RSR Award Detail

Research Spending & Results

Award Detail

Awardee:	NANOFIBER SOLUTIONS, LLC
Doing Business As Name:	Nanofiber Solutions
PD/PI:	Jed K Johnson (937) 631-3596 jed.johnson@nanofibersolutions.com
Award Date:	05/28/2013
Estimated Total Award Amount:	$ 150,000
Funds Obligated to Date:	$ 180,000 FY 2014=$30,000 FY 2013=$150,000
Start Date:	07/01/2013
End Date:	06/30/2014
Transaction Type:	Grant
Agency:	NSF
Awarding Agency Code:	4900
Funding Agency Code:	4900
CFDA Number:	47.041
Primary Program Source:	040100 NSF RESEARCH & RELATED ACTIVIT
Award Title or Description:	SBIR Phase I: Development of a Tissue Engineered Trachea
Federal Award ID Number:	1315524
DUNS ID:	830384223
Program:	SMALL BUSINESS PHASE I
Program Officer:	Jesus Soriano Molla (703) 292-7795 jsoriano@nsf.gov

Awardee Location

Street:	1275 Kinnear Road
City:	Columbus
State:	OH
ZIP:	43212-1155
County:	Columbus
Country:	US
Awardee Cong. District:	03

Primary Place of Performance

Organization Name:	Nanofiber Solutions

Street:	1275 Kinnear Road
City:	Columbus
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ZIP:	43212-1155
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Abstract at Time of Award

This Small Business Innovation Research (SBIR) Phase I project proposes to develop an artificial trachea made from synthetic nanofibers that is seeded with the patient?s own stem cells in the operating room using a disposable, closed system seeding chamber. There currently are no commercially available solutions to large tracheal lesions that may occur from large tumors or traumatic injuries. The research objectives of this project are to develop a reproducible stem cell seeding protocol, determine the efficacy of seeded tracheal grafts versus non-seeded tracheal grafts and characterize the mechanical properties of the neotrachea after implantation for specified time points. It is anticipated that the stem cell seeded tracheal graft will become fully accepted by the patient?s body and facilitate the body to regenerate a new trachea on the implanted nanofiber scaffold. The broader impact/commercial potential of this project is that the results of this project will not only save the lives of patients with tracheal lesions that currently have no other viable options, but it will advance the field of regenerative medicine and have significant benefits on the commercial development of other tissue engineered organs. By creating scaffolds with synthetic polymers, we are able to create the framework of nearly any type of organ in the body ranging from blood vessels to tracheas to skin. If we can develop a robust, fast, efficient method to seed these scaffolds with stem cells from the intended patient in the operating room, then we have the potential to recreate organs for any patient without the risk of rejection, without the need for an organ donor, and without the need to be a waiting list. The ability to repair or regenerate tissue/organs addresses a market size estimated to be several hundred billion dollars annually. This platform technology will create a new paradigm of regenerative medicine and advance patient care to new levels.

Project Outcomes Report

Disclaimer

This Project Outcomes Report for the General Public is displayed verbatim as submitted by the Principal Investigator (PI) for this award. Any opinions, findings, and conclusions or recommendations expressed in this Report are those of the PI and do not necessarily reflect the views of the National Science Foundation; NSF has not approved or endorsed its content.

This Small Business Innovation Research (SBIR) Phase I project successfully demonstrated that we can make an artificial trachea using synthetic nanofibers that are seeded with the patient's own stem cells in the operating room using a disposable, closed system seeding chamber. There currently are no commercially available solutions for large tracheal lesions that may occur from large tumors or traumatic injuries. The research objectives of this project were to develop a reproducible stem cell seeding protocol, determine the efficacy of seeded tracheal grafts versus non-seeded tracheal grafts and characterize the mechanical properties of the neotrachea after implantation for specified time points. We successfully demonstrated that the stem cell seeded tracheal graft was fully accepted by the patient's body and facilitated the body to regenerate a new trachea on the implanted nanofiber scaffold.

The broader impact of this project is that the results of this project will not only save the lives of patients with tracheal lesions that currently have no other viable options, but it will advance the field of regenerative medicine and have significant benefits on the commercial development of other tissue engineered organs. By creating scaffolds with synthetic polymers, we are able to create the framework of nearly any type of organ in the body ranging from blood vessels to tracheas to skin. If we can develop a robust, fast, efficient method to seed these scaffolds with stem cells from the intended patient in the operating room, then we have the potential to recreate organs for any patient without the risk of rejection, without the need for an organ donor, and without the need to be a waiting list. The ability to repair or regenerate tissue/organs addresses a market size estimated to be several hundred billion dollars annually. This platform technology will create a new paradigm of regenerative medicine and advance patient care to new levels.

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Modified by: Jed K Johnson

For specific questions or comments about this information including the NSF Project Outcomes Report, contact us.