

RESEARCH DAY

California Northstate University College of Medicine



**CONGRATULATIONS TO
ALL THE STUDENT
RESEARCHERS!**

**RESEARCH DAY BOOK
OF ABSTRACTS**

**PODIUM PRESENTATION
WINNERS!**

**RESEARCH COMMITTEE
DR. ARPITA K VYAS, & DR.
VALERIE GERRIETS**

Research Day, 2019

California Northstate University's College of Medicine (CNUCOM) celebrated its 4th Annual Research Day on the 13th of December 2019. The purpose for this day is give students a forum to with university-wide audience allowing them to showcase their accomplishments relating to their yearlong engagement in research.

All trainees get an opportunity to present their research findings as podium or poster presentation. This year we had 40 projects on poster display and 12 podium presentations.

The event commenced with keynote addresses by Dean Joseph Silva, (Dean, College of Medicine, Vice President of Academic & Medical Affairs – CNU), and Dr. Catherine Yang (Vice President of Academic Affairs, Associate Dean of Medical Education – CNU).



Success in medical Research: Avoiding the Pitfalls

Dean Silva highlighted the parameters of success in the realm of Medical research and stressed pitfalls to avoid to make research an ongoing life-long process. He drew examples from his professional career and stressed the importance of embracing the unexpected.

Professional Journey Engaging in Innovation

Associate Dean and Vice President of Academic Affairs, Dean Yang based her presentation on the pursuit of innovation and learning to spot the extraordinary in the mundane.





Basic Sciences Research Awards

Emily Nguyen, Tiffany Shao, Harmanprit Randhawa, Rogelio Molina

Clinical Research Award

Jason Kuan, Cindy Ma, Austin Thompson, Melanie Yoshihara & Karen Lei



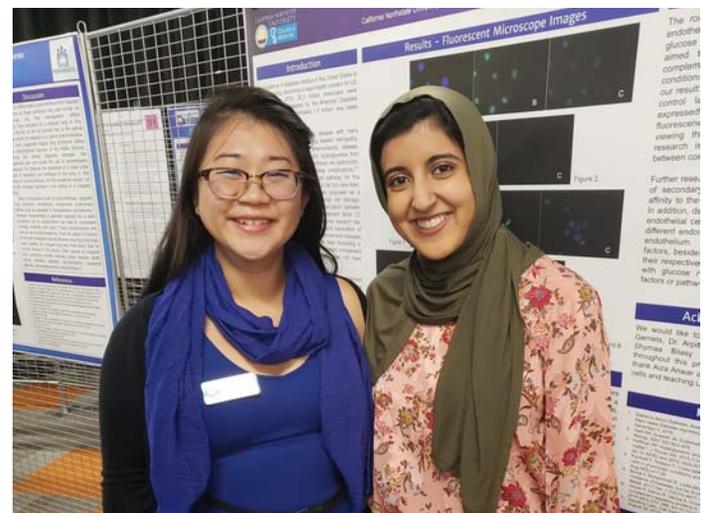
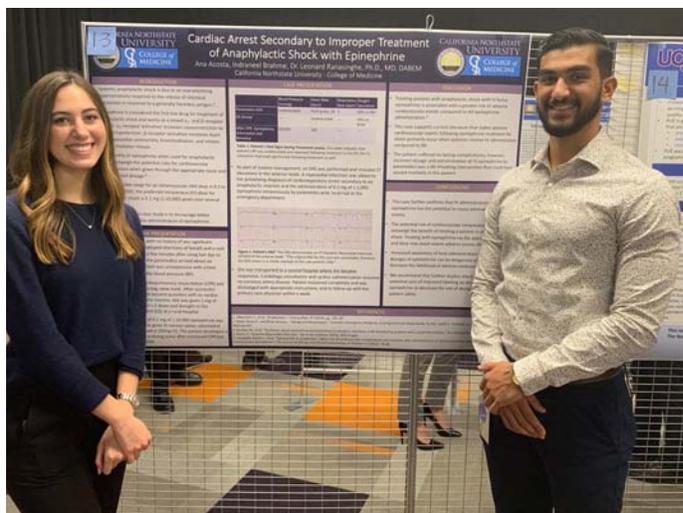
Poster winners:

Andy Lin, Michael Sa, Thong Tieu

Case Report Award

Raven Brower, Venus Shabgahi, Ida Ghlichloo

Congratulations!






 UNIVERSITY OF CALIFORNIA COLLEGE OF MEDICINE
 Rachel Sawada, Tin Ngo, Ryan Dao, Jeckyoung Yiener, The
 California Northstate University College of Medicine, 9700 W. Taron Drive, Elk Grove, CA 95757

Introduction

The incidence of diabetes mellitus in the United States is rapidly growing, becoming a major health concern for US physicians. In 2015, 30.3 million Americans were reported to have diabetes by the American Diabetes Association, with an estimated 1.5 million new cases diagnosed each year.¹

Diabetes mellitus is a chronic disease with many long-term complications, including diabetic retinopathy, peripheral neuropathy, and atherosclerotic disease. Studies have shown that chronic hyperglycemia from diabetes has been linked to endothelial cell dysfunction, many of these complications.^{1,4}

The biochemical pathway for this dysfunction has yet to be fully described. It has been proposed as an endothelial cell damage, an association between complement factor C3 and endothelial cell damage. Additional research has shown that complement-mediated endothelial cell dysfunction and inactivation of complement-mediated endothelial cell dysfunction data illustrating a pathway that has not been fully described.

Results - Fluorescent Microscope Images

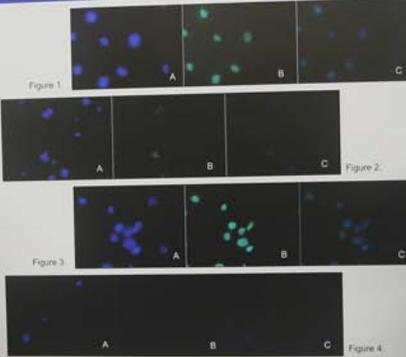


Figure 1. Positive control: LPS treatment with C5b9 antibodies. A) DAPI filter B) FITC filter C) Overlay of A and B

Figure 2. Negative control: 30 mM Mannitol treatment with C5b9 antibodies. A) DAPI filter B) FITC filter C) Overlay of A and B

Figure 3. 30 mM Dextrose treatment with C5b9 antibodies. A) DAPI filter B) FITC filter C) Overlay of A and B

Figure 4. 30 mM Dextrose treatment with C3u antibodies. A) DAPI filter B) FITC filter C) Overlay of A and B

Conclusion

The role of complement activation in endothelial tissue in the setting of hyperglycemia is not yet fully understood. This study aimed to specifically observe complement factors C3c and C5b9 in endothelial cells under conditions with varying amounts of glucose. Our results did not yield conclusive data as control lacked fluorescence, our cells expressed fluorescence, and fluorescence was observed with the FITC filter. Viewing through the DAPI filter. There is further research warranted to discover any relationship between complement activation in endothelial tissue.

Further research may include the use of a secondary antibody, which may be more specific to the anti-C3c or anti-C5b9 antibodies. In addition, due to the sensitivity of the FITC filter, different endothelial cells, such as HUVECs, may be used. Endothelial factors, besides complement factors, may also be investigated with glucose treatments.

We would like to thank Dr. Shymus for his help through this project. Thank you to all the staff and students who helped make this day so special.

Discussion

Upon visualization of HRMECs treated with dextrose solutions, small amounts of fluorescence were detected under the FITC filter for both anti-C3c and anti-C5b9 treatments; however, this is most likely a false-positive result. Given that complement factors C3c and C5b9 do not normally enter the nucleus, antibodies against them should also not localize and lead to fluorescence within the nucleus when viewed under FITC - in contrast to the nuclear staining of DAPI. Additionally, it appears that higher frequency light used to observe DAPI bleaches the cells and results in a false image, as the green fluorescence on FITC was only able to be viewed after viewing the slide through the DAPI filter and respective higher frequency light.

Alternatively, when visualizing cells under lower frequency light with FITC, prior to DAPI, little to no fluorescence was seen, even with cells treated with LPS. This lack of fluorescence could be due to several factors. 1) no C3c or C5b9 bound to the cell surfaces, either due to lack of activation or error in treatment techniques 2) there was inadequate amount of binding of either anti-C3c, anti-C5b9, or primary fluorescent antibodies; or 3) the secondary fluorescent antibodies were not used or were not