

ISBF Twitter Poster Conference

Join us on July 11th and 12th, post your scientific poster on Twitter, tag @ISBiofab, link your poster with the official hashtag of the event, and get in touch with colleagues from all over the world



3x Young Scientist Awards offered
To promote the best contributions

Registration Form, guidelines, info and Call for Awards
https://docs.google.com/forms/d/15mutyyaAFCn92XgkHlq8TfO3tliu9ndSdYuZXpai_BQ/edit



Abstract submission deadline: June 23th, 2023
Abstract acceptance notification: June 24-25th, 2023
The official hashtag will be shared before the beginning of the conference

The screenshot shows a Twitter post from the account 'Int'l Soc Biofab' (@ISBioFab). The tweet text is: 'The @ISBioFab Twitter Poster Conference is back! Register now to participate in this exciting event with amazing awards to win 🏆! @DalyAndy @LindbergLabs @liliangouyang #포토 번역하기'. The tweet is dated '오전 1:06 · 2023년 6월 13일 · 7,516 조회수'. It has 4 retweets and 27 likes. Below the tweet, there is a link to the registration form: 'docs.google.com/ISBF 2023 Twitter Poster Conference'. A reply from 'REGEMA...' (@REGEMA...) is visible, mentioning a senior research scientist Adrian Djalil and his work on biofabrication of hybrid thermoplastic-mesenchymal stem cell-laden hydrogel construct bioprinter for the engineering of functional cartilage tissue.

Yeonggwon Jo (@Yeonggwon) · x

International Society for Biofabrication

POSTECH

Title: 3D Bioprinting of Pancreatic Islet-like Aggregates and Encapsulation System for Regulating Implant Fibrosis

Author list: **Yeonggwon Jo**, Hyung Bae Kim, Hyorung Nam, Ju Young Park, Hyun Ho Han, and Jinah Jang

Affiliation: Pohang University of Science and Technology (POSTECH), Pohang, Korea
Asan Medical Center, University of Ulsan College of Medicine, Seoul, Korea

Acknowledgements: This work was supported by the National Research Foundation of Korea(NRF) grant funded by the Korea government(MSIT) (No. 2022M3C1A3081359)

Abstract:
Type 1 diabetes is known to be an autoimmune disease that destruct the pancreatic cells, resulting in blood glucose level control failure. The promising permanent treatment of type 1 diabetes mellitus is an islet transplantation. But just as other types of organ transplantation, islet transplantation is clinically challenging due to donor shortage and immune reaction. To overcome the current limitation, stem cell applied tissue engineering and immune-protective system are being studied. In this study, we fabricated pancreatic islet-like aggregates using 3D bioprinting technology. We developed dual-crosslinked biomaterial ink with promoted biofunctionality and shape stability using decellularized extracellular matrix(dECM) and alginate to control the shape and size of islet-like aggregates. Also, immune-protective encapsulation system was developed by utilizing nano-size porous PTFE membrane and drug releasing dECM patch. The multi-layer of encapsulation system was designed to block the immune cells and to release the antibiotics and immunosuppressant.

Figure 1. Schematic of islet-like aggregates and encapsulation system

Yeonggwon Jo @Yeonggwon

3D Bioprinting of Pancreatic Islet-like Aggregates and Encapsulation System for Regulating Implant Fibrosis
#Biofab2023
@ISBioFab

오전 3:57 · 2023년 7월 12일 · 322 조회수

트윗 애널리틱스 보기

6 마음에 들었어요

내 답글을 트윗하

Miguel JS F... @mig... · 21시간 ...
Great concept! Why did you decide to use 3D bioprinting as the technology to produce these aggregates?

Yeonggw... @Yeong... · 21시간 ...
Thank you! I used 3D bioprinting to control the size and number of the aggregates. The size of the aggregates may affect the cell viability and cellular activity. If the size of aggregate is too big, the cell in the core may be deprived of glucose and oxygen, die through necrosis.

Andrew... @Daly... · 23시간 ...
Hi Yeonggwon, very nice idea! Do you think the antibiotics and

Yeonggwon Jo (@Yeonggwon) · x

International Society for Biofabrication

POSTECH

Introduction and background:

Islet transplantation is known as a promising treatment for type 1 diabetes patients. However, islet transplantation is still challenging due to donor shortage and immune rejection. Therefore, strategies to develop engineered pancreatic tissues and protecting them from immune system is required. The tissue-specific decellularized extracellular matrix (dECM) can provide suitable microenvironment when fabricating islet-like aggregates. The semi-permeable membrane of encapsulation system can provide proper environment with sufficient oxygen and nutrient, as well as penetration of glucose and insulin.

Materials and methods:

The porcine pancreas dECM (pdECM) and vascular dECM (vdECM) biomaterial ink was obtained through decellularization process. The fabrication of islet-like aggregates and drug releasing semi-permeable membrane was processed using 3D bioprinting system.

Figure 2. The pdECM pre-gel was mixed with alginate and calcium gluconate was added afterward to obtain homogeneous high- viscous biomaterial ink, which is for fabricating islet-like aggregates without support bath. The β -cell loaded bioink was bioprinted into droplet form and gelled at 37°C.

Figure 3. The vdECM pre-gel was mixed with antibiotics and immunosuppressant to fabricate drug releasing semi-permeable membrane of encapsulation system. The drug loaded biomaterial ink was fabricated into multi-layers on nanoporous PTFE membrane for sequential releasing.

Yeonggwon Jo @Yeonggwon

3D Bioprinting of Pancreatic Islet-like Aggregates and Encapsulation System for Regulating Implant Fibrosis
#Biofab2023
@ISBioFab

오전 3:57 · 2023년 7월 12일 · 322 조회수

트윗 애널리틱스 보기

6 마음에 들었어요

내 답글을 트윗하

Miguel JS F... @mig... · 21시간 ...
Great concept! Why did you decide to use 3D bioprinting as the technology to produce these aggregates?

Yeonggw... @Yeong... · 21시간 ...
Thank you! I used 3D bioprinting to control the size and number of the aggregates. The size of the aggregates may affect the cell viability and cellular activity. If the size of aggregate is too big, the cell in the core may be deprived of glucose and oxygen, die through necrosis.

Andrew... @Daly... · 23시간 ...
Hi Yeonggwon, very nice idea! Do you think the antibiotics and

Yeonggwon Jo (@Yeonggwon) · x

International Society for Biofabrication

POSTECH

Results:

Figure 4. The pdECM composite biomaterial ink showed high shape-stability and printability. The β -cell loaded bioink was bioprinted into islet-like aggregates without support bath.

Figure 5. The pdECM composite biomaterial ink showed higher biocompatibility compared to alginate.

Conclusions

pdECM composite biomaterial ink showed enhanced shape-stability and islet-like aggregates were fabricated without support bath. The drugs were released sequentially from the membrane and showed anti-fibrosis effect.

Figure 6. Two drugs released sequentially from multi-layered membrane. The antibiotic burst released at the early stage, and the immunosuppressant released slowly and consistently.

Figure 7. The drugs releasing membrane did not show cytotoxicity.

Figure 8. The drugs releasing membrane showed anti-fibrosis effect.

Yeonggwon Jo @Yeonggwon

3D Bioprinting of Pancreatic Islet-like Aggregates and Encapsulation System for Regulating Implant Fibrosis
#Biofab2023
@ISBioFab

오전 3:57 · 2023년 7월 12일 · 322 조회수

트윗 애널리틱스 보기

6 마음에 들었어요

내 답글을 트윗하

Miguel JS F... @mig... · 21시간 ...
Great concept! Why did you decide to use 3D bioprinting as the technology to produce these aggregates?

Yeonggw... @Yeong... · 21시간 ...
Thank you! I used 3D bioprinting to control the size and number of the aggregates. The size of the aggregates may affect the cell viability and cellular activity. If the size of aggregate is too big, the cell in the core may be deprived of glucose and oxygen, die through necrosis.

Andrew... @Daly... · 23시간 ...
Hi Yeonggwon, very nice idea! Do you think the antibiotics and