Preliminary Program of the 5th Annual Winter Congress of the Korean Medical 3D Printing Society

2020. 01. 18 (토) 08:20 - 18:10
연세대학교 치과대학병원 7층 강당
# Programs

대한메디컬3D프린팅학회
제5회 동계학술대회

2020. 01. 18 (토) 08:20 - 18:10
연세대학교 치과대학병원 7층 강당

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**Session 1: 학계 세션**

최장: 이성재(연세대학교 대응공학부), 강정욱 교수(응용과학기술원)

발표자: 안근선(서인대학교), 이종우(기술원), 이세현(서울대 점막과립), 김승태(한み대 니노베이슈리닝연구소)

**Session 2: 산업계 세션**

최장: 유명철 교수(전 경희의료원), 김인형 대표(휴먼테크놀로지)

발표자: 박태영(일본의사), 사정우(비트로스테디미디어), 안은호(자비아커먼웹), 김명철(검은대)

**Session 3: 초청연사 세션**

최장: 김성현 교수(경북대학교 정형외과), 정양국 교수(가톨릭의대 정형외과)

발표자: 신규현(연세대학교 신경외과), 이종원(가톨릭의대 성형외과), 김성은(경북대학교 정형외과)

12:00 - 14:20 중식
For bone reconstruction, a 3D scaffold has been developed by a variety of materials and structures. However, their material properties were not enough compared to that of the real bone tissue. To enhance mechanical properties of 3D scaffold as a structural approach, we developed a polycaprolactone scaffold with a 3D kagome structure by precision extruding deposition technique. The developed kagome-structure scaffold was compared with conventional grid-structure scaffold. Their mechanical properties were evaluated by both numerical and experimental analysis. In addition, their biological analysis were carried out by using rabbit calvarial defect model for 16 weeks.

**Funding:** This research was financially supported by the Ministry of Trade, Industry and Energy (MOTIE) and Korea Institute for Advancement of Technology (KIAT) through the International Cooperative R&D program (PD112823D) bioprinting iPSC-derived immune protected tissues with vascularization as implantable tissue therapies (2019).

**참고문헌**

Abstract

For bone reconstruction, a 3D scaffold has been developed by a variety of materials and structures. However, their material properties were not enough compared to that of the real bone tissue. To enhance mechanical properties of 3D scaffold as a structural approach, we developed a polycaprolactone scaffold with a 3D kagome structure by precision extruding deposition (PED) technique. The developed kagome-structure scaffold was compared with conventional grid-structure scaffold. Their mechanical properties were evaluated by both numerical and experimental analysis. In addition, their biological analysis was carried out by using rabbit calvarial defect model for 16 weeks.

Conclusion

• We compared representative periodic cellular models under numerical and experimental assessment.
• The mechanically enhanced kagome-structure scaffold was designed and fabricated by the PED head technique.
• Under compressive and bending deformation, apparent stiffness and bending modulus of the kagome-structure scaffold were measured to have 1.4 times and 2.3 times higher than that of the grid-structure scaffold.
• The fabricated scaffolds were observed for 16 weeks after transplantation in rabbit calvarial defect model. As a result, high osteoconduction was shown in a kagome implantation group.

Reference


Acknowledgement

This research was financially supported by the Ministry of Trade, Industry and Energy(MOTIE) and Korea Institute for Advancement of Technology(KIAT) through the International Cooperative R&D program(P0011282_3D bioprinting iPSC-derived immune protected tissues with vascularization as implantable tissue therapies (2019)).