (Selected) ACS LiveSlides™ presentation ACS LiveSlides (Selected)
<https://doi.org/10.1021/acsomega.1c00359>
83. Naturally-derived protein extract from Gryllus bimaculatus improves antioxidant properties and promotes osteogenic differentiation of hBMSCs
K Ganguly, SD Dutta, MS Jeong, DK Patel, SJ Cho and KT Lim*
PLoS ONE **2021**,
IF 3.204
<https://doi.org/10.1371/journal.pone.0249291>
84. Mushroom-derived bioactive molecules as immunotherapeutic agents: A review
Patel DK, SD Dutta, G Keya and Lim KT*
Molecules **2021**, 26(5), 1359
IF 4.411
<https://doi.org/10.3390/molecules26051359>
85. Isolation and characterization of cellulose nanocrystals from the coffee grounds for tissue engineering
SD Dutta, DK Patel, K Ganguly and KT Lim*
Materials Letters **2021**, 287 (15): 129311
IF 3.423
<https://doi.org/10.1016/j.matlet.2021.129311>

86. 3D printed bioactive and biodegradable hydrogel scaffolds with alginate/gelatin/cellulose nanocrystals scaffolds for tissue engineering
SD Dutta, H Jin, DK Patel, K Ganguly and **KT Lim***
International Journal of Biological Macromolecules **2021**, 167 (15): 644-658
IF 6.953 JCR 10%
<https://doi.org/10.1016/j.ijbiomac.2020.12.011>
87. Effect of Cirsium setidens (Dunn) Nakai. on the osteogenic differentiation of stem cells
SD Dutta, Patel DK, B Jin, SI Choi, OH Lee and **KT Lim***
Molecular Medicine Report **2021**, 23 (4), 1-1
IF 2.952
<https://doi.org/10.3892/mmr.2021.11903>
88. Development and characterization of waste equine bone-derived calcium phosphate cement with human alveolar bone-derived mesenchymal stem cells
KJ Jang, H Seonwoo, M Yang, S Park, **KT Lim**, J Kim, PH Choung and JH Chung
Connective Tissue Research **2021**, 62 (2):164-175,
IF 3.417
<https://doi.org/10.1080/03008207.2019.1655003>
89. Protaetia brevitaris seulensis derived protein isolate with enhanced osteomodulatory and antioxidative property
K Ganguly, SD Dutta, DK Patel, SJ Cho, and **KT Lim***
Molecules **2020**, 25(54)
IF 3.267
<https://doi.org/10.3390/molecules25246056>
90. Human teeth-derived bioceramics for improved bone regeneration
Lim KT* DK. Patel, SD Dutta, HW Choung, H Jin, JH Chung*
Nanomaterials **2020**, 10(12), 2396
IF 4.324
<https://doi.org/10.3390/nano10122396>
91. Carbon nanotube-based nanomaterials and their agricultural and biotechnological applications
Patel DK, HB Kim, SD Dutta, K Ganguly, **Lim KT***
Materials, **2020**, 13(7) 1679
IF 3.057
<https://doi.org/10.3390/ma13071679>
92. Stimuli-responsive self-assembly of cellulose nanocrystals (CNCs): structures, functions, and biological applications
K Ganguly, DK Patel, SD Dutta, **KT Lim***
International Journal of Biological Macromolecules **2020**, 155(15), 456
IF 5.162 JCR 8%
<https://doi.org/10.1016/j.ijbiomac.2020.03.171>
93. Enhanced osteogenic differentiation of human periodontal ligament stem cells by suberoylanilide hydroxamic acid
X Yunzei, SD Dutta, J Bin, L Mengmeng, S Zaixian, L Xiwen, K Yang, and **KT Lim***
BIOCELL, **2020**, 44(3), 389
IF 2.821 Invited
<https://doi.org/10.32604/biocell.2020.09170>
94. Bioactive electrospun nanocomposite scaffolds of poly (lactic acid)/cellulose nanocrystals for bone tissue engineering
Patel DK, SD Dutta, H Jin, G Keya, **Lim KT***
International Journal of Biological Macromolecules, **2020**, 162(1), 1429 IF 5.162 JCR 8%
<https://doi.org/10.1016/j.ijbiomac.2020.07.246>
95. Evaluation of the osteogenic potential of stem cells in the presence of growth hormone under magnetic field stimulation
Lim KT*, H Jin, Patel DK, J Kim, H Seonwoo, JH Chung*
ACS Biomaterials Science & Engineering **2020**, 6(7), 4141
IF 4.511 (Journal Cover)
<https://doi.org/10.1021/acsbmaterials.0c00043>
96. Influence of maitake (Grifola frondosa) particle sizes on human mesenchymal stem cells and in vivo evaluation of their therapeutic potential
Patel DK, YR Seo, SD Dutta, OH Lee, **Lim KT***
Biomed Research International **2020**, 2020: 8193971
IF 2.583
<https://doi.org/10.1155/2020/8193971>
97. Lithographically fabricated HA-incorporated PCL nanopatterned patch for tissue engineering
KJ Jang, S Kim, S Park, W Kim, Y Gwon, S Park, **KT Lim**, H Seonwoo, J Kim
Applied Sciences **2020**, 10(7), 2398

IF 2.474

<https://doi.org/10.3390/app10072398>

98. Evaluation of osteogenic/cementogenic modulating potential of PAI-1transfected media for stem cells
H Jin, Y Xu, Y Qi, X Wang, DK. Patel, SD Dutta, R Chen* and KT Lim*
IEEE Transactions on NanoBioscience, 2020, 19(3), 446
IF 2.791
DOI: [10.1109/TNB.2020.2984551](https://doi.org/10.1109/TNB.2020.2984551)
99. Osteogenic potential of human mesenchymal stem cells on eggshells-derived hydroxyapatite nanoparticles for tissue engineering
Patel DK, B Jin, SD Dutta, Lim KT*
Journal of Biomedical Materials Research: Part B - Applied Biomaterials, 2020, 108(5), 1953
IF 2.831
<https://doi.org/10.1002/jbm.b.34536>
100. Enhanced osteogenesis of mesenchymal stem cells on electrospun cellulose nanocrystals/poly(ε-caprolactone) nanofibers on graphene oxide substrates
Patel DK, YR Seo, SD Dutta, Lim KT*
RSC Advances 2019, 9, 36040 – 36049
IF 3.049
<https://doi.org/10.1039/C9RA06260B>
101. Graphene-layered eggshell membrane as a flexible and functional scaffold for enhanced proliferation and differentiation of stem cells
S Park, T Kim, Y Gwon, S Kim, D Kim, HH Park, KT Lim, HE Jeong, K Kim, J Kim
ACS Applied Bio Materials 2019, 2, 4242–4248
IF 4.7 (Front Cover)
<https://doi.org/10.1021/acsabm.9b00525>
102. Evaluation of bone regeneration potential of long-term soaked natural hydroxyapatite
KT Lim*, DK Patel, HW Choung, H Seonwoo, J Kim, JH Chung*
ACS Applied Bio Materials 2019, 2, 12, 5535-5543
IF 4.7 (Front Cover)
<https://doi.org/10.1021/acsabm.9b00345>
103. In vitro biocompatibility of electrospun poly(ε-caprolactone)/ cellulose nanocrystals nanofibers for tissue engineering
SD Dutta, DK Patel, YR Seo, CW Park, SH Lee, JW Kim, J Kim, Lim KT*
Journal of Nanomaterials 2019 1-11
IF 2.233
<https://doi.org/10.1155/2019/2061545>
104. A fully automated bioreactor system for precise control of stem cell proliferation and differentiation
KT Lim*, DK Patel, H Seonwoo, J Kim, JH Chung
Biochemical Engineering Journal 2019 150, 15, 107258
IF 3.371
<https://doi.org/10.1016/j.bej.2019.107258>
105. Biomimetic polymer-based engineered scaffolds for improved stem cell function
Patel DK, Lim KT*
Materials 2019, 12, 2950, 1-21
IF 2.972
<https://doi.org/10.3390/ma12182950>
106. Latent stem cell-stimulating therapy for regeneration of chronic tympanic membrane perforations using IGFBP2-releasing chitosan patch scaffolds
Seonwoo H, Kim SW, Shin B, Jang KJ, Lee M, Choo OS, Choi MJ, Kim J, Lim KT, Jang JH, Chung JH, Choung YH
Journal of Biomaterials Applications 2019 34(2):198-207
IF 2.442
<https://doi.org/10.1177/0885328219845082>
107. Synthesis and characterization of eggshell-derived hydroxyapatite bioceramics
DK Patel, MH Kim, Lim KT*
Journal of Biosystems Engineering 2019 44, 128 Scopus indexed
<https://doi.org/10.1007/s42853-019-00017-x>
108. Enhanced osteogenesis of human mesenchymal stem cells in the presence of single-walled carbon nanotubes
Kim HB, Jin B, Patel DK, Kim JW, Kim J, Seonwoo H, Lim KT*
IEEE Transactions on Nanobioscience 2019 Jul;18(3):463-468
IF 2.012

DOI: 10.1109/TNB.2019.2914127

109. 3D-Printed scaffolds with reinforced poly (lactic acid)/carbon nanotube filaments based on melt extrusion
HB Kim, DK Patel, YR Seo, Lim KT*
Journal of Biosystems Engineering 2019 44, 120 Scopus indexed
<https://doi.org/10.1007/s42853-019-00011-3>
110. Functional cellulose-based hydrogels as extracellular matrices for tissue engineering
SD Dutta, DK Patel, KT Lim*
Journal of Biological Engineering 2019 13(55)
IF 5.256 JCR 10%
<https://doi.org/10.1186/s13036-019-0177-0>
111. Nanocellulose-based polymer hybrids and their emerging applications in biomedical engineering and water purification
Patel DK, Lim KT*
RSC Advances 2019 9 19143
IF 3.049
<https://doi.org/10.1039/C9RA03261D>
112. Structural elucidation and immune-enhancing effects of a novel polysaccharide from Grifola frondosa
Seo YR, Patel DK, Shin WC, Sim WS, Lee OH, Lim KT*
Biomed Research International 2019 16: 7528609
IF 2.583
<https://doi.org/10.1155/2019/7528609>
113. Stimuli-responsive graphene nanohybrids for biomedical applications
Patel DK, Seo YR, Lim KT*
Stem Cells International 2019 2 9831853
IF 3.989
<https://doi.org/10.1155/2019/9831853>
114. Neurogenic differentiation of human dental pulp stem cells on graphene-polycaprolactone
Seonwoo H, Jang KJ, Lee D, Park S, Lee M, Park S, Lim KT, Kim J, Chung JH
Nanomaterials 2018 21;8(7) 554
<https://doi.org/10.3390/nano8070554>
115. β -glucan content and antioxidant activity of mixed extract from Sarcodon aspratus and rice bran
WS Sim, SI Choi, TD Jung, BY Cho, SH Choi, X Han, JH Lee, YR Seo, Lim KT, OH Lee
Journal of Food Hygiene and Safety 2018 33(3) 200-206
<https://doi.org/10.13103/JFHS.2018.33.3.200>
116. Controlled extracellular topographical and chemical cues for an acceleration of neuronal development
S Park, KS Choi, D Kim, W Kim, D Lee, HN Kim, H Hyun, Lim KT, JW Kim, YR Kim, J Kim
Journal of Industrial and Engineering 2018 61(25) 65-70
<https://doi.org/10.1016/j.jiec.2017.12.001>
117. Cellulose-based nanocrystals: sources and applications via agricultural byproducts
Seo YR, JW Kim, S Hoon, J Kim, JH Chung, Lim KT*
Journal of Biosystems Engineering 2018 43(1) 59-71 Front Cover
<https://doi.org/10.5307/JBE.2018.43.1.059>
118. Development of a bio-electrospray system for cell and non-viral gene delivery
MC Lee, H Seonwoo, P Garg, KJ Jang, S Pandey, HB Kim, SB Park, Lim KT, JH Chung
RSC Advances 2018 8:6452-6459
IF 3.2
<https://doi.org/10.1039/C7RA12477E>
119. Iron oxide nanoparticle-incorporated alginate capsules as magnetic field-assisted potential delivery platforms for agriculture pesticides and biocontrol agents
D Lee, KS Choi, D Kim, S Park, W Kim KJ Jang, Lim KT, JH Chung, H Seonwoo, J Kim
Journal of Biosystems Engineering 2017 42(4): 323-329
<https://doi.org/10.5307/JBE.2017.42.4.323>
120. Mechanical and biological characteristics of reinforced 3D printing filament composites with agricultural by-products
HB Kim, YR Seo, KJ Chang, SB Park, H Seonwoo, JW Kim, J Kim, Lim KT*
Food engineering progress 2017 21(3) 1226
<https://doi.org/10.13050/foodengprog.2017.21.3.233>

121. Permeability enhancement of escherichia coli by single-walled carbon nanotube treatment
Mosleh A, Heintz A, Lim KT, Kim JW, Beitle R
Biotechnol Progress 2017 33(3):654-657
 IF: 2.90
<https://doi.org/10.1002/btpr.2443>
122. Pulsed-electromagnetic-field-assisted reduced graphene oxide substrates for multi-differentiation of human mesenchymal stem cells
KT Lim*, Seonwoo H, Choi KS, Jin H, Jang KJ, Kim J, Kim JW, Kim SY, Choung PH, Chung JH*
Adv Healthc Mater. 2016 5(16):2069-79 Cover
 IF: 5.760, JCR: 5%
<https://doi.org/10.1002/adhm.201600429>
123. Physical stimulation-based osteogenesis: effect on secretion in vitro by fluid dynamic shear stress of human alveolar bone-derived mesenchymal stem cells
KT Lim*, Seonwoo H, Choi KS, Jin H, Jang KJ, Kim J, Kim JW, Kim SY, Choung PH, Chung JH*
IEEE Trans Nanobioscience 2016 15(8):881-890
 IF: 3.90
<https://doi.org/10.1109/TNB.2016.2627053>
124. Physical hierarchically micro- and nanopatterned topographical cues for modulation of cellular structure and function
 H. Seonwoo, W.G. Bae, S. Park, H.N. Kim, K.S. Choi, K.T. Lim, J.W. Kim, J. Kim, J.H. Chung
IEEE Trans Nanobioscience 2016 15(8):835-842
 IF: 3.90
<https://doi.org/10.1109/TNB.2016.2631641>
125. Eggshell membrane: review and impact on engineering
 S. Park, KS Choi, D. Lee, D. Kim, K.T. Lim, K.H. Lee, H. Seonwoo, J. Kim*
Biosystems Engineering 2016 151: 446-463
 IF: 4.90
<https://doi.org/10.1016/j.biosystemseng.2016.10.014>
126. Monolayer graphene-directed growth and neuronal differentiation of mesenchymal stem cells
 Kim J, Park S, Kim YJ, Jeon CS, Lim KT, Seonwoo H, Cho SP, Chung TD, Choung PH, Choung YH, Hong BH, Chung JH
J Biomed Nanotechnol. 2015 11(11):2024-33.
 IF: 7.578, JCR: 6.3%
<https://doi.org/10.1166/jbn.2015.2137>
127. Latent progenitor cells as potential regulators for tympanic membrane regeneration
 Kim SW, Kim J, Seonwoo H, Jang KJ, Kim YJ, Lim HJ, Lim KT, Tian C, Chung JH, Choung YH
Scientific Report 2015 23(5) 11542
 IF 4.1
<https://doi.org/10.1038/srep11542>
128. Recombinant human plasminogen activator inhibitor-1 promotes cementogenic differentiation of human periodontal ligament stem cells
 Jin H, Choung HW, Lim KT, Jin B, Jin C, Chung JH, Choung PH
Tissue Eng Part A. 2015 21(23-24):2817-28
 IF 4.3
<https://doi.org/10.1089/ten.TEA.2014.0399>
129. Topographical extracellular matrix cues on anticancer drug-induced cytotoxicity in stem cells
 Kim J, Kim YJ, Bae WG, Jang KJ, Lim KT, Choung PH, Choung YH, Chung JH
J Biomed Mater Res B Appl Biomater. 2015 103(6):1320-7
 IF 2.8
<https://doi.org/10.1002/jbm.b.33316>

Previous Affiliation: Seoul National University

130. Ki Taek Lim, Jangho Kim, Jong Hoon Chung. 2014. Development of Long-Term Storage Technology for Chinese Cabbage - Physiological Characteristics of Postharvest Freshness in a Cooler with a Monitoring and Control Interface. *J. of Biosystems Eng.* 39(3):194-204.
131. Ki-Taek Lim, Jin-Woo Kim, Jangho Kim, Jong Hoon Chung, 2014. Development and Evaluation of Natural Hydroxyapatite Ceramics Produced by the Heat Treatment of Pig Bones. *J. of Biosystems Eng.* 39(3):227-234.
132. Ki-Taek Lim, Jeong Moon Choi, Won-Chul Lim, Jangho Kim, Hong-Yon Cho, Jong Hoon Chung. 2014. Preparation and Characterization of Natural Material Extracted from Germinated Brown Rice. *J. of Biosystems Eng.* 39(3):235-243.
133. Ki Taek Lim, Jangho Kim, and Jong Hoon Chung. 2014. Development of a Vertical Embryo-Retaining Polished Rice Producing System with Abrasive and Friction Rollers. *Food Eng. Prog.* Vol. 18, No. 3. pp. 242~247.

134. Soojung Oh, Jangho Kim, Hyun Ryul Ryu, **Ki-Taek Lim**, Jong Hoon Chung, Noo Li Jeon. 2014. Design, Fabrication, and Application of a Microfluidic Device for Investigating Physical Stress-Induced Behavior in Yeast and Microalgae. *J. of Biosystems Eng.* 39(3):194-204.
135. Kyoung Je Jang, Woo Jae Cho, Hoon Seonwoo, Jangho Kim, **Ki-Taek Lim**, Pill Hoon Chung, Jong Hoon Chung. 2014. Development and Characterization of Horse Bone-derived Natural Calcium Phosphate Powders. *J. of Biosystems Eng.* 39(2):122-133.
136. **KT Lim**, J Hexiu, J Kim, H Seonwoo, WJ Cho, PH Choung, JH Chung. 2014. Synergistic Effects of Orbital Shear Stress on In Vitro Growth and Osteogenic Differentiation of Human Alveolar Bone-Derived Mesenchymal Stem Cells. *SCIE, IF 2.88, Journal of Biomedicine and Biotechnology*, 2014;2014:316803, Epub 2014 Jan 14.
137. Je-Duck Suh+, **KT Lim+**, Jin Hexu, Jangho Kim, PH Choung, JH Chung. 2014. Effects of Co-culture of Dental Pulp Stem Cells and Periodontal Ligament Stem Cells on Assembled Dual Disk Scaffolds. *Tissue Engineering and Regenerative Medicine, SCIE, IF 0.35, February; 11(1): 47-58.*+ These authors contributed equally to this work.
138. Jangho Kim, Won-Gyu Bae, Han-Wool Choung, **Ki Taek Lim**, Hoon Seonwoo, Hoon Eui Jeong, Kahp-Yang Suh, Noo Li Jeon, Pill-Hoon Choung, Jong Hoon Chung, Multiscale patterned transplantable stem cell patches for bone tissue regeneration. *SCI 8.7, Biomaterials. Volume 35, Issue 33, November 2014, Pages 9058–9067.*
139. Jangho Kim, Won-Gyu Bae, **Ki-Taek Lim**, Kyung-Jin Jang, Soojung Oh, Kyoung-Je Jang, Noo Li Jeon, Kahp-Yang Suh, Jong Hoon Chung, Density of nanopatterned Surfaces for designing bone tissue engineering scaffolds, *SCI 2.2, Materials Letters, 1 Volume 130, 1 September 2014, Pages 227–231.*
140. Pankaj Garg, Shambhavi Pandey, Bitna Kang, **Ki-Taek Lim**, Jangho Kim, Myung-Haing Cho, Tae-Eun Park, Yun-Jaie Choi, Pill-Hoon Chung, Chong-Su Cho and Jong Hoon Chung. 2014. Highly efficient gene transfection by a hyperosmotic polymannitol based gene transporter through regulation of caveolae and COX-2 induced endocytosis, *SCI, IF 5.97, Journal of Materials Chemistry B. Vol. 2, pp. 2666-2679.*
141. H. Choi, J Hexiu, JY Kim, **KT Lim**, HW Chung, JH Chung, PH Chung. Hypoxia Promotes CEMP1 Expression and Induces Cementoblastic Differentiation of Human Dental Stem Cells in a HIF-1 dependent Manner. *SCI IF 4.06, Tissue Engineering Part A, 20(1-2):410-23. doi: 10.1089/ten.TEA.2013.0132.*
142. **Ki-Taek Lim**, Soo Jung Baik, Seong Weon Kim, Jangho Kim, Hoon Seonwoo, Jin-Woo Kim, Pill-Hoon Choung, Yun-Hoon Choung, and Jong Hoon Chung. 2014. Development of Fast-hardening Calcium Phosphate Cements composed of Horse-bone derived Bioceramics and Chitosan. *Tissue Engineering and Regenerative Medicine, SCIE, IF 0.7*
143. Jangho Kim, Yeon Ju Kim, Won-Gyu Bae, Kyung-Jin Jang, **Ki Taek Lim**, Pill-Hoon Choung, Yun-Hoon Choung, Jong Hoon Chung. 2014. Topographical extracellular matrix cues on anticancer drug induced cytotoxicity in stem cells. *Journal of Biomedical Materials Research: Part B - Applied Biomaterials. [Accepted].*
144. Jangho Kim, Subeom Park, Yeon Ju Kim, Chang Su Jeon, **Ki Taek Lim**, Hoon Seonwoo, Sung-Pyo Cho, Taek Dong Chung, Pill-Hoon Choung, Yun-Hoon Choung, Byung Hee Hong, Jong Hoon Chung. 2014. Monolayer graphene-directed growth and neuronal differentiation of mesenchymal stem cells. *J. Biomed. Nanotech. [Accepted].*
145. Hexiu J+, **KT Lim+**, HW Chung, JH Chung, PH Chung. 2014. Recombinant human plasminogen activator inhibitor-1 induces osteogenic/cementogenic differentiation of human periodontal ligament stem cells. *SCI IF 4.06, Tissue Engineering Part A, Jan;20(1-2):410-23 [Accepted].* + Equivalent author
146. Jangho Kim, Hong Nam Kim, **Ki-Taek Lim**, Yeonju Kim, Hoon Seonwoo, Soo Hyun Park, Hye Jin Lim, Deok-Ho Kim, Pill-Hoon Choung, Yun-Hoon Choung, Kahp Suh, and Jong Hoon Chung. 2013. Designing nanotopographical density of extracellular matrix for controlled morphology and function of mesenchymal stem cells. *[Scientific Reports, SCIE, IF 2.927, Dec 19;3:3552*
147. Soo Hyun Park, **Ki Taek Lim**, Hoyoung Lee, Soo Hee Lee, Sang Ha Noh, Prediction of Soluble Solids Content of Chestnut using VIS/NIR spectroscopy, *Journal of Biosystems Engineering.* 38(1):55-63.
148. J Kim, HN Kim, **KT Lim**, Y Kim, S Pandey, P Garg, YH Choung, PH Choung, KY Suh, JH Chung. Synergistic Effects of Nanotopography and Co-Culture with Endothelial Cells on Osteogenesis of Mesenchymal Stem Cells. *Biomaterials 34(30): 7257-7268, SCI, IF 7.6.*
149. HM Son, H Seonwoo, J Kim, **KT Lim**, JH Chung. 2013. Development of a System Observing Worker's Physiological Responses and 3-Dimensional Biomechanical Loads in the Task of Twisting While Lifting. *Journal of Biosystems Engineering* 38(2): 163-170
150. AL Im, J Kim, **KT Lim**, H Swonwoo, WJ Cho, PH Choung, JH Chung. 2013. Effects of Micro-Electrical Stimulation on Regulation of Behavior of Electro-Active Stem Cells. *Journal of Biosystems Engineering.* 38(2): 113-120
151. **KT Lim**, J Kim, H Seonwoo, SH Park, PH Choung, JH Chung. 2013. In Vitro Effects of Pulsed Low-Intensity Ultrasound Stimulation on the Osteogenic Differentiation of Human Alveolar Bone-derived Mesenchymal Stem Cells. *SCIE, IF 2.88, Journal of Biomedicine and Biotechnology*, 2013; 269724, Epub 2013 Sep 30. * The special issue for which the paper is "Bone Tissue Engineering and Regeneration
152. **KT Lim**, J Hexiu, J Kim, PH Choung, JH Chung. 2013. Effects of Electromagnetic Fields on Osteogenesis of Human Alveolar Bone-Derived Mesenchymal Stem Cells. *Journal of Biomedicine and Biotechnology. Vo. 2013 (2013), SCIE, IF 2.88*
153. H Seonwoo, SW Kim, J Kim, T Chunjie, **KT Lim**, Y Kim, YH Choung, JH Chung. 2013. Development of Novel Chitosan Patch Scaffolds Releasing Epithelial Growth Factor for Regeneration of Chronic Tympanic Membrane Perforations. *SCI IF 4.02, Tissue Engineering Part A, Sep;19(17-18):2097-107*
154. **KT Lim**, SH Park, J Kim, H Seonwoo, PH Choung, JH Chung. 2013. Cell Image Processing Methods for Automatic Cell Pattern Recognition and Morphological Analysis of Mesenchymal Stem Cells - Essential Algorithm for Cell Classification and Adaptive Brightness Correction - *Journal of Biosystems Engineering.* 38(1):55-63.
155. **KT Lim**, J Kim, H Seonwoo, JU Chang, H Choi, J Hexiu, WJ Cho, PH Choung, JH Chung. 2013. Enhanced Osteogenesis of Human Alveolar Bone-Derived Mesenchymal Stem Cells for Tooth Tissue Engineering Using Fluid Shear Stress in a Rocking Culture Method.

Tissue Engineering Part:C. Vol. 19, No. 2, pp. 128-145. [Featured Article, SCI, IF 4.02]

*The 1st most-read article in *Tissue Engineering* during March 2013.

156. Shambhavi Pandey, Pankaj Garg, **Ki-Taek Lim**, Jangho Kim, Yun-Hoon Choung, Yun-Jaie Choi, Pill-Hoon Choung, Chong-Su Cho, Jong Hoon Chung. The efficiency of membrane transport of vitamin B6 coupled to poly(ϵ -ester amine) gene transporter and transfection in cancer cells. *Biomaterials*. Volume 34, Issue 14, May 2013, Pages 3716-3728 [SCI, IF 7.4]
157. J Kim, SW Kim, S Park, **KT Lim**, H Seonwoo, Y Kim, BH Hong, YH Choung, JH Chung. 2013. Bacterial Cellulose Nanofibrillar Patch as a Wound Healing Platform of Tympanic Membrane Perforation. *SCIE IF No, Advanced Healthcare Materials*, Nov 2(11):1525-31.
158. J Kim, S Choi, YJ Kim, **KT Lim**, H Seonwoo, Y Park, DH Kim, PH Choung, CS Cho, SY Kim, YH Choung, JH Chung. 2013. Bioactive Effects of Graphene Oxide Cell Culture Substratum on Structure and Function of Human Adipose-Derived Stem Cells. *SCI, IF 2.625, Journal of Biomedical Materials Research Part A*, Dec;101(12):3520-30.
159. J Kim, YR Kim, Y Kim, **KT Lim**, H Seonwoo, S Park, SP Cho, BH Hong, PH Choung, TD Chung, YH Chung, JH Chung. 2013. Graphene-Incorporated Chitosan Substrata for Adhesion and Differentiation of Human Mesenchymal Stem Cells. *Journal of Materials Chemistry B*. Vol. 1, pp. 933-938. [SCI, IF 5.968]
160. J Kim, DH Kim, **KT Lim**, H Swonwoo, SH Park, YR Kim, YH Choung, PH Choung, JH Chung. 2012. Charged Nanomaterials as Efficient Platforms for Modulating Cell Adhesion and Shape. *Tissue Engineering Part C: Methods*, Vol. 18, Issue 12, pp. 913-923. [SCI, IF 4.02]
161. **Lim, K.T.**, Suh, J. D., Kim, J. H., Choung, P.H., and Chung, J.H. 2011. Calcium Phosphate Bioceramics fabricated from Extracted Human Teeth for Tooth Tissue Engineering. *Journal of Biomedical Materials Research Part B: Applied Biomaterials*. Vol. 99B No.2, pp. 399–411. [SCI, IF 2.3]
162. **Ki-Taek Lim**, Tu San Park, Jang-Ho Kim, Pill-Hoon Choung, and Jong-Hoon Chung. 2011. Noninvasive Measurement of Glucose and Lactate Metabolism of Human Alveolar Bone-derived Mesenchymal Stem Cells using Near-Infrared Spectroscopy. *Tissue Engineering and Regenerative Medicine*. Vol.8, No.6, pp.503-511. [SCle]
163. Ariunaa Togloom*, **Ki-Taek Lim***, Jang-Ho Kim, Pankaj Garg, Hoon Seonwoo, Chong-Su Cho, Yun-Hoon Choung, Pill-Hoon Choung, and Jong-Hoon Chung. 2011. Molecular Responses in Osteogenic Differentiation of Mesenchymal Stem Cells Induced by Physical Stimulation. *Tissue Engineering and Regenerative Medicine*. Vol.8, No.3, pp. 271-281. [SCle] *Equivalent author
164. Kim JH, Kim SW, Choi SJ, **Lim KT**, Lee JB, Seonwoo H, Choung PH, Park K, Cho CS, Choung YH, Chung JH. 2011. A Healing Method of Tympanic Membrane Perforations Using 3-Dimensional Porous Chitosan Scaffolds. *Tissue Engineering: Part A*. Vol.17, No. 21, pp 2763-2772. Jun 21. [SCI, IF 4.6]
165. **K. T. Lim**, J. H. Kim, J. H. Chung. 2011. Development of an Automatic Brown Rice Germinating System of Air-Phase Type with Intermittent Water Spraying and Anion Radiation. *Journal of Biosystems Engineering*. Vol.36, No. 3, pp. 187-194.
166. H. Seonwoo, **K. T. Lim**, J. H. Kim, H. M. Son, J. H. Chung. 2011. Measurement of Worker's Physiological and Biomechanical Responses during the Cherry Tomato Harvesting Work in a Greenhouse. *Journal of Biosystems Engineering*. Vol.36, No. 3, pp. 223-230.
167. Byeong-Ro Min, **Ki-Taek Lim** and Dae-Weon Lee. 2011. The Research of Shape Recognition Algorithm for Image Processing of Cucumber Harvest Robot. *Journal of Bio-Environment Control*, 20(2):63-71.
168. **Ki-Taek Lim**, Han-Wool Choung, Ae-Lee Im, Jang-Ho Kim, Chong-Su Cho, Yun-Hoon Choung, Soung-Hoo Jeon, Pill-Hoon Choung, and Jong-Hoon Chung. 2010. Novel Composite Scaffolds for Tooth Regeneration using Human Dental Pulp Stem Cells. *Tissue Engineering and Regenerative Medicine*. vol.7, No.5, pp.473-480. [SCle, IF 3.12]
169. Hong-Sik Choi*, **Ki-Taek Lim***, Jang-Ho Kim, Joo-Young Park, Soung-Hoo Jeon, Han-Wool Choung, Chong-Su Cho, Yun-Hoon Choung, Pill-Hoon Choung, and Jong-Hoon Chung. 2010. Evaluation of Novel Degradable Poly-bioceramic Scaffolds of PDLLA/Toothapatite/TCP using Human Dental Pulp Stem Cells for Tooth Bioengineering. *Tissue Engineering and Regenerative Medicine*. vol.7, No.5, pp.481-488. [SCle, IF 3.12] *Equivalent author
170. **K. T. Lim**, J. H. Kim, H. Seonwoo, J. H. Hong, J. H. Chung, 2010, Effects of Electric Current Stimuli and High-Voltage Electric Field Treatments on Brown Rice Germination, *Journal of Biosystems Engineering*. 35(2): 100-107.
171. Min-Ho Yang, **Ki-Taek Lim**, Min-Ho Yanog, Pill-Hoon Choung, Chong-Su Cho, Jong Hoon Chung, 2010, Application of Ultrasound Stimulation in Bone Tissue Engineering. *International Journal of Stem Cells*. 3(2): 74-79.
172. H. M. Son, H. Seonwoo, **K. T. Lim**, J. H. Kim, J. H. Chung, 2010. Analysis of Physiological Bio-information, Human Physical Activities and Load of Lumbar Spine during the Repeated Lifting Work. 2010. *J. Biosystems Eng*. 35(5): 357-365.
173. Jang-Ho Kim, Seong Jun Choi, Jung-Sub Park, **Ki Taek Lim**, Pill-Hoon Choung, Seung Won Kim, Jong Bin Lee, Jong Hoon Chung, Yun-Hoon Choung. 2010. Tympanic Membrane Regeneration Using a Water-Soluble Chitosan Patch. *Tissue Engineering:Part A*, vol.16, No. 1, pp. 225-232. [SCI, IF 4.6]
174. **Ki-Taek Lim**, Chong-Su Cho, Yun -Hoon Choung, Hoon Seonwoo, Hyun-Mok Son, Soo-Jung Baik, Jang-Ho Kim, Sung-Min Hong, Joo-Young Park, Soung-Hoo Jeon, Pill-Hoon Choung, and Jong-Hoon Chung. 2009. Development of a Perfusion Flow Bioreactor System for Culturing Human Alveolar Bone Marrow Stem Cells. *Tissue Engineering and Regenerative Medicine*. vol.6, No.14, pp. 1410-1419. [SCle, IF 3.12]
175. **Ki-Taek Lim**, Hoon Seonwoo, Hyun-Mok Son, Soo-Jung Baik, Jang-Ho Kim, Soung-Hoo Jeon, Joo-Young Park, Yun-Hoon Choung, Chong-Su Cho, Pill-Hoon Choung, and Jong-Hoon Chung. 2009. Biomechanical effects of fluid dynamics, and mass transport on cell growth in perfusion bioreactors for tissue engineering. *Tissue Engineering and Regenerative Medicine*. vol.6, No. 14, pp. 1327-1342. [SCle, IF 3.12]
176. **Ki-Taek Lim**, Jang-Ho Kim, Hoon Seonwoo, Hyun-Mok Son, Soo-Jung Baik, Eun-Suk Kim, Joo-Young Park, Soung-Hoo Jeon, Yun -Hoon Choung, Chong-Su Cho, Pill-Hoon Choung, and Jong-Hoon Chung. 2009. In vitro Effects of electromagnetic field stimulation on cells in tissue engineering. *Tissue Engineering and Regenerative Medicine*. vol.6, No. 4, pp. 675-684. [SCle, IF 3.12]

177. **Ki-Taek Lim**, Chong-Su Cho, Yun-Hoon Choung, Jang-Ho Kim, Hyun-Mok Son, Hoon Seonwoo, Soo-Jung Baik, Soung-Hoo Jeon, Joo-Young Park, Pill-Hoon Choung, and Jong-Hoon Chung. 2009. Novel Perfusion Bioreactor Systems for Tissue Engineering. *Tissue Engineering and Regenerative Medicine*. vol.6, No. 1-3, pp. 207-218. [SCle, IF 3.12]
178. **Ki-Taek Lim**, Chong-Su Cho, Yun-Hoon Choung, Jang-Ho Kim, Hyun-Mok Son, Hoon Seonwoo, Soo-Jung Baik, Soung-Hoo Jeon, Joo-Young Park, Pill-Hoon Choung, and Jong-Hoon Chung. 2009. Influence of static magnetic field stimulation on cells in tissue engineering. *Tissue Engineering and Regenerative Medicine*. vol.6, No. 1-3, pp. 250-258. [SCle, IF 3.12]
179. Jang Ho Kim, Chong-Su Cho, Yun-Hoon Choung, **Ki-Taek Lim**, Hyun-Mok Son, Hoon Seonwoo, Soo-Jung Baik, Soung-Hoo Jeon, Joo-Young Park, Pill-Hoon Choung, and Jong-Hoon Chung. 2009. Mechanical Stimulation of Mesenchymal Stem Cells for Tissue Engineering. *Tissue Engineering and Regenerative Medicine*. vol.6, No. 1-3, pp. 199-206. [SCle, IF 3.12]
180. Jang Ho Kim, Pill-Hoon Choung, In Yong Kim, **Ki-Taek Lim**, Hyun-Mok Son, Yun-Hoon Choung, and Jong Hoon Chung. 2009. Electrospun nanofibers composed of poly(ϵ -caprolactone) and polyethylenimine for tissue engineering applications. *Material Science and Engineering C*. 29 (2009) 1725-1731. [SCI, IF 2.6]
181. Jang Ho Kim, Jun Ho Bae, **Ki Taek Lim**, Pill-Hoon Choung, Jung-Sub Park, Seong Jun Choi, Ae Lee Im, Eung Tae Lee, Yun-Hoon Choung, Jong Hoon Chung. 2009. Development of Water-Insoluble Chitosan Patch Scaffold to Repair Traumatic Tympanic Membrane Perforations. *Journal of Biomedical Materials Research Part A*. 90(2) : 446-455 [SCI, IF 3.1]
182. Eung Tae Lee, **Ki-Taek Lim**, Jang Ho Kim, Ae Lee Im, Hyun Mok Son, Chong Su Cho, Pill-Hoon Choung, Jong Hoon Chung. 2008. Effect of Low Intensity Ultrasound Stimulation on the Proliferation of Alveolar Bone Marrow Stem Cell. *Tissue Engineering and Regeneration Medicine* vol.5, No. 4-6, pp. 572-580. [SCle]
183. J. H. Chung, J. H. Kim, Y. H. Choung, A. L. Im, **K. T. Lim**, J. H. Hong, P. H. Choung. 2007. Biomechanical Properties and Cytotoxicity of Chitosan Patch Scaffold for Artificial Eardrum. *Journal of Biosystems Engineering*. 32(1): 57-62.
184. A.L. Im, J. H. Chung, **K. T. Lim**, P. H. Choung, J. H. Hong. 2007. Preparation and Biocompatibility of Composite Bone Scaffolds Using Gnotobiotic Pig Bones. *J. of Biosystems Eng*. 32(1): 49-55
185. **K. T. Lim**, J. H. Chung, J. H. Hong, J. H. Kim, E. T. Lee, A. L. Im. 2006. Effect of Air-Phase Germination with Anion Radiation and Water-Spraying on Germination Ratio, Sprout Growth, and GABA Contents of Germinated Brown Rice. *Agricultural and Biosystems Engineering*. 7(1) : 42-47
186. J. Lee, **K. T. Lim**, J. H. Hong, Y. B. Lee, C. O. Rhee, J. H. Chung. 2006. Effects of Ultrasound Stimuli on Acceleration of Brown Rice Germination. *J. of Biosystems Eng*. 31(6) : 506-513
187. 1. J. Lee, **K. T. Lim**, J. H. Hong, C. O. Rhee, Y. S. Choi, Y. B. Lee, S. M. Choi, J. H. Chung. 2006. Effects of Germinating Types of Water-soaking & Air-exposure and Chitosan Treatment on Brown Rice Germination. *J. of Biosystems Eng*. 31(4) : 363-368

E. Patents

1. Korea. Packaging film reinforced with spike-structured zinc oxide nanoparticles, method for manufacturing the same, and food preservation method using the same, APN: 10-2026-0159891 (2026. 08. 25)
2. Korea. Method for manufacturing an electrically conductive, piezoelectric, biodegradable, adhesive, and 3D-printable nanocomposite hydrogel and a hydrogel manufactured by the same, APN: 10-2026-0156785 (2026. 08. 20)
3. Korea. Amide-functionalized nanocellulose drives Stat6 and Ion channel-mediated M2 polarization of tissue-resident macrophage, APN: 10-2025-0004576 (2026.01.09)
4. Korea. Bioinspired shape reconfigurable, printable, and conductive 'E-skin' patch with robust antibacterial properties for human health sensing, APN: 10-2025-0055576 (2025.04.28)
5. Korea. Ultra-thin, antimicrobial, self-cleaning, reusable, and biodegradable, micro nanofibrous mask and preparation method thereof, APN: 10-2025-0060503 (2025.05.09)
6. Korea. 3D printed multifunctional bioadhesive patch with intrinsic bioelectronic properties for decoding electromechanical and anisotropic cardiac microenvironment, APN: 10-2025-0082825 (2025.06.23)
7. Korea, A method for In situ fabricated mechanically robust 3D printed gelatin methacrylate-polypyrrole hydrogels with electrical conductivity and continuous microcurrent stimulation of stem cells for accelerating osteogenesis, APN: 10-2024-0033944 (2024.03.11)
8. Korea, A composition of 3D printable Zn/polyphenol-incorporated gelatin/chitosan hydrogel with drug-free antibacterial and macrophage activation and its use for same, APN: 10-2024-0021972 (2024.02.16)
9. Korea, A composition of 3D printed ultra-small carbon nitride-decorated scaffolds with visible light-driven phototherapy for bacterial biofilm eradication, reducing hemorrhage, and immunomodulatory bone regeneration and its use for same, APN: 10-2024-0025834 (2024.02.23)
10. Korea, A simplified method for isolation, characterization, and culture optimization of bovine muscle satellite cells and use of the same, APN: 10-2021-0036743 (2021.03.22) | [Granted No. 10-2594006 \(2023.10.20\)](#)
11. Korea, A method of optimal cultivation for preparing cultured meat using plant and insect protein hydrolysate and application of this same, APN: 10-2021-0040899 (2021.03.30) | [Granted No. 10-2581772 \(2023.09.19\)](#)
12. Korea, A method for near-infrared laser-responsive spiky-structured microbots for effective killing of cancer cells and bacteria, & its applications, APN 10-2023-0104796 (2023.08.10)
13. Korea, A method for perfusion culture of bone marrow mesenchymal stem cells in 3D nHA/GelMa hydrogel promotes a compact bone graft template, APN 10-2023-0099900 (2023.07.31)
14. Korea, Method for promoting osteogenic differentiation of stem cells using soft hydrogel-based pulsating pressure stimulation technology and its applications, APN 10-2023-0058659 (2023.05.04)
15. Korea. Antioxidative and osteogenic differentiation potentials of Gryllus bimaculatus protein isolates, APN: 10-2021-0003914 (2021.01.12) | [Granted No. 10-2525499 \(2023.04.20\)](#)
16. Korea, 3D bioprinted nanoengineered hydrogel with photo-activated drug delivery for tumor apoptosis and simultaneous bone regeneration via macrophage immunomodulation and use of the same, APN 10-2023-00047298 (2023.04.11) | [Granted No. 10-2928872-0000 \(2026. 02.12\)](#)
17. Korea, A composition for tissue engineering comprising alginate, gelatin, and cellulose nanocrystals and use of the same, APN: 10-2020-0181006 (2020.12.22) | [Granted No. 10-2506227 \(2023.03.30\)](#)
18. Korea. Extraction, preparation, and characterization of cellulose nanocrystals derived from coffee byproducts, APN: 10-2020-0133226 (2020.10.15) | [Granted No. 10-2506227 \(2023.02.28\)](#)
19. Korea, A method for 3D-printed transparent bioadhesive, conductive, and biocompatible hydrogel platforms as sensors and moist electric-generators, APN 10-2023-0021615 (2023.02.17) | [Granted No. 10-2835846-0000 \(2025. 07.15\)](#)
20. Korea. A composition for promoting osteogenic differentiation of stem cells comprising an extract from Cirsium setidens (Dunn) Nakai, APN: 10-2020-0153666 (2020.11.17) | [Granted No. 10-2495083 \(2023.01.30\)](#)
21. Korea, A method for immunopolarized exosome-laden 3D bioprinted d-ECM skin grafts with all functional physiological features, APN 10-2023-0006670 (2023.01.17)
22. Korea, A method for curcumin releasing bioactive electrospun unzipped CNT/PDA nanofibrous mat with tunable mechanical properties and enhanced NIR-triggered bactericidal efficacy for wound healing, APN 10-2022-0121579 (2022.09.26) | [Granted No. 10-2907255-](#)

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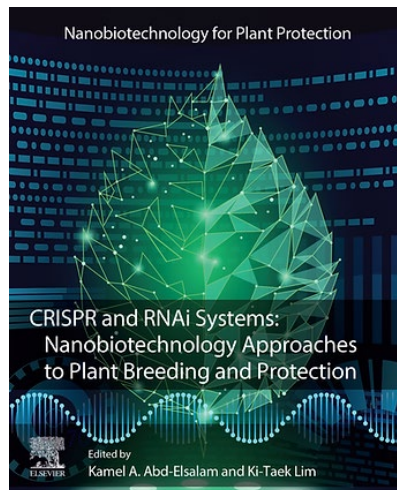
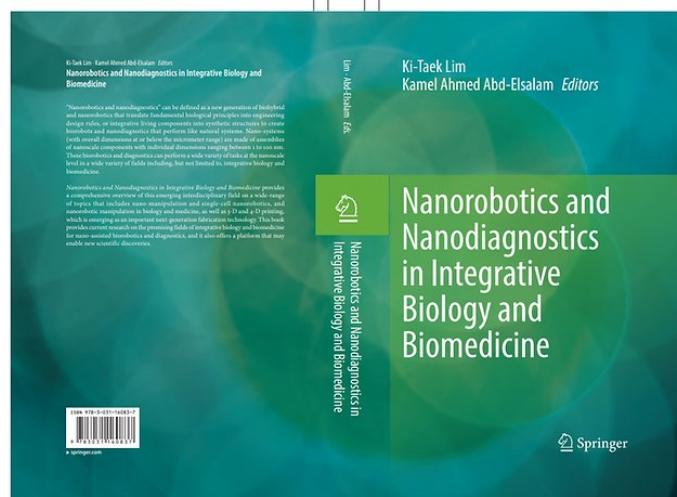
23. Korea, A method for trackable, conductive, and highly luminescent nanocellulose-based printable bio-resins, APN 10-2022-0982193-11 (2022.09.19) | [Granted No. 10-2987758-0000 \(2026. 07.02\)](#)
24. Korea, A method for highly stretchable, adhesive, and biocompatible hydrogel platforms of tannic acid functionalized spherical nanocellulose for strain sensors, APN 10-2022-0106854 (2022.08.25)
25. Korea, A method for promoting osteogenic commitment of stem cells using pulsatile pressure stimulation and application thereof, APN 10-2022-0097301 (2022.08.04) | [Granted No. 10-2885911-0000 \(2025. 11.10\)](#)
26. Korea, A method for expansion of human mesenchymal stem cells using the wave bioreactor system with pulsed electromagnetic field stimulation for enhanced cell culture performance, APN 10-2022-0008586 (2022.01.20)
27. Korea. Electromagnetic fields-directed bone marrow-on-a-chip system for monitoring differentiation and secretome of human mesenchymal stem cells | [Granted No.: 10-2362160-0000 \(2022.02.08\)](#)
28. Korea. TEMPO-CNCs-capped gold nanoparticles for colorimetric detection of pathogenic DNA, APN: 10-2021-0006000 (2021.01.15) | [Granted No. 10-2480428-0000 \(2022.12.26\)](#)
29. Korea, A method for In situ fabricated mechanically robust 3D printed gelatin methacrylate-polypyrrole hydrogels with electrical conductivity and continuous microcurrent stimulation of stem cells for accelerating osteogenesis, APN: 10-2021-1529703 (2021.12.30)
30. Korea, A method for functionalized chitosan/spherical nanocellulose-based hydrogels with superior antibacterial efficiency for improved wound healing, APN: 10-2021-0178841 (2021.12.14) | [Granted No. 10-2668218 \(2024.05.20\)](#)
31. Korea, A method for shape-engineered carbon quantum dots as mitochondrial stress amplifier for cancer theranostics, APN: 10-2021-0180734 (2021.12.16) | [Granted No. 10-2767831-0000 \(2025. 02.10\)](#)
32. Korea, A composition for sleep induction comprising an extract of rice bran, APN: 10-2020-026015(2020.03.02) [Granted No. 10-2322023 \(2021.10.29\)](#)
33. Korea. A method of chemically free 3D-printable self-standing and recoverable nanocellulose hydrogel for improved bone regeneration through osteo-immunomodulation and M2 macrophage polarization, APN: 10-2021-0137556 (2021.10.15)
34. Korea. A method for hydroxyapatite extracted from eggshell, APN: 10-2019-0015523 (2019.02.11) | [Granted No. 10-2249137 \(2021.04.30\)](#)
35. Korea. A method of optimal cultivation for preparing cultured meat using plant and insect protein hydrolysate and application of this same, APN: 10-2021-0040899 (2021.03.30)
36. Korea. A simplified method for isolation, characterization, and culture optimization of bovine muscle satellite cells and use of the same, APN: 10-2021-0036743 (2021.03.22)
37. Korea. TEMPO-CNCs-capped gold nanoparticles for colorimetric detection of pathogenic DNA, APN: 10-2021-0006000 (2021.01.15)
38. Korea. Antioxidative and osteogenic differentiation potentials of Gryllus bimaculatus protein isolates, APN: 10-2021-0003914 (2021.01.12)
39. Korea. A composition for tissue engineering comprising alginate, gelatin, and cellulose nanocrystals and use of the same, APN: 10-2020-0181006 (2020.12.22)
40. Korea. A method for structural elucidation and immune-enhancing effects of a novel polysaccharide from Grifola frondosa, APN: 10-2018-0149994(2018.11.28) | [Granted No. 10-2182507 \(2020.11.18\)](#)
41. Korea. A composition for promoting osteogenic differentiation of stem cells comprising an extract from Cirsium setidens (Dunn) Nakai, APN: 10-2020-0153666 (2020.11.17)
42. Korea. A method for cellulose nanocrystals extracted from rice husks, Granted No. 10-2172173 (2020.10.26)
43. Korea. Extraction, preparation, and characterization of cellulose nanocrystals derived from coffee byproducts, APN: 10-2020-0133226 (2020.10.15)
44. Korea. A method for single-walled carbon nanotubes for mesenchymal stem cells' osteogenesis, APN: 10-2019-0002937 (2019.01.09). [Granted No. 10-2133820\(2020.07.08\)](#)
45. Korea, A composition for sleep induction comprising an extract of rice bran, APN: 10-2020-026015 (2020.03.02)
46. Korea. An automated bioreactor system for precise control of cell proliferation and differentiation and use of the same, APN: 10-2019-0033794 (2019.03.25).

Granted No. 10-2040691 (2019.10.30)

47. Korea. A method for hydroxyapatite extracted from eggshell, APN: 10-2019-0015523 (2019.02.11)
48. Korea. A method for single-walled carbon nanotubes for mesenchymal stem cells' osteogenesis, APN: 10-2019-0002937 (2019.01.09)
49. Korea. A method for cellulose nanocrystals extracted from rice husks, APN: 10-2019-001204 (2019.01.04)
50. Korea. A method for Structural elucidation and immune-enhancing effects of a novel polysaccharide from Grifola frondosa, APN: 10-2018-0149994 (2018.11.28)
51. Korea. A method for multi-differentiation of human mesenchymal stem cells using pulsed-electromagnetic-field-assisted reduced graphene oxide substrate, APN: 10-2018-0017387 (2018.02.13). | Granted No. 10-1856723(2018.05.03)
52. Korea. A composition for sleep induction comprising an extract of rice bran and Sarcodon aspratus, APN: 10-2017-0133753 (2017.10.16). Granted No. 10-1918249 (2018.11.07)
53. Korea. A method for inducing enhanced adhesions and osteogenesis on mesenchymal stem cells using the magnetic field, APN: 10-2016-0167398 (2016.12.09). | Granted No. 10-1952761 (2019.02.21)
54. Korea. Biofilament manufacturing method using agricultural by-products and filament manufactured by the method, APN: 10-2016-0182740 (2016.12.29).
55. Korea. Automated bioreactors and their applications for precise control of cell proliferation and differentiation, APN: 10-2016-0159188 (2016.11.28).
56. Korea. A Method for promoting proliferation and osteogenic differentiation of Human Alveolar Bone-derived Mesenchymal Stem Cells and a composition therefor, APN: 10-2016-0139395(2016.10.25). | Granted No. 10-1890889(2018.08.16)
57. Korea. Multidifferentiation method of mesenchymal stem cells using pulsating electromagnetic fields and reduced graphene oxide, APN: 10-2016-0113362 (2016.09.02).
58. Korea. Ultrasonic Stimulated Perfusion Flow Automatic Bioreactor System for Culturing Adult Stem Cells, APN: 1013272090000 (2011.06.17). | Granted No. 10-1327209(2013.11.04)

E. Book & Contributed Chapters

1. [Nanorobotics and Nanodiagnostics in Integrative Biology and Biomedicine](#) (Springer 2023. 01
ISBN: 978-3-031-16083-7
<https://doi.org/10.1007/978-3-031-16084-4>)
2. [Functionalized Polymers Synthesis, Characterization and Applications](#) (Taylor and Francis, 2021 | ISBN: 0367420619)
 - SD Dutt, [KT Lim*](#) Chapter 04: Biodegradable polymers
 - K Ganguly, [KT Lim*](#) Chapter 06: Functional proteins
 - DK Patel, [KT Lim*](#) Chapter 13: Stimuli-Responsive Polymers and Their Biomedical Applications
3. [Handbook of Single Cell Technology](#) (Springer, 2021 | ISBN: 978-981-10-8952-7)
 - SD Dutta, [KT Lim*](#), Molecular force spectroscopy on cells: physiological functions of cell adhesions
 - DK. Patel, [KT Lim*](#), Single-cell analysis by mass spectrometry: a technique for metabolic and unraveling the secret content analysis
4. Multifunctional Hybrid Nanomaterials for Sustainable Agrifood and Ecosystems (Elsevier, 2021 | ISBN: 978-0-12-821354-4)
 - DK Patel, SD Dutta, [KT Lim*](#), Recent Progress in Cellulose-based Smart Nanocrystals by Agricultural Resources
 - K Ganguly, [KT Lim*](#), Nanocellulose-based Polymer Nano-hybrids and Nanocomposite Applications
 - SD Dutta, [KT Lim*](#), Carbon Nanotubes-based Nanohybrids for Agricultural and Biological Applications
 - WC Shin, SD Dutta, [KT Lim*](#), Naturally derived 3D printed hydrogel scaffolds for agroecosystem and biomedical applications
5. CRISPR and RNAi Systems: NanoBio tools in Plant Breeding and Protection (Elsevier, 2021 | ISBN: 9780128219102), [Co-Editor*](#)
 - Kamel Abd-Elisalam, [KT Lim](#), Chapter 1. CRISPR and RNAi: A Promising Tool in Plant Nanobiotechnology
 - K Ganguly, [KT Lim*](#), Chapter 27. RNAi mediated viral disease resistance in crop plants
 - SD Dutta, K Ganguly, [KT Lim*](#), Chapter 26. RNAi-based gene silencing in plant-parasitic nematodes: A road towards crop improvements
 - MD Salman Hyer, SD Dutta, K Ganguly, [KT Lim*](#), Chapter 4. Are CRISPR/Cas9 and RNAi-based new technologies to relocate crop pesticides?
6. Aquanotechnology: Applications of Nanomaterials for Water Purification (Elsevier 2021 | ISBN: 9780128211410)
K Ganguly, SD Dutta, DK Patel, [KT Lim*](#) Silver nanoparticles for wastewater treatment (Chapter 18)
7. Soft Matter and Biomaterials on the Nanoscale (World Scientific Series in Nanoscience and Nanotechnology 2020)
Engineering Cell–Graphene Interface for Controlling Stem Cell Behavior
8. Srikanth Sivaraman, Arvind Sinha, Ki-Taek Lim, Jin-Woo Kim, Raj Rao, Hanna Jensen, 2019. [Nanotechnology Characterization Tools for Tissue Engineering and Medical Therapy. Nanotechnology-Based Stem Cell Tissue Engineering with a Focus on Regeneration of Cardiovascular Systems](#). pp 1-67. (Approved by Springer)
9. S. Park, H. Seonwoo, [K.T. Lim](#), S. Park, D. Lee, D. Kim, W.C. Kim, J.H. Chung, J. Kim. Engineering cell-graphene interface for controlling stem cell behavior. Nanoscale Soft Materials in Nano/Bio Medicine (in press).
10. Jong Hoon Chung, Pill-Hoon Choung, [Ki-Taek Lim](#) and Han-Wool Choung. Vol. 5, 2012, pp 161er. 2. [Scaffolds for Human Dental Stem Cells to regenerate Cementum, Stem Cells and Cancer Stem Cells](#), Springer (ISBN: 978-94-007-2900-1)



F. A Summary of Future Research Plans

Building upon established expertise in bio-convergence systems, my future research will focus on four core pillars:

Pillar 1: Self-Powered Bioelectronics and Conductive Hydrogels for Brain–Computer Interfaces

- Objective: Develop fully biodegradable, self-adhesive, and piezoionic electronic skin interfaces along with biocompatible conductive hydrogels for high-fidelity neural signal decoding and brain–computer interfaces (BCIs).
- Approach: Integrate ultra-stretchable conductive polymers and tissue-conformable hydrogels with wireless telemetry to establish seamless bio-electronic interfaces for real-time neural recording (e.g., EEG/ECoG) and continuous neuro-electromechanical mapping.

Pillar 2: High-Resolution Bioprinting and Automated Bioreactor Systems for Scalable Stem Cell Manufacturing & Tissue Mimics

- Objective: Advance stimulus-responsive 4D bioprinting techniques capable of dynamic shape-morphing and micro-architectural maturation, while developing fully automated, closed-loop bioreactor platforms for the large-scale expansion and directed differentiation of stem cells.
- Approach: Develop novel bioactive ECM bio-inks derived from plant/insect-based nanocellulose and engineered exosome secretomes to construct complex vascularized bone, osteochondral, and neural tissues. Concurrently, design sensor-integrated, automated perfusion bioreactor systems equipped with real-time metabolic monitoring and fluidic control to achieve standardized, high-yield stem cell biomanufacturing.

Pillar 3: Immuno-Instructive Bio-Nanorobotics for Targeted Theranostics

- Objective: Create plant-/pollen-inspired micro/nanomotors and stimuli-responsive nanoplatforms for precision oncotherapy and biofilm eradication.
- Approach: Harness near-infrared (NIR) and magnetic actuation to drive deep-tissue penetration, on-demand drug/gene release, and tailored macrophage reprogramming (osteomicroenvironment modulation and anti-inflammatory switching).

Pillar 4: Advanced E-Skin Biosensing Platforms for Real-Time Disease Diagnostics and Integrated Theranostics

- Objective: Engineer multi-modal, highly selective epidermal biosensing systems capable of continuous, non-invasive biomarker profiling and on-demand therapeutic intervention for chronic and acute pathological conditions.
- Approach: Construct skin-interfaced biosensing arrays capable of real-time multiplexed decoding of biochemical cues (e.g., sweat metabolites, inflammatory cytokines, electrolytes, and disease-specific biomarkers) alongside biophysical signals. Integrate responsive microfluidics, transdermal drug delivery modules, and wireless data telemetry to achieve fully automated, closed-loop "sense-and-treat" theranostic regimens for personalized healthcare, point-of-care diagnostics, and post-surgical recovery monitoring.