Bioprinted Pancreas-on-a-Chip Platform for Drug Response Evaluation ID# 2016-4547





Pancreas-on-a-chip for TD1 response

Technology Summary

This technology describes a chip that can be used to evaluate pancreatic function and response to TD1 pharmaceuticals. The chip acts as a perfusable human pancreas model with embedded vascularization. The design includes a microfluidics chamber, a bioprinted extracellular matrix, and adipose-derived stem cells directed towards a beta-cell fate. A lumen is formed within the extracellular matrix, which can be perfused with cells, culture media, or other perfusate. This "organ on a chip" recreates the key features of a pancreatic microenvironment and can be used for screening drugs that regulate pancreatic function.

Application & Market Utility

Real-time observation of cell morphology and drug response. Keeps tissue intact for testing various TD1 drugs. Capable of long-term perfusion (up to 26 days), First successful culture of pancreatic islets in a 3D vascularized form. First successful 3D bioprinting system for pancreatic islets.

Next Steps

Seeking licensing with biomedical industry partner for commercialization of innovation.

TECHNOLOGY READINESS LEVEL 1-3

Seeking

Investment | Licensing | Research

Keywords

- TD1 response
- drug screening
- pancreatic islets
- 3D bioprinting
- perfusable vascularized tissue

Researchers

Ibrahim Tarik Ozbolat Harzt Family Associate Professor of Engineering Science and Mechanics Department Online Bio

Monika Hospodiuk

Graduate Student Website

Dino Jospeh Ravnic Assistant Professor <u>Website</u>

Other Researchers Bugra Ayan

Originating College College of Engineering

Office of Technology Management Contact Ritter, Dustin dwr18@psu.edu 814-863-7070



Invent Penn State is a Commonwealth-wide initiative to spur economic development, job creation, and student career success. Invent Penn State blends entrepreneurship-focused academic programs, business startup training and incubation, funding for commercialization, and university-community collaborations to facilitate the challenging process of turning research discoveries into valuable products and services that can benefit Pennsylvanians and humankind. Learn more at invent.psu.edu.

Penn State is an equal opportunity, affirmative action employer, and is committed to providing employment opportunities to all qualified applicants without regard to race, color, religion, age, sex, sexual orientation, gender identity, national origin, disability or protected veteran status.