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New Chapter of Future Regenerative Medicine

Program Book

KTERMS Korean Tissue Engineering and Regenerative Medicine Society

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Contents

02/ Welcome Message

05/ Organizing Committee

07/ 2022 TERMIS-AP Awardees

08/ Conference Information

10/ Scientific Information

11/ Useful Information

12/ Program at a Glance

16/ Floor Plan

19/ Plenary Lectures

28/ Symposia

71/ SYIS Oral Sessions

77/ General Posters Sessions

93/ SYIS Posters Sessions

112/ Optional Tour Program

116/ Authors Index

138/ Sponsors and Exhibitors

PS04-023

Regulation of head and neck squamous cell carcinoma migration and invasion behaviors by mild reduction of cell surface

Laurensia Danis Anggradita[1], Sung Sik Hur[1], Myung Jin Ban[2], Yongsung Hwang*[1]

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PS04-024

Evaluation of the efficacy of SDF-1-based novel polypeptides by structure-based drug design in an acute myocardial infarction model

Kang-Gon Lee[3], Ana Rita M. P. Santos[1], Yong Guk Kang[1], Yun Jin Chae[2], Myeongjin Myeongjin Song[1], Sangdun Choi[4], Jongseong Kim[2], Yongdoo Park*[1]

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PS04-025

PINK1 deficiency induces adipogenic differentiation and suppresses osteogenic differentiation in mouse mesenchymal stem cells

HyunJeong Yeo[1], So-Young Lee[1], Hyun-Ju An[1], Sujin Choi[1], Kyurim Lee[1], Soonchul Lee*[1]

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PS04-026

Cartilage repair in temporomandibular joint osteoarthritis mediated by inflammatory cytokines-stimulated human umbilical cord stem cells via immunomodulating activation of M2 macrophages

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October 7-8
PS05 Organ-mimetic platforms (organoid, organ-on-a-chip, etc.)

PS05-018

Differentiation of vascularized functional liver organoids using transcription factors in iPSCs

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PS05-019

Engineered heterochronic parabiosis in 3D microphysiological system

Yunki Lee[1], Jeongmoon Choi[1], Gunjae Jeong[1], Young Jang*[1]

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PS05-020

3D tumor angiogenesis models for effective anti-cancer treatment

Kim Hyelim[1], Kim Hongnam*[1]

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PS05-021

3D bioprinting-based tissue assembly to generate multi-axially contracting engineered heart tissue

Dong Gyu Hwang[1], Uijung Yong[1], Hwanyong Choi[1], Jinah Jang*[1]

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PS05-022

Integrating the endosteal and perivascular compartments of the bone marrow niche in a microfluidic device

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PS05-023

Bone marrow on-a-chip for in vitro bone disease modeling with Osteo-Vascular biphasic niche

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PS05-024

Spatial restriction of diffuse gastric cancer cells promotes cell softening and filopodia formation

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PS05-026

Development of drug screening platform to mimic pancreas tumor microenvironment using decellularized extracellular matrix and pancreas organoids

Hanse Goh[1], Heymin Jung[1], Yuna Lee[1], Song Cheol Kim[1], In Kyong Shim*[1]

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PS05-027

Modeling pancreatic cancer with patient-derived organoids integrating cancer-associated fibroblasts

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PS05-028

Differentiation of human hair follicle stem cells into a vascularized hair bearing skin organoids

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PS05-029

Enhancing maturation of human vascularized cardiac organoids using a magnetic torque stimulation (MTS) system

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PS05-021 3D bioprinting-based tissue assembly to generate multi-axially contracting engineered heart tissue

Dong Gyu Hwang[1], Uijung Yong[1], Hwanyong Choi[1], Jinah Jang*[1]

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Various types (e.g., strip, ring, and chamber-like) of tissue have been developed for the *in vitro* study of the human heart. The strip and ring types of EHT could reproduce contractility and electrophysiology of the heart, however, these models have limited pump-like cardiac functions due to the lack of structural complexity. The advancement of biofabrication enabled the generation of chamber-like models that reproduce volume-pressure dynamics. However, the level is still poor and needs improvement. In this study, we suggest a 3D bioprinting-based tissue assembly as a strategy to achieve myocardial fiber orientation, a critical architectural feature of a cardiac chamber for maximizing the chamber contraction. Tissue assembly is a method that creates larger or more complex constructs based on functional tissue units. The strip EHT was generated and functional validations regarding contractility and electrophysiology and drug responsiveness. Then the pin-hole-based assembly platform was developed to perform tissue assembly, and the assembly process was established. Based on the assembly platform, the EHTs were assembled, and assembled EHT exhibited synchronized contractile and electrophysiological functions. Simultaneously, the 3D bioprinting-based tissue assembly proved to be capable of controlling fiber orientation. Subsequently, strip and ring types of EHT, showing longitudinal and radial contraction, respectively, were generated. Then, two types of EHTs were assembled to generate multi-axially contracting EHT. In conclusion, we proposed a 3D bioprinting-based tissue assembly as a method of fabricating complex contractile tissue, which will further be advanced to build a cardiac chamber having myocardial fiber orientation.

Keywords : 3D bioprinting, Tissue assembly, Engineered heart tissue