To explore the fascinating world of glycobiology and the crucial role of glycans (sugars) in understanding rare diseases caused by altered glycosylation patterns, we'll take a closer look at the work of Dr. Osman Sheikh. Osman is the Associate Director/Principal Investigator of the Bioanalytical Mass Spectrometry Division at Amicus Therapeutics, where he is responsible for overseeing sample analysis and processing of biologics and *in vivo* study samples using various biochemical and bioanalytical assays.

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

Did you always want to be a scientist? How did you get interested in glycoscience in particular? I have always wanted to be a scientist. Growing up, I considered myself a "tinkerer." I would always take things apart around the house – much to my parents' frustration – and I was determined to figure out how they worked by myself. Assuming medicine would be the right fit for my love of science, I continued my education as a Biochemistry major on the pre-med track at the University of Oklahoma. My thoughts on going into medicine shifted after taking upper-level science courses such as Physical Chemistry and beginning my senior research project. For my senior project, I worked in an analytical lab and studied how certain pesticides affected the life cycle of a native insect in Oklahoma. We used pig carcasses as surrogates for human bodies. We sprayed them down with varying amounts of different pesticides and observed how that inhibited or changed life cycle timing. I conducted extractions and ran GC/MS on the collected samples to separate and identify distinct chemical components within a mixture. It was interesting to see the forensic side of things – to work at the interface between forensics, chemistry, and biology. I realized that science offered countless questions to answer and fascinating opportunities to work with advanced laboratory tools. Shortly after, I decided to pursue graduate school at the University of Oklahoma Health Sciences Center. I conducted my PhD in Dr. Christopher M. West's lab, where I worked on cytoplasmic glycosylation in the social soil amoeba *Dictyostelium discoideum*. Through this work, I discovered how uniquely complex glycosylation is, and I became interested in the role of sugars in organismal development and oxygen sensing. Through different collaborations, I met lots of professors over the years, and accepted a postdoctoral training position with fellow glycobiologist, Dr. Lance Wells. Overall, seeing the glyco community and how collaborative it was made me feel comfortable in embracing the unknown within the field. Surrounded by a great group of mentors and collaborators, it felt like a special place to be.

Can you tell me a bit about your journey? Were there any unexpected twists? While interviewing for a graduate school program, I was asked, "Where do you see

yourself in 10 years, do you want to stay in academia or go into industry?" I answered the question by expressing my interest in academia and eventually starting my own laboratory. Since I was focused on an academic path, I made a point of attending the Society for Glycobiology conferences regularly to stay connected with new research in the field, present my work, and network. At the 2018 meeting in New Orleans, I happened to reconnect with a former academic colleague who transitioned into the biotech industry and was creating his own research group at Amicus and expanding his team. Based on the skill set that I had, he told me I would be a great fit in his group. After consulting my mentors and family, I decided I wanted to try my hand in an industry setting. Luckily, Amicus works on a lot of different glycoproteins and I was comforted by the fact that I wasn't transitioning completely away from glycobiology. There aren't many companies that focus on glycosylation. While it impacts a protein's biological function and therapeutic capabilities, glycans are considered technically challenging to analyze. Companies developing therapies using biologics have typically focused on analyzing a protein's amino acid structure instead. I got lucky to work for a company like Amicus that appreciates the importance of glycobiology, and what it means to develop treatment for people living with a rare disease related to defects in glycosylation.

How did you know that glycoscience was the right field for you? I knew that glycoscience was right for me from speaking to other scientists. When I would tell them that I studied some sort of glycosylation pathway or a specific glycoprotein, nine times out of ten, folks would say, 'Oh, yeah, I don't care about that" or "I don't understand the glyco aspect of things." Many people overlook glycosylation, so they don't bother studying it. By neglecting the study of glycosylation, they may completely miss how important it is. I wanted to be a person that understood that process and become an expert in this field. I think this mindset comes from my curious, tinkering self. Glycoscience offers a special place for me to study something important that is mostly unknown, building on the remarkable work that was done by the pioneers of the field.

Is there anything else you think is important for people to know about glycoscience or being a glycoscientist? Learn to ask the right questions! My time as a grad student and postdoc really taught me to think logically about the right questions to ask. Sometimes, when there is a process we encounter at work, I often ask myself how I can relate this new and unknown concept to something I am familiar with. So, a major takeaway is learning how to ask the right questions and, if you find you are asking the wrong ones, being able to think outside of the box and pivot.

Could you tell me some hobbies or interests that you have outside of the lab? Outside of the lab, I'm a musician! I play a few different instruments, but I really enjoy playing the guitar. I've been playing for a long time and have an extensive collection of

guitars in my basement. As I mentioned, I'm also a tinkerer, so one thing that I'm passionate about is working on cars. I've worked on all types of car maintenance with my father, trying to understand the inner workings – from the mechanical side to the computational or automated side of things. I also really enjoy spending time with my amazing wife, Meagan, and my 11-year-old son, Jacob.