



Summer Research Institute (SRI) in FYRE

A Kansas Louis Stokes Alliance for Minority Participation sponsored by the National Science Foundation (NSF).

Bridge Program

Welcome to Shocker Nation

- Incoming Freshman & Transfer Students
- Up to 10 students
- Earn 1-credit hour

Research

STEM Focused

- Immersive research experience
- Build scientific communication skills
- Collaboration and Teamwork
- Leadership skills
- Explore STEM labs across campus

Team Building

On Campus Experience(s)

- Mentorship
 - Faculty – Student
 - Student – Student
- Shocker Hall
 - Living & Dining
- University programs

Next Steps

- FYRE
- URCA
- McNair Scholars
- K-INBRE
- JumpStart
- Other

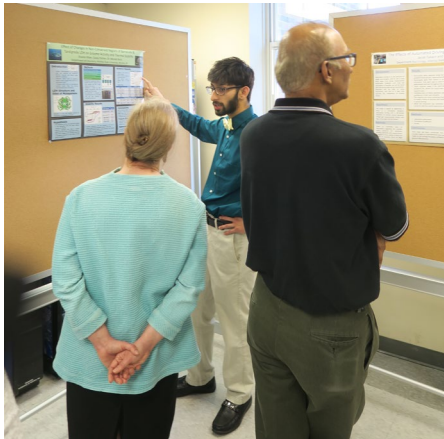


WICHITA STATE
UNIVERSITY
DOROTHY AND BILL COHEN
HONORS COLLEGE

FYRE

First Year Research Experience in STEM

- Connect first-year students with authentic hands-on research experiences in a variety of STEM-related disciplines
- Participate in faculty-mentored research which contributes new knowledge to your discipline
- Receive training and support in finding a research mentor
- Be part of interdisciplinary network of peer, academic and professional mentors
- Discover funding, career, and advanced opportunities in research
- Honors credit



EFFECT OF FETAL BOVINE SERUM ON ENDOTHELIAL CELL GROWTH
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What is Fetal Bovine Serum?

- Fetal bovine serum (FBS) is drawn from a bovine fetus of a pregnant cow
- FBS promotes cell growth and proliferation, supplies essential nutrients, and maintains a favorable growth environment

What are Endothelial Cells?

- Endothelial cells form the endothelium, which is a thick one-cell layer that lines the blood vessels
- Acts as an intermediary between blood and other tissues
- Endothelial cells are unique due to its capability to fulfill different functions depending on the location in the body

Background & Introduction

Endothelial cells grow quicker when a growth factor is included in the medium. We hypothesize that varying the concentration of fetal bovine serum will increase endothelial cell growth and the rate at which it grows. Higher concentrations of fetal bovine serum will allow for endothelial cells to proliferate and grow at a faster rate. We believe that this is due to the FBS providing hormone factors for cell growth and proliferation as well as supplying essential nutrients and other factors needed to maintain a favorable growth environment.

Methodology

Our study focused on 4 experimental groups with 10%, 5%, 2%, and 0% fetal bovine serum.

The endothelial cells that we used were initially frozen. To revive the cells, we made a solution for the cells to be resuspended in. For every media, we used 2 ml for each concentration in a 48 well. Each media contained different concentration of glucose, fetal bovine serum, penicillin and streptomycin, and ACSF (1) medium. We combined the cells and the media in 75 ml culture flask and placed it in an incubator for 10 days.

The endothelial cells were then isolated and cultured in 24-well plates.

Results

The results concluded that the cells cultured with higher concentrations of FBS had more cells and grew at a faster rate than the cells that were cultured with lower concentrations.

Discussion & Conclusion

By understanding what amount of fetal bovine serum concentration will help to increase cell growth and proliferation, researchers are able to increase endothelial cells in order to be used for regenerative medicine. With further studies, using FBS to increase growth could lead to regenerating more endothelial cells and helping to improve several cell functions in the human body such as engineering new blood vessels.

Acknowledgements

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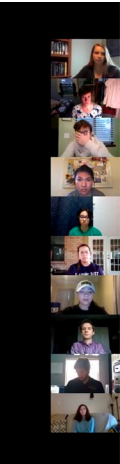
References

1. An Introduction to Primary Endothelial Cells. (n.d.). Retrieved from https://bioassays.wisc.edu/oma_2nd/09endotherel.html
2. Atlas of Fetus and Animal Histology. (n.d.). Retrieved from <https://images.wellspring.com/02-english/09>
3. Chiu-Hui Tang, C.C. W. (n.d.). Long term growth comparison studies of FBS and FBS dilution in the head and neck cell lines. Retrieved from <https://journal.ptsu.org/090808/article/view/123/123>
4. Goswami, S., Moran, L., Brown, D., & Brantwell, C. (n.d.). Costal growth of bovine aortic endothelial cells: fibroblast growth factor as a survival agent. 4120-4124.

Figure 1: Endothelial cells lining the blood vessel (reference 3).

Figure 2: The endothelial cells that we used were initially frozen. To revive the cells, we made a solution for the cells to be resuspended in. For every media, we used 2 ml for each concentration in a 48 well. Each media contained different concentration of glucose, fetal bovine serum, penicillin and streptomycin, and ACSF (1) medium. We combined the cells and the media in 75 ml culture flask and placed it in an incubator for 10 days.

Figure 3: Endothelial cells maintained in 25% cell serum for 4 days without fibroblast growth factor (FBS). (25% endothelial cells after 4 days cultured with FBS and 25% cell serum reference 4).



FYRE in STEM Outcomes



Diversification

STEM Fields:

- 1 Biological Sciences
- 2 Human Performance Studies
- 2 Chemistry
- 1 Computer Engineering
- 1 Mechanical Engineering
- 3 Biomedical Engineering
- 4 Aerospace Engineering

FYRE Students

- 50% first generation
- 50% underrepresented minority
- 50% women

Pipeline

- 8 of 14 2020 FYRE in STEM were part of SRI in FYRE
- 2 of 1st and 2nd FYRE cohorts received summer research scholarships from K-INBRE
- 2 students were awarded NASA JumpStart funding

Assessment

Undergraduate Research Student Self-Assessment (URSSA)

- skills such as lab work and communication
- conceptual knowledge and linkages in their field
- deeper understanding of the intellectual and practical work of science
- growth in confidence and adoption of the identity of scientist
- preparation for a career or graduate school in science
- greater clarity in understanding what career or educational path students might wish to pursue.