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Poster Session

분야 I : Fabrication and Characterization of Functional Biomaterials

PO-1 **Human Adipose Derived Stem Cells Coated-Poly(dimethysiloxane) for Improving Medical Device Implant-Induced Fibrosis**

Chanutchamon Sutthiwanjampa[1], Byung Ho Shin[2], Shin Hyuk Kang[3], Chan Yeong Heo[4,*], and Hansoo Park[1,*]

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PO-2 **Three-Dimensional Culture Based Hyaluronic acid hydrogel Used as Progenitor Cells Carrier for Kidney Regeneration**

Sureerat Khunmanee[1,†], So Young Chun[2†], Yun-Sok Ha[3,4], Jun Nyung Lee[3,5], Bum Soo Kim[3,5], Wei-Wei Gao[6], In Yong Kim[6], Dong Keun Han[7], Seungkwon You[5], Tae Gyun Kwon[4,5*] and Hansoo Park[1,*]

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PO-3 **Partial VEGF Peptide as an Angiogenesis Inhibitor**

Kevin Kent Vincent Canlas[1] and Hansoo Park[1,*]

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PO-4 **Fabrication and Characterization of Magnetically Actuated Polymer/Magnetite Navigator**

Seul Ki Lee[1,§], Da Rum Kim[1,§], Jin Woo Park[1], Woo Cheol Kim[1], Jae Dong Kim[1,*]

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PO-5 **Polyelectrolytes Multilayer Coatings on Filtration Membrane for Improved Wettability and Flux Properties**

Eun Kyoung Lee[1] and Sung Yun YANG[1,*]

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PO-6 **Construction of Physiomimetic Pancreatic Tissue Models Using Stem Cell-Derived Islets and Extracellular Matrix-Based Pancreatic Islet Niche-Like Bioink**

Myungji Kim[1], Seungyeun Cho[2], Dong Gyu Hwang[1] and Jinah Jang[1,2,3,*]

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PO-7 **Catechol-Thiol-based Protein Glue : inspired by Underwater Mussel Redox Chemistry for Dental Resin Formulation**

Surim Yoo[1], Dohoon Lee[2] and Dong soo Hwang[1,2,*]

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PO-8 **Polymeric Microspheres containing Magnesium Hydroxide and Anti-oxidant Agents for Functional Filler**

Yun Heo[1], Semi Lee[1], Da-Seul Kim[1,2] and Dong Keun Han[1,*]

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PO-9 **Improvement of Mechanical and Biological Properties by PLLA/MH Composites including Surface-modified Magnesium Hydroxide Nanoparticles**

Seung-Woon Baek[1,2,3], Duck Hyun Song[1], Yun Heo[1], Chun Gwon Park[2,3] and Dong Keun Han[1,*]

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PO-5

Polyelectrolytes Multilayer Coatings on Filtration Membrane for Improved Wettability and Flux Properties.

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Creating active surface layer coating for membrane technology is critically important especially crude wastewater filtration. Recent development of the functional active layers has derived to use polymer hybrid coatings. In our lab, we have studied many years in the development of functional surface coatings created by polyelectrolyte multilayer film by layer-by-layer method. We have prepared polyelectrolyte coatings on filtration membrane and characterized the properties of the membrane surface with AFM, contact angle, water filtration and anti-fouling test. Especially, we modified the surface to be hydrophilic and as the results, increasing surface wettability, water flux and anti-fouling properties were achieved. We expect these films have a great potential to be used in environmental and biomedical fields.

PO-6

Construction of Physiomimetic Pancreatic Tissue Models Using Stem Cell-Derived Islets and Extracellular Matrix-Based Pancreatic Islet Niche-Like Bioink

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Pancreatic islet is surrounded by peri-islet extracellular matrix (ECM) with dense vascular networks. Selecting proper biomaterial is an important consideration for recapitulation of the native pancreatic tissue microenvironment. In this study, comprehensive proteomic analysis of pancreatic tissue-derived decellularized ECM (pdECM) was conducted and the abundance of peri-islet basement membrane proteins (i.e., laminin and collagen type IV) was relatively low compared to that of fibrillar collagen. In this regard, we developed pancreatic islet niche-like (PINE) bioink, which is inspired by composition of human pancreatic proteome, via reconstitution of pdECM supplemented with basement membrane proteins. Furthermore, we cultured stem cell-derived islets and endothelial cells (ECs) in the PINE bioink and compared with widely used other bioinks to evaluate whether developed bioink can provide a more physiologically relevant microenvironment for boosting maturation capacity of encapsulated cells. Maturation of beta cells and ECs was observed and its-related markers expressed significantly higher in the group of PINE bioink. Finally, we optimized co-localization of stem cell-derived islets and vascular networks using PINE bioink and 3D bioprinting technology to generate advanced pancreatic tissue. The PINE bioink could be a great foundation that can facilitate the construction of physiomimetic pancreatic tissue platforms and transplantable constructs for diabetes research.

PO-7

Catechol-Thiol-based Protein Glue inspired by Underwater Mussel Redox Chemistry for Dental Resin Formulation

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Mussels are effectively operated by creating an acidic environment when adhering with 3,4-dihydroxy-l- phenylalanine (DOPA)–thiol redox chemistry for underwater bonding. Similarly, in dental adhesives, phosphoric acid-based etching is used for dentin-bonding materials. In view of the similarity between dental adhesives and underwater mussel adhesives, the combination of DOPA and thiol chemistry with acid etching can be used to overcome one of the most critical issues in dentin medical adhesives. The proposed adhesion method produces high adhesion strengths compared to those currently used in dentin and zirconia adhesives. Here, we extend and evaluate dentin and zirconia dental adhesives by mixing with mussel (DOPA)–thiol redox chemistry and acid etching.

PO-8

Polymeric Microspheres containing Magnesium Hydroxide and Anti-oxidant Agents for Functional Filler

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Polymeric microspheres containing magnesium hydroxide (MH) and antioxidants such as apocynin (APO) and astaxanthin (ATX) have been prepared as functional skin filler with enhanced physical chemistry and biological performance. In this study, polycaprolactone (PCL)-based microspheres were uniformly produced with a size of about 30~40 μm through a membrane emulsification device. In the PCL/MH microspheres, MH effectively neutralized acidic degradation products from polymer degradation. In *in vitro* cell experiments, when MH was treated in acidic degradation products (6-hydroxyacaprolic acid, HCA), acidic pH was neutralized to induce wound healing along with suppressing inflammation. The microspheres comprising antioxidants were sustained released without initial burst release. In particular, antioxidant, ATX, added into the microspheres was maintained for 16 weeks and displayed positive effects such as tissue regeneration and collagen production improvement in *in vivo* test. In conclusion, these results suggest that the prepared microspheres have great potential as a functional dermal filler for skin aesthetics and facial plastic surgery.