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바이오공학부문

2022년 춘계학술대회 초록집

일 시 : 2022년 4월 20일(수)~ 22일(금)
장 소 : 아일랜드 리솜
주 관 : 대한기계학회 바이오공학부문

후 원 : ㈜티앤알바이오팹, ㈜코렌텍, 유엔아이㈜, ㈜호모미미쿠스, ㈜티디엠, ㈜퓨전테크놀로지, ㈜메타바이오메드, ㈜엘쏠텍, ㈜자이브솔류션즈

KSME 사단법인 대한기계학회

[2022년 4월 22일(금요일)]

[09:00 ~ 10:40] 여성과학자 초청 세션 **좌 장: 여선주(KIMM), 임현의(KIMM)**

KSME 22BE-Fr02A01 Inorganic-Nanoparticle-based Superhydrophobic Colored Coatings for Sustainable Building-Integrated Photovoltaics/ 여선주, Sandipan Bera, 김부성, 이보연, 박승철, 임현의(KIMM)

KSME 22BE-Fr02A02 Microgel coated surfaces for temperature-controlled cell sheet harvesting./ 김혜정(고려대)

KSME 22BE-Fr02A03 Artificial intelligence-assisted image analysis in a biomimetic bone-on-a-chip platform for osteoporosis drug testing/ 김정아(KBSI)

KSME 22BE-Fr02A04 The formation of rippled edges in leaves/ 이안나, 곽현수, 기강현, 김준식(포항공대)

KSME 22BE-Fr02A05 뇌-혈관 장벽 모사 칩 개발 및 뇌약물분포 연구로의 응용/ 안송이(부산대), Yoshitaka J. Sei(Georgia Tech.), 박현지, 김진환, Allan I. Levey, 김용태(부산대)

KSME 22BE-Fr02A06 Soft, Skin-Interfaced Microfluidic Systems for Dynamic Range Sweat Sensing/ 양다솜(Northwestern Univ.) Donghwan Kim(성균관대), John A. Rogers(Northwestern Univ.)

[13:00 ~ 14:00] 구연: Biofabrication **좌 장: 서경덕(원광대)**

KSME 22BE-Fr02C01 Fabrication of nanofibrous microwell array with controllable size, aspect ratio, and density through thermoforming process/ 김도희, 이성진, 윤재승, 홍현준, 엄성수, 김동성(포항공대)

KSME 22BE-Fr02C02 Bioprinting of Physiomimetic Human Islet-like Cellular Aggregates-Vascular Platform for Functional Maturation of Beta Cells/ 김명지, 조승연, 장진아(포항공대)

KSME 22BE-Fr02C03 3D Bioprinting-based Tissue Assembly to Modulate Contraction Direction of Engineered Heart Tissues/ 황동규, 용의중, 최환용, 장진아(포항공대)

KSME 22BE-Fr02C04 분기점에서의 누수 방지와 세포배양이 가능한 전기방사 공정 기반의 Y자 인공혈관 공정 조건 탐색 및 제작 / 조준희(포항공대), 엄성수, 김동성

KSME 22BE-Fr02C05 The fabrication method of electrospun nanofiber mebrane integrated PDMS microfluidic chip with an assist of the functinal layer/ 류준열(포항공대), 윤재승, 엄성수, 김동성

[14:20 ~ 15:00] 구연: 3D Printing & Tissue Engineering **좌 장: 이준희(KIMM)**

KSME 22BE-Fr02D01 3차원 세포 프린팅 기술을 이용한 혈관-림프관이 포함된 전이성 흑색종 모델 개발/ 조원우(포항공대), 안민준, 김병수(부산대), 조동우(포항공대)

KSME 22BE-Fr02D02 3D Cell Printing of Vascularized Patient-Derived Gastric Cancer Organoid model for Preclinical Assays by Providing a Tissue-Specific Microenvironment/ 김지수(포항공대), 정재호(연세대), 장진아(포항공대), 조동우

KSME 22BE-Fr02D03 3D Printing of Tissue-Sensor Biohybrid Platform for Continuous Monitoring of Contraction Changes Induced by Drug Cardiotoxicity/ 용의중(포항공대), 김동환, 김호중(Georgia Tech.), 황동규(포항공대), 조성건, 남효영, 김세진, 김태영, 정운룡, 김기훈, 정완균, 여운홍(Georgia Tech.), 장진아(포항공대)

KSME 22BE-Fr02D04 Engineering Densely Packed Adipose Tissue via Environmentally Controlled In-Bath 3D Bioprinting/ 안민준(포항공대), 조원우, 김병수(부산대), 조동우(포항공대)

2022 KSME 바이오공학부문 춘계학술대회
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KSME 22BE-Fr02D03

3D Printing of Tissue-Sensor Biohybrid Platform for Continuous Monitoring of Contraction Changes Induced by Drug Cardiotoxicity

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Key Words: 3D printing, tissue-sensor biohybrid platform, cardiotoxicity

Cardiotoxicity generally from an anticancer medication can be divided into two categories: acute and chronic cardiotoxicity. Acute cardiotoxicity is reversible to a degree and can be mitigated within a week after stopping therapy. However, late-stage chronic cardiotoxicity can induce heart failure that can lead to death in severe cases. Therefore, before treating drugs to patients, a platform to find optimal drug exposure time to minimize the risk of cardiotoxicity is highly required. Meanwhile, the development of *in vitro* 3D cardiac tissue, which is called engineered heart tissue (EHT), has been actively conducted. EHT is able to recapitulate the physiological contractions of the real heart because the hydrogel can provide a three-dimensional microenvironment of the native cardiac tissue. Furthermore, advances in carbon-based conductive printable polymers and multi-material 3D printing/bioprinting technology have provided new opportunities to integrate flexible sensors with 3D cardiac tissues for contractile force measurement inside the incubator. Here, we propose a 3D-printed tissue-sensor biohybrid platform, named as bi-pillar-grafted strain gauge (BPSG) platform, for continuous monitoring of contraction changes by drug-induced cardiotoxicity. Through the developed BPSG platform, it was confirmed whether commercially available drugs act according to the known efficacy on the *in vitro* 3D cardiac tissues.