

***TO: Nakatani Foundation***

## **Nakatani RIES 2024 Final Report**

**Your Name:** Karolina I. Mercado Ruiz

**Your university:** Osaka University

**Host Lab in Japan:** Matsuoka Lab (Cutaneous Allergy and Host Defense)

### ***Meaning of Nakatani RIES Fellowship:***

The Nakatani RIES Fellowship has been one of the best experiences of my life and academic career. It was an extraordinary opportunity not only for conducting hands-on research and expanding my scientific knowledge, but for immersing myself in the rich and beautiful culture of Japan. What really made the program special, though, were the amazing people I met along the way—mentors, lab members, and fellow students—who made every moment meaningful. I learned so much, not just in the lab, but about myself and the world around me. This experience has truly shaped how I see my future, and I'll always be grateful for everything it gave me.

### ***My favorite experience in Japan was...***

My favorite experience was our very first week. Although it was short compared to the roughly 70 days we spent in the country, it stands out in my memory as one of the most impactful parts of the program. It introduced me to so many new people, many of which I am very lucky to now call friends. Meeting the US fellows and getting to explore Tokyo together was very fun and helped me meet people that I might never have met otherwise, even though all of us came from the same university and department. As a student at Georgia Tech, life beyond freshman years can often become hectic and making new friends can be difficult, which is why I truly enjoyed connecting with them through our shared experience in Japan. Later, that weekend, during our program trip to Gotemba, we were introduced to the JP fellows and several JP alumni. Even though they had just met us, all of them were so welcoming and eager to get to know us and share their culture. Their kindness and energy made a strong impression on me, and it was clear how much thought the Nakatani Foundation puts into building international connections and making all the fellows feel comfortable from the start.

### ***Before I left for Japan, I wish I had...***

I wish I had done a bit more research on lesser-known places to visit beyond the popular tourist spots featured on social media. While I was lucky to explore many amazing parts of Japan, some areas were crowded and a bit hectic. Discovering more hidden gems would've made the experience feel even more personal, but honestly, that just gives me another reason to return in the future. I also wish I had put more time into learning the language beyond the classes provided. Japanese is complex, and at times it felt overwhelming and intimidating. Still, listening closely to locals and asking about words in context helped me pick up useful phrases that I used throughout the summer. And finally, packing! I'm definitely a severe over-packer and ended up bringing things I never even used. Looking back, I wish I had packed lighter and more strategically, especially since there are so many fun and unique things to buy in Japan.

***While I was in Japan, I wish I had...***

Explored the Osaka University campus and the activities it had to offer more in depth. Since my lab was closer to the university hospital, it was a bit far from the areas where most students spent their time. As a result, I mostly stayed in that area or near the other fellow's building. After lab hours, I was usually very eager on exploring the city since it had so much to offer that I unintentionally overlooked the opportunity to get to know the campus better, even though it was more accessible to me. In terms of cultural and touristic aspects, I would have liked to participate in a traditional tea ceremony and attended a baseball game since the sports culture is very big in Japan.

***Research Internship Overview:***

My research project was centered on investigating the immunomodulatory effects of UVB radiation on skin health, with a focus on vitamin D synthesis and tissue repair mechanisms. Our aim was to understand how cutaneous vitamin D3 synthesis, induced by UVB exposure, influences skin healing following injury using neonatal mouse models. We also analyzed gene expression markers related to inflammation, tissue remodeling, and immune regulation, such as *VDR*, *TGF-β1*, *MMP9*, and *WNT5A*, to identify potential pathways through which UVB exposure can modulate healing outcomes. This experience greatly aligned with my future academic interest of becoming a physician since most of the members in my lab were practicing dermatologists conducting clinically relevant research. Working in an international research setting was surprising in the sense of sterile techniques used and the overall work ethic compared to my lab at Georgia Tech, but these differences helped me grow more adaptable and appreciative of diverse research approaches. Although I was not familiar with dermatological research, I am very grateful to have learned more about vitamin D metabolism and the pathophysiology of skin inflammation and regeneration. Finally, I hope to apply the new wet lab skills I gained into my future academic career.

***Lab Environment Overview:***

Compared to my lab at GT, the Matsuoka Lab felt smaller in terms of both the number of members and student involvement. One of the most surprising differences I noticed was that in Japan, undergraduate students typically do not join research labs until their fourth year. As a result, the environment lacked the constant presence of similarly aged peers that I was accustomed to. However, the smaller lab fostered a friendly and welcoming atmosphere. Everyone in the lab was exceptionally kind and approachable. This environment made it easy for me to get to know everyone on a personal level and feel truly integrated into the team. I always felt comfortable asking questions, and I appreciated how genuinely invested they were in making sure I had a good educational experience. Unlike the other U.S. fellows' labs, most members of my lab were physicians pursuing their Ph.D. degrees. This meant that several of them, including my mentor, had clinical duties throughout the week. It was interesting to see this dual commitment to patient care and research, especially since in the U.S., MD/PhD follows a more structured and separated path. Because of their clinical schedules, I had the opportunity to be mentored by multiple members of the lab. Everyone offered different perspectives and expertise, enriching my learning experience throughout the summer. Beyond the research setting, the Matsuoka Lab did so much to make me feel welcome. I am incredibly grateful for the many cultural experiences they shared with me—from visiting the EXPO and exploring Kyoto together, to introducing me to new foods like yakitori, yakiniku, and soba, and singing karaoke late into the night. Their enthusiasm in helping me experience Japanese

culture made my time in the lab even more memorable. I will miss them dearly.

### ***Daily Life in Japan:***

During weekdays, my daily routine started with making breakfast and deciding how to get to the lab. Since our housing was located a bit far from campus, I usually chose between biking or taking a bus followed by the monorail. If it was raining or extremely hot, I'd take public transportation, but on calmer days, I preferred biking, the peaceful, scenic ride became one of my favorite parts of the day. Once I arrived at the lab, I'd work on experiments, discuss progress with my mentors, chat about my adventures in Japan with my coworkers (often with the help of Google Translate), and join them for lunch either in the office or at the cafeteria. I genuinely enjoyed this consistent rhythm and the sense of belonging it brought.

In the evenings after lab, I would often go into the city to explore sometimes with Noah, the other US fellow in Osaka. Many times, we set out with a plan, like a fun evening with Reina and the other JP alumni/fellows. Some of the things we did together were a sushi making class in Namba, explore the lively izakaya-filled streets of Tenma, and fun dinner nights around Umeda creating memories that I will cherish forever. Other nights, I hopped on a train alone without a fixed destination, simply seeing where the evening would take me. Living in a vibrant city like Osaka taught me how fun spontaneity can be and some of my favorite discoveries came from those unplanned adventures.

On weekends, I spent most of my time by traveling across Japan. Whether with the U.S. fellows or with my family during their visit, I was able to explore Okinawa, Hokkaido, Kobe, Nara, Kyoto, Tokyo, and Himeji. Each place offered something unique like history, local flavors, and beautiful scenery. While the constant travel was tiring at times, it gave me some of my most memorable experiences of the summer and showed me just how diverse and culturally rich Japan truly is.

### ***Experiences with Japanese Culture:***

One of the most meaningful parts of my time in Japan was witnessing how generosity, hospitality, and respect are deeply woven into everyday life. Whether it was a nice greeting at the *konbini*, strangers offering help when I looked lost at a train station, or Japanese students kindly offering to carry my bags, I consistently felt a sense of care and thoughtfulness in every interaction. These small gestures made me feel welcomed and valued, even as a foreigner navigating an unfamiliar environment. I was also struck by the remarkable discipline and order that characterize Japanese society. From the punctuality of the trains, the unspoken etiquette in public spaces, and even the presentation of even the simplest meals, there is a collective mindfulness and respect that shapes how people move through the world. It was humbling and inspiring to witness such a deep commitment to social wellbeing.

However, the most profound cultural lesson I took away came from a tour guide in Kyoto who introduced me to the concept of *ichi-go ichi-e*, meaning "one time, one meeting." This philosophy emphasizes the fleeting nature of each moment and encourages us to treat every encounter as unique and a once-in-a-lifetime opportunity. Leaving Japan was bittersweet; I felt a deep sense of nostalgia and gratitude for the incredible learning experiences and the amazing people I had met. But *ichi-go ichi-e* reminded me to cherish those moments not as something lost, but as something deeply meaningful that I was fortunate enough to experience.

Ultimately, this program not only taught me about Japanese culture, but also helped me grow as a person. I learned to slow down, to be more patient, and to approach life with a greater sense of appreciation. I'm truly grateful to have been part of such an incredible experience.