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CUSTOMER INTERVIEW

Curiosity, Collaboration, and Single Cells: A PhD Journey in Biological Research

Introduction

Roxy carries out her PhD at the the Prinses Máxima Center Netherlands, in the co-led research lab of Dr. Benedetta Artegiani and Dr. Delilah Hendriks, whose lab has a strong focus on human organoids, development and cancer modeling. Roxy has strong expertise in developing human organoid-based cancer models utilizing state-of-the-art genetic engineering techniques and she is specializing in dissecting tumor dynamics through, among others, single-cell and bulk RNA-seq approaches.

Roxy Finger
Prinses Máxima Center for Pediatric Oncology in Utrecht, Netherlands

Interview

Could you please tell us your full name and title?

My name is Roxy Finger, and I am a PhD student at the Prinses Máxima Center for Pediatric Oncology in Utrecht, Netherlands.

Can you describe your PhD research?

I work on several projects, but one of my main research focuses is on the onset of high-grade gliomas. These are very rare but aggressive brain tumors. My goal is to understand where intratumoral heterogeneity and spatial variability come from, as these features are frequently observed in the clinic.

Why is single-cell sequencing important for your research?

There is a high level of intratumoral heterogeneity in these tumors. While bulk RNA sequencing can reveal differences at a mutational or transcriptomic level, it cannot fully resolve heterogeneity within a tumor. Single-cell sequencing allows us to disentangle these differences at the cellular level, which is critical for understanding tumor biology.

Why did you decide to adopt Illumina single-cell technology for your work?

We study high-grade gliomas, which involve brain cells that are very large and have long protrusions. Microfluidic-based systems can cause these cells to get stuck, potentially skewing the data. Illumina's single-cell technology does not rely on a microfluidic device, which made it particularly suitable for our project.

What did success look like when you started the project, and how has that changed?

Initially, success meant identifying differences between tumors with different mutational backgrounds. While we expected those differences, we did not anticipate finding such strong heterogeneity within our organoid models. Discovering this and being able to investigate it further using single-cell sequencing has been a major success for us.

How would you explain single-cell sequencing to another PhD student?

I would explain single-cell sequencing as starting with a cell suspension that is partitioned into barcoded droplets. These barcodes allow each cell's RNA to be reverse-transcribed and sequenced individually, enabling analysis at single-cell resolution rather than as a bulk population.

Looking five years ahead, how do you see single-cell technologies evolving?

I hope single-cell technologies will become more standardized. Ideally, it would be easier to integrate patient-derived single-cell data with our own organoid datasets. Streamlined and standardized pipelines would make it much easier to combine and compare data across studies.

What technological breakthroughs would you like to see in the future?

I would like to see more integration of multiomics approaches. Combining single-cell sequencing, bulk RNA sequencing, and spatial technologies into unified pipelines would make it much easier to dissect complex biological systems at multiple levels.

What inspired you to pursue a career in life sciences and genomics?

During my bachelor's and master's studies, I really enjoyed wet-lab work and uncovering new biological insights. I became particularly interested in oncology, especially pediatric oncology, which differs significantly from adult oncology. That combination ultimately inspired me to pursue a PhD in this field.

What motivates you to continue your work every day?

My motivation comes from my curiosity about biology and my interest in understanding disease mechanisms at a fundamental level. That drive keeps me motivated to go to the lab every day and continue my research.

What are you most proud of so far, and what do you hope to achieve in the future?

Personally, starting and continuing my PhD is my biggest achievement. It is not an easy path, but I am proud that I stay motivated and give my best every day. In the next five years, I hope to complete my PhD soon, earn my doctorate, and continue working in this field.

How important is collaboration in your work?

Collaboration is extremely important in wet-lab research. Experiments are time-consuming and expensive, and different labs have different areas of expertise. Collaborating allows us to share knowledge, resources, and pipelines, which ultimately drives science forward more efficiently.

How are you leveraging next-generation sequencing (NGS) in your research?

Sequencing is central to my work because we focus on fundamental biological research. NGS allows us to study disease mechanisms at the molecular level-down to DNA and RNA-rather than relying only on higher-level observations. It enables us to truly dive into the cell itself.

What message would you share with others who are just starting their PhD journey?

I would tell them that they have already achieved a lot by choosing to develop themselves further. It's important to remember why you started your PhD in the first place and to reconnect with that motivation every day-it really helps you keep going.

Learn more

Illumina Single Cell Technology