KSBM

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(공동개최 : 차의과학대학교 중점연구소)

Fall Meeting of the Korean Society for Biomaterials (Joint host : CHA Univ. Priority Research Institute)

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발표자료집

제27권 4호

- 일 시 : 2023년 9월 21일(목) ~ 22일(금)
- 주 관 : 한국생체재료학회
- 후 원 : KOFST 한국과학기술단체총연합회 JEJU 제주컨벤션뷰로 CVB

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Sep. 20(수), 2023	
Time	Landing Ballroom A
13:30-14:00	*Registration & Opening Ceremony*
14:00-15:20	〈1부〉 생체재료 분석 기법 및 활용 방안
15:20-15:30	*Coffee Break*
15:30-16:50	〈2부〉 생체재료연구에서의 빅데이터 획득 및 분석 개론
16:50-17:00	*Coffee Break*
17:00-18:20	〈3부〉 RNA치료제 전달시스템 : 기초 및 최신 연구동향

Sep. 21(목), 2023			
Time	Landing Ballroom A	Landing Ballroom B	Landing Ballroom C
08:30-09:00	*Opening Ceremony*		
09:00-10:20	Session 1 : Tissue & Disease Modeling and Therapy for Regeneration	Session 2 : Advanced Strategies for Bioanalyte Detection in Therapy	Student Oral Competition I
10:20-10:40	*Coffee Break*		
10:40-12:00	Session 3 : The Potential of Extracellular Vesicles in Biomedical Applications	Session 4 : Biofabrication in Healthcare: Applications, Challenges, and Future Directions	Student Oral Competition II
12:00-12:20	*Coffee Break*		
12:20-13:00	Plenary Lecture Ⅰ Nicholas A. Peppas (The University of Texas at Austin, USA)		
13:00-14:40	*KSBM General Meeting & Lunch & Poster Presentation Session*		
14:40-16:00	Session 5 : Medical Applications of Non-Polymeric Biomaterials	Session 6 : Bio-interfaced Medical Devices for Diagnosis and Therapy	Session 7 : Advanced 3D Bioprinting Technology
16:00-16:20	*Coffee Break*		
16:20-17:40	Session 8 : Advanced Immunoengineering for Cancer and Inflammation	Session 9 : Innovations in Drug Delivery Systems: Advancing Therapeutics for the Future	*Gala Dinner Preparation*
17:40-21:00	*Gala Dinner*		

Sep. 22(금), 2023			
Time	Landing Ballroom A	Landing Ballroom B	Landing Ballroom C
09:00-10:20	Session 10 : Emerging technologies in Medical & Wearable Devices	Session 11 : Tackling the Technical Challenges in Regenerative Medicine	Session 12 : Recent Advances in Skin Regeneration and Skincare Treatments
10:20-10:40	*Coffee Break*		
10:40-12:00	Session 13 : Innovative Approaches for the Development of Gene/Cell Therapeutics	Session 14 : Nanobio Convergence: Shaping Future Therapies and Biosensors	Session 15 : Advanced Functional Biomaterials and Engineering for Personalized Medicine
12:00-12:20	*Coffee Break*		
12:20-13:00	Plenary Lecture Ⅱ Jian Yang (Pennsylvania State University, USA)		
13:00-14:00	*Lunch & Poster Presentation Session*		
14:00-15:20	Session 16 : Beyond Drug Delivery: Pioneering Technology and Pre-Clinical Advancements	Session 17 : Advances in Regenerative Dentistry	Student Oral Competition III
15:20-15:40	*Coffee Break*		
15:40-17:00	Session 18 : Emerging Junior Investigator Session	Session 19 : Women Scientists in Biomaterials : From Basic to Commercial Operation	Student Oral Competition IV
17:00-17:30	*Award Ceremony & Poster Presentation Award) and Closing Remarks*		

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PO-194 **'Find-me' signaling microparticle boosts antitumor immune response for cancer immunotherapy**

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PO-195 **Hyaluronic acid-bilirubin nanomedicine-based combination chemoimmunotherapy**

Yonghyun Lee[1,2,*], Jongyoon Shinn[1,2], Cheng Xu[3,4], Hannah E. Dobson[3,4], Nouri Neamati[5] and James J. Moon[3,4,*]

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분야 VI : Biofabrication & 3D Printing

PO-196 **Chitosan-based borate hydrogels for tissue regeneration**

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PO-197 **Advancements in 3D bioprinting technology-derived biofabrications for establishing high-quality *in vitro* tissue/disease model**

Jungbin Yoon[1,4], Narendra K. Singh[2], Yoo-mi Choi[3,4], Dong-Woo Cho[1] and Jinah Jang[1,3,4,*]

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PO-198 **3D printing of tissue-stimulator integrated biohybrid platform to increase efficacy of pancreatic islets through electrical stimulation**

Jihwan Kim[1], Uijung Yong[2], Jaewook Kim[1], Yeonggwon Jo[3] and Jinah Jang[1,3,4,*]

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PO-199 **3D co-axial bioprinting of visible light-activated decellularized extracellular matrix-based bioinks to build liver-like tissue modules**

Daekeun Kim[1], Donghwan Kim[2], Yoo-mi Choi[1], Dayoon-Kang[3,4], Jaewook Kim[4] and Jinah Jang[1,2,3,4,*]

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PO-200 **Development of magnetic polarity patterning for 4D-printed structure mimicking myocardial fiber orientation**

Hwanyong Choi[1], Dong Gyu Hwang[2] and Jinah Jang[1,2,3,4,*]

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PO-201 **3D printed electroconductive and stretchable composite hydrogel patches for accelerated wound healing**

Seo-Jun Bang[1], Ginam Han[1], Hyeong Seok Kang[1], Hyun Lee[1] and Hyun-Do Jung[1,*]

[1]Department of Biomedical-Chemical Engineering, The Catholic University of Korea, [*]hdjung@catholic.ac.kr

PO-202 **3D printable and stretchable hyaluronic acid methacrylate hydrogels for enhanced wound healing**

Hyeong Seok Kang[1], Ginam Han[1], Seo-Jun Bang[1], Hyun Lee[1] and Hyun-Do Jung[1,*]

[1]Department of Biomedical-Chemical Engineering, The Catholic University of Korea, [*]hdjung@catholic.ac.kr

PO-203 **Effect of oxygen ratio in atmosphere on post-curing of dental 3D printing materials**

Young Ran Kim[1], Ye Seul Kim[1], Jin-Ho Kang[1] and Chan Park[1,*]

[1]Department of Prosthodontics, School of Dentistry, Chonnam National University, [*]upgradepc@jnu.ac.kr

PO-204 **Development of electrospun nanofibrous hydrogels injectable with precise volume control**

Ji Woo Lee[1] and Kwang Hoon Song[1,*]

[1]Department of Nano-Bioengineering, Incheon National University, Incheon 22012, Republic of Korea, [*]khsong@inu.ac.kr

PO-205 **Multi-channel microfluidic system to analyze the effects of interleukin 6 on lymphatic breast cancer metastasis**

Seung-su kim[1], Jeong-min An[1], Chae-won Yoon[1], So-hee Ju[1], Hyun-Joong Kim[1] and Hyeon-Yeol Cho[1,*]

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PO-206 **Biofabrication of 3D tumor models surrounded by capillaries and arteries**

Jihyeon Song[1], Yeji Lee[1] and Junmin Lee[1,*]

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PO-207 **Villi differentiation of intestinal epithelial cells grown in the tubular structure generated by 3D bioprinting**

Heeju Song[1] and Hyungseok Lee[1,2,*]

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PO-200

Development of magnetic polarity patterning for 4D-printed structure mimicking myocardial fiber orientation

Hwanyong Choi[1], **Dong Gyu Hwang**[2] **and Jinah Jang**[1,2,3,4,*]

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The heart's ventricles exhibit a complex hierarchy of helical myocardial fibers, each differently oriented for efficient contractions. Though engineered myocardial tissues have developed through various tissue engineering techniques, no model replicates myocardial fiber orientation, crucial for ventricular volume reduction during ejection. Traditional 3D printing accurately replicates macroscopic structures but struggles with microstructures like myocardial fibers. Magnetic polarity patterning-based 4D printing has the potential to solve this problem. Magnetic polarity patterning imparts inherent magnetic traits to structures, enabling precise manipulation of its shape and arrangement through responding to external magnetic fields. In this study, we developed magnetic polarity patterning for fabricating structures mimicking myocardial fiber orientation. Initially, we established the system for the magnetic polarity patterning, including materials and printing parameters. Subsequently, we simulated morphological deformation using ANSYS software to explore patterns replicating fiber orientation under external magnetic field. Following this, the designed structures were printed and subjected to external magnetic field, validating the simulation results. This structure will be used to fabricate cardiac tissue with myocardial fiber orientation based on magnetic polarity patterns. This system has the potential to fabricate diverse hierarchical tissue structures, such as those found in the lung and liver, paving the way for advanced biomedical applications.

PO-201

3D printed electroconductive and stretchable composite hydrogel patches for accelerated wound healing

Seo-Jun Bang[1], **Ginam Han**[1], **Hyeong Seok Kang**[1], **Hyun Lee**[1] **and Hyun-Do Jung**[1,*]

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Versatile kinds of hydrogel-based patches for efficient wound healing have been utilized because they could provide humid environment to wound site resulted from water uptake ability of hydrogels. Specifically, gelatin-methacryloyl (GelMA) hydrogels have been widely studied as for effective tissue regeneration because of their biocompatibility and tunable physical characteristics. In addition, rheological behavior of GelMA-based hydrogels has been acknowledged as suitable for 3D printing, numerous researches adopted GelMA to fabricate hydrogel scaffolds with personalized structures. However, GelMA hydrogels are too stiff and rigid to withstand strains caused in certain applying positions and still more improvement in biocompatibility is necessary. In this study, we adopted dopamine-methacrylate (DMA) for enhancing stretchable property. Moreover, MXene particles are supplemented to GelMA/DMA system to introduce electrical conductivity and improve biocompatibility. Through SEM-EDX and XRD analysis, structure of MXene particle and hydrogel composites were analyzed. And physical properties including swelling ratio, degradation, rheological properties, and mechanical properties were also evaluated. Furthermore, in vitro cellular responses of produced GelMA/DMA/MXene hydrogel system were assessed using fibroblast cells.

PO-202

3D printable and stretchable hyaluronic acid methacrylate hydrogels for enhanced wound healing

Hyeong Seok Kang[1], **Ginam Han**[1], **Seo-Jun Bang**[1], **Hyun Lee**[1] **and Hyun-Do Jung**[1,*]

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Hyaluronic acid (HA), naturally occurring polysaccharide, has been widely used for wound healing applications because of its advantages including biocompatibility, biodegradability, suppression of inflammation. Additionally, hydrophilicity of HA results in retaining large amount of moisture which could supply moist environments. Recently, versatile researches are investigating 3D printing of HA by using hyaluronic acid methacrylate (HAMA) through methacrylation of HA and photo-crosslinking to produce customizable hydrogel patches. However, pure HAMA hydrogel exhibits deficient stretchability and biological performances for diverse application sites. Here, we incorporated polydeoxyribonucleotide (PDRN) to improve biocompatibility and to achieve enhanced stretchability and adhesion property to HAMA hydrogel. Firstly, analyses regarding HAMA were conducted using NMR and FT-IR to confirm whether methacrylation was well conducted. Photo-crosslinking of HAMA was carried out under presence of photo-initiator. After adding PDRN to HAMA, mechanical properties and internal structure of produced hydrogels were assessed. Furthermore, swelling and degradation behavior were evaluated. In vitro cell tests using fibroblasts to confirm tissue regeneration ability were also carried out.

PO-203

Effect of oxygen ratio in atmosphere on post-curing of dental 3D printing materials

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The aim of this study is to confirm the effect of different oxygen concentrations on the post-curing of 3D printing process. A disc specimen with a diameter of 15 mm and a height of 2 mm was manufactured using an LCD 3D printer and TC-80DP resin. The prepared specimens were washed and post-cured under oxygen concentrations of 5, 10, and 20% using a nitrogen curing machine, respectively. As a result of confirming the surface polymerization rate of the specimen using FT-IR, the surface polymerization rate increased as the oxygen concentration decreased. Furthermore, as the concentration of oxygen decreased, the mechanical strength and glossiness increased. Consequently, these results are expected to be useful as a clinical application in dentistry.