



# Immunology Center of Georgia researchers use pioneering technology to explore elusive role of neutrophils in bladder cancer

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**AUGUSTA, Ga.** (Jan. 9, 2024) – Researchers at Augusta University's [Immunology Center of Georgia](#) (IMMCG) are taking advantage of revolutionary technology to investigate the role of neutrophils in the spread of bladder cancer.

[Peipei Zhu](#), PhD, is an assistant professor with IMMCG, a center within the [Medical College of Georgia](#). A leading immunologist in the field of neutrophil heterogeneity, Zhu leads a team of researchers now armed with a grant supported by biotechnology company [NanoString](#), in collaboration with the [Georgia Cancer Center's Integrated Genomics Core](#).

Zhu's study, "Neutrophils Orchestrate Local Immune Response to Promote Urothelial Carcinoma of the Bladder (UCB) Pathogenesis," delves into the complexities of neutrophils, a challenging cell type to capture in real time.

NanoString's [CosMx Spatial Molecular Imager](#), a cutting-edge platform for spatial transcriptomics, provides the key to deciphering these elusive cells, Zhu said.

"This technology is a game-changer," Zhu said. "Its ability to unravel the mysteries of neutrophil behavior in real-time helps us spot these cells at the right time, which is almost like 'ghost-hunting.' We can now capture these cells at the right moment and witness the changes in gene expression — a feat previously thought impossible."

The CosMx Spatial Molecular Imager allows scientists to explore the world of cells by creating detailed maps of gene and protein activity. It acts like a high-tech microscope, providing a unique ability to see and quantify the specific molecules in cells, helping researchers understand how they function and communicate in diseases like cancer.

Neutrophils, described by Zhu as "tricky cells" that can be transient and deceptive, are a type of white blood cell that act as the immune system's first line of defense. Her research aims to capture these cells at the precise moment when they play a crucial role in the immune response.

For this study, Zhu will collaborate with [Vinata Lokeshwar](#), PhD, chair of MCG's Department of Biochemistry and Molecular Biology and a renowned specialist in treating bladder cancers, to demonstrate the cellular and molecular targets of neutrophils using tissue samples from bladder cancer patients.

Zhu plans to examine surface protein expression, gene expression and the specific locations of different cell types. This enables researchers to observe how cells interact, communicate and influence their microenvironments in real-time — a feat previously unattainable, Zhu added.

The collaboration supports Zhu's research by providing funding for essential reagents and access to state-of-the-art technology.

"Martina Zoccheddu, PhD, director of the Integrated Genomics Core, and her team are instrumental in advancing our research capabilities," Zhu said. "Their proactive approach, from initiating collaborative grants to providing technical support, demonstrates a commitment to fostering cutting-edge research at Augusta University."

Anticipated outcomes of the research include a comprehensive understanding of neutrophil behavior in UCB and potential applications in other diseases, such as head and neck cancer, heart disease and aortic aneurysms, Zhu added.

Zhu's project also presents an opportunity for education and training, providing a platform for students and early-career researchers to engage with cutting-edge technology and contribute to groundbreaking scientific discoveries.

"This research is a springboard for future exploration," Zhu said. "The technology opens doors to new possibilities, and I envision furthering our understanding of immune responses and cell dynamics in cancer and many other diseases."

As new technology continues to unveil microscopic landscapes and decipher the intricate dance of cells in real-time, Zhu's research promises not only to reshape our understanding of UCB, but also to influence the future trajectory of cancer research and immunology.

"At the Immunology Center of Georgia, we believe in pushing the boundaries of scientific exploration," said [Klaus Ley](#), MD, founding co-director of IMMCG and associate director of Georgia Cancer Center Shared Resources. "Dr. Zhu's research, powered by the newest technology and supported by campus collaborations, exemplifies our commitment to providing researchers with the tools and resources needed to pioneer new frontiers in immunology."

By uncovering the hidden details of neutrophil interactions, Zhu's work is poised to contribute significantly to advancements in urothelial carcinoma research, Ley added. Insights into neutrophil behavior and immune responses could also influence future clinical approaches and research directions in the broader field of oncology and immunology.

"Beyond unraveling the intricacies of UCB, Dr. Zhu's research has potential to reshape how we approach cancer and immunology research," Ley said.

**Download:** [Photos of the researchers.](#)

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