How would you explain the main findings of your paper in lay terms?
Glycosylation is one of the most abundant protein modifications and its composition varies at different stages of development; this is the reason why several glycoproteins are currently used as biomarkers in various biological contexts. However, the molecular function of glycosylation and its relationship with intracellular signaling is still poorly understood. Using mouse embryonic stem cells (mESCs), which can give rise to all organismal tissues and thus are pluripotent stem cells, we observed that a specific structure of the mucin-type O-glycosylation, namely T antigen, is essential for the maintenance of the mESC pluripotent state by directly modulating Wnt signaling. Importantly, mucin-type O-glycosylation and Wnt signaling dysregulation are known hallmarks of cancer. Thus, our findings have significant implications for developmental biology research and novel therapeutic approaches.

Were there any specific challenges associated with this project? If so, how did you overcome them?
Since the very early stages of this project, I could observe that reduction in the T antigen structure upon C1GalT1 knockdown resulted in the differentiation of mESCs. Nonetheless, to mechanistically define the connection between the observed mESC differentiation and the signaling involved was a completely different task that took an extensive revision of the existing literature and many pilot experiments.

When doing the research, did you have a particular result or ‘eureka’ moment that has stuck with you?
I think that one of the main turning points in this project was the identification of Wnt receptor frizzled-5 as a T antigen carrier. I still remember how thrilled I was about sharing this finding with my mentor when, condition after condition and replicate after replicate, I observed that frizzled-5 precipitated.

Why did you choose Journal of Cell Science for your paper?
We chose Journal of Cell Science because we wanted a high-quality journal specialized in providing mechanistic insights into fundamental cell biological processes that would reach a broad audience of biologists.

Have you had any significant mentors who have helped you beyond supervision in the lab? How was their guidance special?
I am particularly grateful to my supervisor, Shoko Nishihara, both for the incredible help and guidance in terms of insightful scientific discussion, and for being very patient and supportive during my first years in Japan, when I was adapting to the new working and cultural environment. To know that she believed in me despite my shortcomings and that I could count on her straightforward guidance has been a tremendous source of encouragement that pushed me to do my best.

What’s next for you?
During my graduate studies in developmental biology and glycobiology, I developed a strong interest in understanding the molecular mechanisms underlying mammalian development and plasticity of stem cells. This inclination directed me to Professor Torres-Padilla’s laboratory at the Institute of Epigenetics and Stem Cells, Helmholtz Zentrum München, where I am hoping to do my postdoc.

Why did you choose Japan for your PhD studies?
Coming from Europe, my decision to pursue a master and a PhD in Soka University of Japan may sound odd. The reasons behind this decision lie in my desire to challenge my limits and for the deep respect that I feel for Soka University’s founder, Dr Daisaku Ikeda,
whom I consider my role model and mentor in life. Looking in retrospect, going to Japan for my graduate studies was a very decisive choice for my career. I believe that in the early stages of the research career, it is crucial to actively seek challenges and opportunities to develop ourselves.

Reference