To explore the fascinating world of glycobiology and the crucial role of glycans (sugars) in understanding our immune system, we'll take a closer look at the work of Zainab Hakeem. Zainab is a fourth-year PhD candidate at the University of Georgia in the Department of Biochemistry and Molecular Biology. Zainab conducts her doctoral research in the lab of Dr. Adam Barb, where she studies how natural killer cells in our body use the receptor CD16A to recognize and bind antibodies on abnormal cells and foreign pathogens.

Learn more about Zainab's journey in this interview with here:

Did you always want to be a scientist? How did you get interested in glycoscience in particular? Growing up I was initially drawn to medicine and even thought I wanted to become a doctor in middle school. However, after watching my cousin prepare for and move through medical school, I realized that path wasn't quite right for me. Everything really changed in high school for me, when I had the opportunity to attend a summer science camp where I worked in a research lab and interacted with faculty and lab personnel. That experience sparked my fascination with immunology and showed me the excitement of scientific discovery. Now my doctoral work sits at the intersection of immunology and glycobiology. Before joining Dr. Barb's lab, I had never encountered glycoscience, but I quickly learned how central it is across many areas of biology. Glycans and their modifications are incredibly diverse, and even small changes to a sugar can dramatically alter a protein's function across different organisms. This versatility is what makes glycobiology such a powerful and exciting area of research.

Can you tell me a bit about your journey? Were there any unexpected twists? During the science camp I mentioned, we were taught the importance of networking. Taking that advice to heart, I reached out to one of the faculty members I met at the camp and asked if I could join her lab as a high school student. Although I was only able to come in twice a month, which was not enough time to make progress on a project, I really enjoyed learning about different scientific equipment and experiencing what it felt like to work in a research lab. That early exposure really stuck with me. I then transitioned to college, where I majored in Biochemistry and worked in a yeast lab as an undergraduate researcher. To learn whether research was truly what I wanted to pursue, I joined a post-bac program, which is usually a paid, full-time research training experience designed to help recent college graduates gain hands-on lab experience before applying to graduate school. I did immunology research as a post-bac, and that helped solidify my passion for research and prepared me for my PhD program. I applied to graduate school and decided to pursue my PhD at UGA.

During my rotations at UGA, I was especially drawn to Dr. Barb's lab because it aligned well with my background in immunology while also introducing me to a new challenge: glycobiology. I had no formal training in glycoscience and had not taken any glycobiology courses, so it was a steep learning curve. Much of that process involved teaching myself from the *Essentials of Glycobiology* textbook and learning through hands-on research. While challenging at first, this experience ultimately strengthened my scientific independence and persistence. During this time, I even ended up writing a review on N-glycosylation, a process where sugars are attached to the asparagine amino acids of proteins. Writing this review further solidified my understanding of glycan biology and its relevance across many organisms and human cell types.

How did you know that glycoscience was the right field for you? At first, I didn't know whether glycoscience was the right fit for me. The field was entirely new to me. Over time, I started to see just how central glycans are across so many areas of life science. Now I get genuinely excited to talk with new people about the impact of glycans in immunology—because it's not always something researchers think about right away. I also love being in a niche field; it makes me feel like a bit of a "secret expert."

Is there anything else you think is important for people to know about glycoscience or being a glycoscientist? Glycoscience is so important! It's frustrating that you don't learn about it in undergrad. The chances of learning about it are slim even in graduate school unless you specialize in the field. I like to tell folks that glycoscience is so important that glycoproteins should be a part of the Central Dogma. The glycans on a protein can influence its structure and function. Altered glycan patterns on a protein can result in congenital disorders in human beings. Being able to study and understand these glycans can unlock a world of mystery. Unfortunately, not enough people or scientists know about it, and I think that's really tragic!

Could you tell me some hobbies or interests that you have outside of the lab? I enjoy a lot of artistic hobbies. Outside of the lab, I like to paint, sew, crochet, and make collages. I also enjoy watching movies. My favorite genre is coming-of-age.