



Fall 10-27-2021

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Recommended Citation

Galloway, Kailee, "Patel'23 Research Bird Eyes Using Antibody Staining Techniques" (2021). *News and Events*. 4104.
<https://digitalcommons.iwu.edu/news/4104>

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Patel '23 Researches Bird Eyes Using Antibody Staining Techniques

October 27, 2021

BLOOMINGTON, Ill. — Junior biology major and psychology minor Anjali Patel '23 spent her summer researching blood vessel structures as part of her 2021 Eckley Fellowship project, “Investigating the Development of the Vascular System in Bird Eyes.”

As one of the five 2021 [Robert S. and Nell B. Eckley Summer Scholars and Artists Program](#) fellows, Patel conducted her independent research under the mentorship of Associate Professor of Biology Tyler Schwend.

“Our goal is to observe how and when blood vessels form in the anterior part of the eye. This is of interest to scientists as certain anterior eye tissues are heavily vascularized (e.g. sclera and conjunctiva, the white part of the eye), while other neighboring tissues are completely avascular (e.g. the cornea),” Patel said. “Our long-term goal is to better understand how developing blood vessels arise in the sclera but are kept free from the cornea.”

Patel first became interested in the vascular system of bird eyes after researching in Schwend’s lab the spring semester of her freshman year. Inspired by his research, Patel began to further explore the topic leading to her joining another student’s research project.

Patel stated, “As a freshman I started working with another student researcher’s project on studying how the bones in bird eyes form. The bones, like the blood vessels, arise in the developing eye only in certain tissues. Thus, over the summer, I started to consider whether the same types of regulatory events in the eye that induce bone to form in the sclera, but not the cornea, may also be involved in vascularizing the sclera but not the cornea.”

In order to test this theory, Patel speculated on different techniques to visualize the blood vessel structures.

Patel said, “Over the summer, I tried multiple techniques to stain the blood vessels with a fluorescent tag, so I could view the blood vessels as they enter and expand their vasculature network in the eye. The time afforded to me over the summer enabled me to rule a few techniques out while eventually focusing on one strategy that involved using a blood vessel specific antibody.”

Patel began her research using highlighter ink. The ink was injected into the blood vessels of a developing embryo, suspended within the egg in a bath of albumen and yolk, under a microscope.

“This technique proved to be very difficult to master and replicate the experiment with success,” Patel said. “Through searching the available primary literature, I found an alternative method that involves using a readily available antibody to view the blood vessels.”

Patel is currently working to perfect staining the blood vessels with this technique and move forward with her project.

“In the future, I hope to work out the antibody staining technique that will enable our lab to better study blood vessel development in the developing eye. This will open up many new opportunities for me and other students,” Patel stated.

For Patel, the Eckley program allowed her to conduct independent research for the first time. She stated, “Through this experience, I really learned the importance of resilience and the importance of being able to re-strategize.”



Anjali Patel '23 in the lab.

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Eckley Scholar Jenna Ney '22 is studying abroad in Budapest, Hungary, this semester.

By Kailee Galloway '23