추계학술대회 및 총회

제 29 권 4호

발 표 자 료 집

2025년 9월 11일(목) ~ 12일(금)

부산 벡스코

This work is supported by the 'Lottery Fund' of the 'Ministry of Strategy and Finance' and the 'Science and Technology Promotion Fund' of the 'Ministry of Science and ICT', contributing to the realization of social value and the development of national science and technology.

Sep. 11 (Thu), 2025

Time	Room A (321-323호)	Room B (324호)	Room C (325-326호)	5A Hall
08:00-09:00	Registration			
09:00-10:20	**Session 1. Emerging Scientist in Hybird Biomaterials I** Chair: Min-Ho Kang (The Catholic University of Korea), Minsuk Kwak (Yonsei University)	**Session 2A. Student Oral Competition I** Chair: Min-Jun Baek (Korea Advanced Institute of Science and Technology), Mikyung Kang (Korea University)	**Session 2B. Student Oral Competition II** Chair: Seo Woo Song (Korea Institute of Science and Technology), Jungho Ahn (Sungkyunkwan University)	Poster Presentation Session (09:30-10:20) Chair: Jieung Baek, Hyeon-Yeol Cho
	[S1-IL-1] Jaiwoo Lee (College of Pharmacy, Korea University) Engineering Biomaterials for Targeted and Responsive Drug Delivery in Cancer Immunotherapy	**[S2A-SOC-1] Jaewook Park** (Yonsei University) Modular Reconstruction of Biomimetic Microenvironments Using a Bottom-Up Assembly of Self-Healing Hydrogel Modules with Cellular Composites	**[S2B-SOC-1] Yeonju Boo** (Pohang University of Science and Technology) Smart Nitric Oxide-Responsive JAK Inhibitor for Targeted Rheumatoid Arthritis Therapy	
		[S2A-SOC-2] Jae Won Kwon (Korea Institute of Science and Technology) Decellularized Extracellular Matrix Derived from Mesenchymal Stem Cells Promotes Scar-Free Healing in Burn Wounds by Modulating Myofibroblast	**[S2B-SOC-2] Ga-Hyun Bae** (Sungkyunkwan University) Lipid Nanoparticle-Mediated Gene Silencing Enhances Ferroptosis for Improved Photodynamic Tumor Therapy	
	[S1-IL-2] Yohan Kim (Sungkyunkwan University) Human Assembloid-Based *in vitro* Modeling of Periportal Liver Tissue	**[S2A-SOC-3] Seongheon Bae** (Hanyang University) Engineering 3D Vascularized Tissue by Spatially Regulated Positioning of Spheroids on 3D Printed Scaffold	**[S2B-SOC-3] Jeong Yeon Kim** (Ewha Womans University) Enhanced Discovery of Glioblastoma-Specific Aptamers By 3D Cell-SELEX Using Hyaluronic Acid Hydrogels	
	[S1-IL-3] Ilkoo Noh (Kangwon National University) Functionalized Cell Membrane Nanoparticles for Biomedical Applications	**[S2A-SOC-4] Eui Bum Choi** (Korea University) Spheroid Cryopreservation: A Strategy and Its Mechanism	**[S2B-SOC-4] Jaeseong Lee** (Soongsil University) Microfluidic Generation and Analysis of LNPs for RNA Therapeutics	
		[S2A-SOC-5] Eunchae Kim (Dankook University) Development of Therapeutic Delivery via Engineered Fibrinogen-Based Cell and Spheroid Sheet System	**[S2B-SOC-5] Phuong Linh Nguyen** (Kangwon National University) RAW 264.7 Cell Membrane-Coated PLGA Nanoparticles for Targeted Methotrexate Delivery in Rheumatoid Arthritis Therapy	
	[S1-IL-4] Kihak Gwon (Kyungpook National University) Microfluidic-Assisted Engineered Core-Shell Microcapsules for Tissue Engineering	**[S2A-SOC-6] Jongmin Lee** (Korea Institute of Science and Technology) Engineered 3D In-Vitro Keloid Skin Model Reproducing the Human Keloid Microenvironment for Drug Screening	**[S2B-SOC-6] Yejin Lee** (Seoul National University) Targeted Degradation of NRF2 Transcription Factor by dNRF2 Oligonucleotide PROTAC Enhances Sensitivity of Cancer Redox Stress	
		[S2A-SOC-7] Eunseon Jeong (Yonsei University) Generation of Functional Skeletal Muscle Tissue via Spatially Patterned Cell Constructs	**[S2B-SOC-7] Sunjun Lee** (Dongguk University) Osteoarthritis-Specific Drug Delivery System Using Curcumin-PLGA Nanoparticles Coated with Personalized Stem Cell Membranes	
10:20-10:40	Opening Ceremony (Room A)			Poster Viewing & Exhibition (10:20-17:40)
10:40-11:20	**Plenary Lecture I (Room A)**		Chair : Kwideok Park (Korea Institute of Science and Technology)	
	[PL-1] Kun Na (The Catholic University of Korea) ROS Generating Biomaterials in Therapy, DDS and Cell Activation			
11:20-12:00	KSBM General Meeting (Room A)			
12:00-13:00	*Break*			
13:00-14:20	**Session 3. Emerging Scientist in Hybrid Biomaterials II** Chair: Hyun-Ji Park (Ajou University), Jun Shik Choi (Korea Institute of Radiological Medical Sciences)	**Session 4. Emerging Leaders: Early Career Excellence in Biomaterials** Chair: Hyejeong Seong (Korea Institute of Science and Technology), Eunjung Kim (Incheon National University), Mikyung Shin (Sungkyunkwan University), Jihye Kim (Ajou University)	**Session 5. Global Frontiers in Biomaterials I** Chair: Yeu Chun Kim (Korea Advanced Institute of Science and Technology)	
	[S3-IL-1] Young Uk Cho (Incheon National University) MRI-Compatible, Transparent PEDOT: PSS Neural Implants for the Alleviation of Neuropathic Pain	**[S4-OP-1] Sora Son** (Gyeongsang National University) **[S4-OP-2] Yeonwoo Jang** (Chung-Ang University) **[S4-OP-3] Min-Ju Lee** (Dongguk University) **[S4-OP-4] Min-Ji Kang** (Sungkyunkwan University) **[S4-OP-5] Hyeon-Ji Oh** (Sungkyunkwan University) **[S4-OP-6] Gaeun Lee** (Sungkyunkwan University) **[S4-OP-7] Myungji Kim** (Pohang University of Science and Technology) **[S4-OP-8] Jae Seo Lee** (Kyung Hee University) **[S4-OP-9] Jiyu Hyun** (Sungkyunkwan University) **[S4-OP-10] Soonjong Roh** (Korea Institutes of Science and Technology) **[S4-OP-11] Sumin Kim** (Sungkyunkwan University) **[S4-OP-12] Seo Young Cheon** (The Catholic University of Korea) **[S4-OP-13] Su Yeon Lim** (Kangwon National University) **[S4-OP-14] Heewon Choi** (Sungkyunkwan University)	13:00-13:30 **[S5-IL-1] Hiroshi Abe** (Nagoya University) Chemistry-Based mRNA Design Enhancing Translation Toward Therapeutics	
	[S3-IL-2] Yoon Ho Roh (Incheon National University) Hydrogel Microparticles for Multiplexed Detection of Biomolecules		13:30-14:00 **[S5-IL-2] James Lai** (National Taiwan University of Science and Technology) Engineering Stimuli Responsive Polymers to Transform Bioprocessing for Biomarker Detection and in vitro Diagnostics	
	[S3-IL-3] Laura Ha (Sun Moon University) Nanobiohybrids: A Material-Based Approach for Biomedical Applications			
	[S3-IL-4] Myungjae Song (Gachon University) Bridging Gene Editing and Biomaterials: CRISPR in Therapeutic Delivery		14:00-14:30 **[S5-IL-3] Deok-Ho Kim** (Johns Hopkins University) Engineering Biomaterials and Biosensors for Advanced Organoid and Microphysiological Systems	
14:20-14:40	*Break*		*Break* (14:30-14:50)	
14:40-16:00	**Session 6. Nanobiomedicine Approaches for Disease Treatment** Chair: Jun-O Jin (College of Medicine, Ulsan University), Youngeun Kim (Seoul National University)	**Session 7. Beyond Boundaries: Integrating New Disciplines into Biomaterials** Chair: Yoon Shin Park (Chungbuk National University), Jin Yoo (Korea Institute of Science and Technology), Sung Yun Yang (Chungnam National University), Hwan Drew Kim (Seoul National University of Science and Technology)		
	[S6-IL-1] Jung Heon Lee (Sungkyunkwan University) DNApatite: An Elastic Apatite with Sub-Nanometer Scale Organo-Inorganic Structures	**[S7-IL-1] Min Young Lee** (Korea institute of Materials Science) Plasmonic Material-Based Development of Cancer Diagnostic Applications	**Session 8. Global Frontiers in Biomaterials II** Chair: Won-Gun Koh (Yonsei University)	
	[S6-IL-2] Kyusik Shim (PLCOskin Co., Ltd) Lymphatic Vessel Regeneration through Biomaterials and Cell Therapy	**[S7-IL-2] Jeong Hoon Lee** (Korea University) Beyond Limits: AI-Enabled Rapid Diagnostics for Spatial and Temporal Expansion	14:50-15:20 **[S8-IL-1] Huaxiao Adam Yang** (University of North Texas) hPSC-Derived Organoid Vascularization and Intelligence	
	[S6-IL-3] Eun Jung Lee (Kyungpook National University) Naturally Derived Nanocarriers for Modulation of Immune Microenvironment	**[S7-IL-3] Hyun-Ji Park** (Ajou University) An Integrated Organoid Modeling and Bioinformatics to Define the Role of Macrophages in Vascular Repair	15:20-15:50 **[S8-IL-2] Akira Matsumoto** (Institute of Science Tokyo) "Borono-Lectins" in Action: From Cis-Diol Recognition to Advanced Biomedical Applications	
	[S6-IL-4] Seongchan Kim (College of Pharmacy, Gyeongsang National University) Tailored Nanomedicine Strategies for Advanced Biologic Therapeutics in Hepatocellular Carcinoma	**[S7-IL-4] Eunjung Kim** (Incheon National University) From Fusion to Function: Engineering Membrane-Mimicking Nanomaterials for Optical Biosensing		
		[S7-IL-5] Anna Seo (SEEANN Solution) Patient-Specific Devices Design for Surgery	15:50-16:20 **[S8-IL-3] Hua Ai** (Sichuan University) MRI Nanoprobes: Design Considerations and Biological Responses	
16:00-16:20	*Break*			
16:20-17:40	**Session 9. Biomaterials for Precision Immune Modulation for Therapy** Chair: Gayong Shim (Soongsil University), Yoosoo Yang (Sungkyunkwan University)	**Session 10. Multifunctional Materials: Pushing the Boundaries of Bioengineering** Chair: Chaenyung Cha (Ulsan National Institute of Science and Technology), Kyueu Lee (Kyungpook National University)	*Break* (16:20-16:40)	
	[S9-IL-1] Yong Taik Lim (Sungkyunkwan University) Designer Materials for Kinetic Immune Modulation	**[S10-IL-1] Su-Hwan Kim** (Chung-Ang University) Metal-Free PCET-Active Nanozymes for ROS Regulation and Gasotransmitter Generation	**Session 11. Biomaterials Preservation by Ice-Biointerface Augmentation [sponsored by ERC]** Chair: Eunji Lee (Gwangju Institute of Science and Technology), Ki Wan Bong (Korea University)	
	[S9-IL-2] Ju Hee Ryu (Korea Institute of Science and Technology) Programmable DNA Origami Nanomaterials for Precision Immune Modulation and Regenerative Therapy	**[S10-IL-2] Jin Yoo** (Korea Institute of Science and Technology) Gel-Like Functional Coatings for Antifouling and Antithrombotic Surfaces	16:40-17:00 **[S11-IL-1] Dong June Ahn** (Korea University) Augmented Biopreservation: From Cells to Tissues	
	[S9-IL-3] Joonbeom Bae (Korea University) Engineered Cell-Based Therapeutic Platforms for Tumor-Targeted Immunotherapy	**[S10-IL-3] Seung Yun Yang** (Pusan National University) Injectable Photocrosslinked Microgels: From Local Cancer Treatment to Cell Therapy	17:00-17:20 **[S11-IL-2] Seok Chung** (Korea University) Cold Chain & Microphysiological Systems	
	[S9-IL-4] Wonhwa Lee (Sungkyunkwan University) Novel Therapeutic Strategies for Severe Pulmonary Infectious Diseases	**[S10-IL-4] Ja-Hyoung Ryu** (Ulsan National Institute of Science and Technology) Supramolecular Lysosome-Targeting Chimeras (Supra-LYTAC) for Targeted Protein Degradation	17:20-17:40 **[S11-IL-3] Do-Nyun Kim** (Seoul National University) DNA Origami and Its Application for Cell Cryopreservation	
17:40-18:00	KSBM-KOFWST Award (Room A)			
18:00-21:00	Gala Dinner			

Sep. 12 (Fri), 2025

Time	Room A (321-323호)	Room B (324호)	Room C (325-326호)	5A Hall
09:40-11:00	**Session 12. Integrate Invigorate Innovate in Bioprinting** Chair: Justin J. Chung (College of Medicine, Seoul National University), Yun Jung Yang (Inha University)	**Session 13A. Student Oral Competition III** Chair: Sungjin Min (Sungkyunkwan University), Ha Rin Kim (Kookmin University)	**Session 13B. Student Oral Competition IV** Chair: Kyoung Sub Kim (The Catholic University of Korea), Byung-Hyun Cha (Kangwon National University)	
	[S12-IL-1] Seong Keun Kwon (College of Medicine, Seoul National University) Tracheal Tissue Engineering Using Two Types of Decellularized ECM Developed via a Detergent-Free Method	**[S13A-SOC-1] Jeong Min Kim** (Incheon National University) Mg^{2+}-Incorporated Hydrogel Bioinks for Volumetric Muscle Loss Regeneration	**[S13B-SOC-1] Dong-Sung Won** (Asan Medical Center) 3D-printed Biodegradable Stent with Tantalum/Sirolimus to Inhibit In-Stent Restenosis in a Porcine Infrapopliteal Artery	Poster Presentation Session (10:10-11:00) Chair: Ilkoo Noh, Jinho Yoon
		[S13A-SOC-2] Young Min Jeon (Sungkyunkwan University) Personalized Bone Repair Using an In situ Printing Device	**[S13B-SOC-2] Kyumin Kang** (Sungkyunkwan University) Closed-Loop Performance-Recoverable Neural-Prosthetic System	
	[S12-IL-2] Sungjune Jung (Pohang University of Science and Technology) 3D Bioprinted Lung-on-Chip Platforms for Drug and Toxicity Testing	**[S13A-SOC-3] Ju Yeong Gwon** (Hanyang University) Spermidine-Released Bioink with MXene for Synergistic Bone Regeneration and Infection Prevention	**[S13B-SOC-3] Yeeun Woo** (Kwangwoon University) Design of Chitosan Oligosaccharide-Coated Lipid Nanocarriers for Controlled Delivery of Strontium Ranelate in Bone Regeneration	
	[S12-IL-3] Hyun Lee (Korea Institute of Industrial Technology) Artificial Intelligence-Controlled 4D Printing of DNA Releasing Biomimetic Microneedles	**[S13A-SOC-4] Min Hee Cho** (Chungnam National University) Development of an In Situ Crosslinkable MGC/SHA Thermogel for 3D Bioprinting	**[S13B-SOC-4] Jinwoo Hwang** (Yonsei University) Design of an Automated Fluidic Control System for Uniform Production of Lipid Nanoparticles	
		[S13A-SOC-5] Yonghoe Koo (Ulsan National Institute of Science and Technology) Wavelength-Tunable Photonic Crystal Sensors for Dynamic Assessment of Skin Healing	**[S13B-SOC-5] Eunji Lee** (Ewha Womans University) Hydrogel-Assisted Delivery of Brain-Tropic AAVs for Targeted Gene Therapy in Glioblastoma	
	[S12-IL-4] Won-Woo Cho (Yonsei University) Development of In-Bath 3D Bioprinting Technique for Tissue Engineering Applications	**[S13A-SOC-6] Jaewon Park** (Dongguk University) Harnessing Multi-Targetable Lipid Biomaterials for NK Cell Surface Engineering to Enhance Anticancer Efficacy via Elevating Tumor Targeting Specificity	**[S13B-SOC-6] Sukwon Jung** (Pohang University of Science and Technology) Adhesive Adjuvant Protein-Based Nanoparticulate Vaccine	
		[S13A-SOC-7] Torsha Ghosh (Sungkyunkwan University) Light-Independent Polymer Conjugate-Induced Photochemical Internalization Elicits Cancer Pyroptosis to Orchestrate Host Immune Responses	**[S13B-SOC-7] Joomin Oh** (Seoul National University Hospital) Evaluation of the Influence of Bone Marrow Endothelial Cells on Platelet Formation in a 3D Dynamic Culture System	
11:00-11:40	**Plenary Lecture II (Room A)**		Chair : Heungsoo Shin (Hanyang University)	Poster Viewing & Exhibition (11:00-17:40)
	[PL-2] Xuesi Chen (Changchun Institute of Applied Chemistry, Chinese Academy of Sciences) Biodegradable Polymers: Applications in Biomedical and Medical Fields			
11:40-13:00	*Break*			
13:00-14:20	**Session 14. Innovations in Targeted Therapeutics & Bio-delivery Systems** Chair: Kyuri Lee (Korea University), Wooram Park (Sungkyunkwan University)	**Session 15. State-of-the-Art Biosensing and Imaging** Chair: Inhee Choi (University of Seoul), Joonseok Lee (Hanyang University)	**Session 16. Global Frontiers in Biomaterials III** Chair: Soo-Hong Lee (Dongguk University)	
	[S14-IL-1] Dae-Hyuk Kweon (Sungkyunkwan University) What We Can Do with Antibody-Guided Targeted Delivery of mRNA-Lipid Nanoparticle	**[S15-IL-1] Inki Kim** (Sungkyunkwan University) Biophotonic Metamaterials for Sensing and Imaging Applications	13:00-13:30 **[S16-IL-1] Takayuki Nonoyama** (Hokkaido University) Creation of Functional Biomaterials via Integration of Hydrogels and Bioceramics	
	[S14-IL-2] Hak Jong Lee (College of Medicine, Seoul National University) Ultrasound Guided Treatment Using Nanoparticles and Focused Ultrasound	**[S15-IL-2] Jong-Hwan Lee** (Hanyang University) Nanoplasmonic Rapid Antimicrobial-Resistance Point-of-Care Identification Device		
	[S14-IL-3] Aram Chung (Korea University) Advancing Cell and Gene Therapy via Microfluidics	**[S15-IL-3] Young-Kwan Kim** (Dongguk University) Nanostructure-Assisted Laser Desorption/Ionization Time-of-Flight Mass Spectrometry for Analysis of Various Small Biomolecules	13:30-14:00 **[S16-IL-2] Jui-Yang Lai** (Chang Gung University) Advances in Biomaterial Design for Dry Eye Pharmacotherapy	
	[S14-IL-4] Min-Jun Baek (Korea Advanced Institute of Science and Technology) Near-Infrared Fluorescent Organic Nanomaterials for Image-Guided Phototherapy of Solid Tumors	**[S15-IL-4] Jung-Hoon Lee** (Soonchunhyang University) Light-Powered PCR with Plasmonic Nanoparticles	14:00-14:30 **[S16-IL-3] Eunji Lee** (Gwangju Institute of Science and Technology) Short-Peptide Supramolecular Nanoagents: From Structure to Function	
14:20-14:40	*Break*		*Break* (14:30-14:50)	
14:40-16:00	**Session 17. Emerging Organoid Systems Driving Breakthroughs in Medicine** Chair: Kisuk Yang (Incheon National University), Soah Lee (Sungkyunkwan University)	**Session 18. Organ-on-a-Chip for Therapeutic Screening** Chair: Minjung Jang (Korea Institute of Radiological Medical Sciences), Hong Nam Kim (Korea Institute of Science and Technology)		
	[S17-IL-1] Mi-Ok Lee (Korea Research Institute of Bioscience and Biotechnology) Induced Alveolar Assembloids: A 3D Lung Model Integrating Functional Macrophages	**[S18-IL-1] Junmin Lee** (Pohang University of Science and Technology) Smart Design of Biomaterials for Organs-on-a-Chip Applications	**Session 19. Global Frontiers in Biomaterials IV** Chair: Ki Su Kim (Pusan National University)	
	[S17-IL-2] Tae-Eun Park (Ulsan National Institute of Science and Technology) Patient-Derived Cancer Organoid Arrays Enable Label-Free Image-Based Prediction of Cancer Traits	**[S18-IL-2] Sujin Hyung** (Samsung Medical Center) Patient-Derived Organoid Models Reveal Exosome-Driven MET Amplification as Therapeutic Target	14:50-15:20 **[S19-IL-1] Congcong Xu** (Soochow University) Algorithm and Structure-Guided Design of mRNA Vaccines and Therapeutics	
	[S17-IL-3] Jong-Chan Park (Sungkyunkwan University) Neuroglia-Neuron Communication Studies for Alzheimer's Disease Using iPSC-Derived Brain Organoid Model	**[S18-IL-3] Jin Kim** (Korea Institute of Science and Technology) Human iPSC-Derived Organoid for Physiologically Relevant Modeling	15:20-15:50 **[S19-IL-2] Youngmee Jung** (Korea Institute of Science and Technology) Anatomically Inspired Nerve Guidance Conduit for Translational Peripheral Nerve Regeneration	
	[S17-IL-4] Hee Sung Lee (College of Medicine, Yonsei University) Organoid-Driven Discovery of Therapeutic Targets and Biomarkers in Pancreatic Ductal Adenocarcinoma	**[S18-IL-4] Sejoong Kim** (Seoul National University Bundang Hospital) Kidney Microphysiological Systems for Nephrotoxicity Assessment	15:50-16:20 **[S19-IL-3] Yoonsung Nam** (Korea Advanced Institute of Science and Technology) Multilamellar Protein-Lipid Hybrid Nanovaccines for Enhanced Protective Immunity Against Bacterial Infection	
16:00-16:20	*Break*			
16:20-17:40	**Session 20. Bridging Device and Biomaterials: Hybrid Approach for Regenerative Medicine** Chair: Donghee Son (Sungkyunkwan University), Jung-Hoon Park (College of Medicine, University of Ulsan)	**Session 21. Revolutionizing Regeneration: Bridging Challenges and Opportunities** Chair: Jae Min Cha (Incheon National University), Tae-Jin Lee (Kangwon National University)	*Break* (16:20-16:40)	
	[S20-IL-1] Jae-Young Yoo (Sungkyunkwan University) Intelligent Medical Solution Using Multimodal Electronics and Control Networks	**[S21-IL-1] Sanguine Byun** (Yonsei University) Identification of Bioactive Compounds against Musculoskeletal Disorders	**Session 22. Company Session** Chair: Dong Nyoung Heo (BioFriends Inc.)	
	[S20-IL-2] Ha Uk Chung (Korea University) Soft and Flexible Wireless Monitoring Platforms for Digital Healthcare	**[S21-IL-2] Jihye Kim** (Ajou University) Real-Time Bladder Function Monitoring System for Long-Term Recovery Period	16:40-17:10 **[S22-CS-1] Jiwon Sarah Choi** (KRBIOTECH Co., Ltd.) Viral Safety Evaluation of Biotechnology Products Derived from Human or Animal Materials	
	[S20-IL-3] Seo Woo Song (Korea Institute of Science and Technology) Smart Microparticles for High-Throughput Screening and Precision Medicine	**[S21-IL-3] Hyung-Jun Kim** (Samsung Medical Center) Regenerative Medicine in Stroke: Unmet Needs, Challenges, and Future Directions	17:10-17:40 **[S22-CS-2] Jue-Yeon Lee** (NIBEC Co., Ltd.) Peptide Discovery and its Application to Biomaterials for Enhanced Tissue Regeneration	
	[S20-IL-4] Gun-Hee Lee (Pusan National University) Electromechanically Stable Elastomeric Conductors for Human-Machine Interfaces	**[S21-IL-4] Myung Chul Lee** (Korea Institute of Science and Technology) Tissue Regeneration via ECM-Mimetic Bioprinting and Oxygen-Releasing Hydrogels		
17:40-18:10	Award Ceremony (Student Oral Competition Award & Poster Presentation Award) and Closing Remarks (Room A)			

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PO-331 **Nettle-Inspired Microneedles for Localized Skin Cancer Therapy and Tissue Regeneration**

Chan Ho Moon[1], Seojoon Bang[1], Hyeong Seok Kang[1], Ju Yeong Gwon[2], Jong Hwa Seo[1], and Hyun-Do Jung[1,*]

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PO-332 **Direct Ink Writing of Dual Drug Releasing Microneedle Patch for Trachoma Treatment**

Jae Yun Lee[1], Hee Kyoung Kang[2], Jae Ho Kim[1], Hyun Beom Song[2,*], and Won Hyoung Ryu[1,*]

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PO-333 **Biofabricated 3D Multiorgan Platforms with Tissue-Specific dECM Bioinks and Real-Time Biosensors for Systemic Disease Modeling**

Jungbin Yoon[1,2], Uijung Yong[2,3], and Jinah Jang[1,2,4,5,*]

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PO-334 **Hair Follicle-Inspired Tantalum Nanopatterned Nitinol Stent Enabling Photothermal and Drug-Responsive Modulation of the Bile Duct Cellular Microenvironment**

Nayoung Lee[1], Yubeen Park[1,2], Chan Ho Monn[1], Jung-Hoon Park[2,3], and Hyun-Do Jung[1,*]

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PO-335 **Scalable and Uniform Lipid Nanoparticle Production Using Inter-Layer Balanced Stacked Microfluidic Platform**

Jaejeung Kim[1,2], Zhaoyu Zhang[1], Jinwoo Hwang[1], Seoyeon Choi[1,2], and Hyo-Il Jung[1,2,3,*]

*[1]School of Mechanical Engineering, Yonsei University, 50 Yonsei-ro, Seoul, South Korea, The DABOM Inc., 50 Yonsei-ro, Seoul, South Korea, [3]Department of Integrated Medicine, Yonsei University, 50 Yonsei-ro, Seoul, South Korea, *E-mail address: uridle7@yonsei.ac.kr (H.I. Jung)*

PO-336 **Development of Keratin Conjugated Alginate Based Hydrogels for 3D Printing Applications**

Eun Hye Choi[1], Sung Jun Min[1], and Il-Keun Kwon[2,*]

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PO-337 **Construction of a Fibrosis-Encapsulated Tumor model with Enhanced Barrier Function via Core-shell Bioprinting and Stepwise Stiffness Modulation**

Seok-Hyeon Lee[1] and Byoung Soo Kim[1,*]

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PO-338 **Development of Tumor Assembloid Platform Via 3D Bioprinting of Spheroids**

Min-Seo Choi[1], Minjun Ahn[2], Seok-Hyeon Lee[1], and Byoung Soo Kim[1,2,*]

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PO-339 **Evaluation on Printability and Biocompatibility for Fabrication of DLP-Bioprinting Assisted Microneedles (MN) Patches**

Fowzul Islam Fahad[1], Jeson Lee[1], Minjun Ahn[2], and Byoung Soo Kim[1,*]

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PO-340 **3D-Printed Laponite-DNA Hydrogel Patch for Hemostasis and Tissue Regeneration in Diabetic Wounds**

Kimin Park[1], Seojoon Bang[1], and Hyun-Do Jung[1,*]

*[1]Division of Materials Science and Engineering, Hanyang University, *hdjung@hanyang.ac.kr*

PO-341 **MXene-Based Electroconductive Hydrogel Nanocomposite for Accelerating Bone Regeneration**

Gyeong Min Ryu[1], Hyeong Seok Kang[1], and Hyun-Do Jung[1,*]

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PO-342 **Development of Self-Gelling Nanocomposites for Accelerating Cartilage Regeneration**

Sunhwa Lee[1], Ju Yeong Gwon[2], and Hyun-Do Jung[1,*]

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PO-343 **Development of 3D Fibrotic Tumor Platform via Coaxial Bioprinting of 3D Spheroids**

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PO-344 **Versatile Biohybrid Artificial Skin Platform for Cosmetic Formulation Screening**

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PO-345 **3D-Printed GelMA–Silica Hydrogel via Micro DLP for Regenerative and Anticancer Applications**

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PO-346 **A Bioprinted Lung Cancer Model with Lung dECM Recapitulates Tumor-Stroma Interactions for Combination Therapy Evaluation**

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PO-347 **Demineralized Bone Matrix Bioinks with Enhanced Odontogenic Differentiation: Synthesis and Characterization**

PO-333

Biofabricated 3D Multiorgan Platforms with Tissue-Specific dECM Bioinks and Real-Time Biosensors for Systemic Disease Modeling

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3D multiorgan platforms represent a powerful *in vitro* approach for modeling complex physiological responses through the integration of organ-specific functions and dynamic interorgan communication. To address inherent limitations of conventional models in capturing systemic disease interactions, we developed advanced biofabricated platforms combining decellularized extracellular matrix (dECM)-derived bioinks, 3D bioprinting technologies, and microfluidics. Initially, we engineered a gut–kidney axis model to investigate secondary hyperoxaluria (SH), a metabolic disorder characterized by intestinal inflammation, oxalate malabsorption, and kidney stone formation. By bioprinting intestinal and vascularized proximal tubule modules under continuous perfusion, the platform successfully recapitulated SH pathologies and validated therapeutic intervention efficacy using trisodium citrate. Further advancing systemic modeling, we established an integrated kidney–heart microphysiological system to comprehensively study cardiorenal interactions. This platform incorporates iPSC-derived cardiomyocytes embedded in heart-specific dECM (engineered heart tissue, EHT) connected via microfluidics to renal modules for precise physiological crosstalk. PEDOT: PSS-based bioelectronic electrodes integrated within the EHT enable real-time electrical impedance monitoring of cardiac contractility influenced by renal stimuli. Collectively, our biofabricated multiorgan platforms, equipped with physiologically relevant architecture and advanced sensing technologies, hold significant translational potential for precision medicine, drug discovery, and modeling systemic disorders such as Type 4 cardiorenal syndrome.

PO-334

Hair Follicle-Inspired Tantalum Nanopatterned Nitinol Stent Enabling Photothermal and Drug-Responsive Modulation of the Bile Duct Cellular Microenvironment

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Biliary stents have been used to treat biliary strictures caused by cholangiocarcinoma, gallstones, and pancreatic cancer. However, post-implantation bacterial colonization in the bile duct promotes biofilm and sludge formation, leading to stent occlusion and infection-related adverse events. To overcome these limitations, a near-infrared (NIR) responsive antibacterial nitinol biliary stent with dual photothermal and drug release functions was developed, inspired by the pouch-like morphology of hair follicles. Tantalum, a biocompatible metal, was nanopatterned onto the nitinol surface via target ion plasma sputtering (TIPS). This surface modification inhibited bacterial adhesion and promoted cell attachment. The stent was coated with a thermoresponsive phase-change fatty acid–drug matrix, with polydeoxyribonucleotide (PDRN) loaded into the nanostructure, enabling temperature-activated drug release upon NIR irradiation. Functional evaluation was conducted through *in vitro* experiments and physicochemical analyses, confirming that the designed stent exhibited significantly enhanced antibacterial activity and biocompatibility under NIR stimulation compared to unmodified stents. These results indicate that this versatile stent has potential as an advanced therapeutic strategy to reduce recurrent occlusion and infection-related complications in patients with biliary strictures.

PO-335

Scalable and Uniform Lipid Nanoparticle Production Using Inter-Layer Balanced Stacked Microfluidic Platform

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Lipid nanoparticles (LNPs) are spherical vesicles consisting of lipids and widely recognized for their high nucleic acid encapsulation efficiency. Yet, clinical translation remains limited by low production yield and difficulty in maintaining uniform particle sizes. Microfluidic synthesis provides precise control over component mixing and assembly, but conventional single-channel devices cannot achieve industrial-scale throughput.

Here, we introduce a multilayer microfluidic platform designed for scalable and uniform LNP production. A stacking approach with modified fluidic inlets balances flow rates across channels, guided by Hagen–Poiseuille calculations and validated through computational simulations. The device is fabricated from polycarbonate (PC), providing greater mechanical strength and biocompatibility than PDMS. An integrated re-Tesla mixer enables continuous, efficient, and non-toxic LNP formation. Composite adhesive bonding minimizes channel deformation and prevents leakage, with stable operation confirmed at flow rates up to 16 mL/min.

This system reliably generates LNPs with diameters of 100–150 nm and a polydispersity index below 0.2, suitable for therapeutic use. A five-layer configuration achieves throughputs of ~7.9 × 10^{12} particles per minute, markedly outperforming conventional single-layer devices. Our platform offers a scalable, high-throughput strategy for producing clinically relevant LNPs, addressing a major bottleneck in nucleic acid therapeutics manufacturing.

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Development of Keratin Conjugated Alginate Based Hydrogels for 3D Printing Applications

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Hydrogels are three-dimensional (3D) networks of hydrophilic polymer chains, which have been widely explored for tissue engineering. Among biopolymers, Human hair-derived keratin offers excellent biocompatibility and bioactivity, promoting cell adhesion, proliferation, and differentiation. Alginate, a biodegradable polysaccharide from seaweed, is commonly used but has poor mechanical properties and limited bioactivity. To overcome these limitations, we developed keratin-conjugated alginate (KA) hydrogels with tunable mechanical properties and enhanced bioactivity, aiming to provide an improved biomaterial for tissue engineering applications. KA hydrogels were synthesized using EDC/NHS-mediated coupling reaction for keratin-alginate conjugation. Mechanical properties, including compressive modulus and viscosity, were evaluated for tunability. Printability was tested for 3D printing applications, and biocompatibility was assessed through cell viability assays and live/dead staining in vitro. FTIR, NMR, and UV-Vis analyses confirmed successful keratin conjugation, indicating chemical modifications in the hydrogel network. FE-SEM revealed a porous, interconnected structure of KA hydrogel. Mechanical testing demonstrated tunable compressive strength and viscoelastic properties by adjusting keratin concentration. KA hydrogels exhibited excellent printability, maintaining structural integrity after 3D printing. In vitro studies confirmed improved non-toxicity and biocompatibility, highlighting their suitability as biocompatible biomaterials.