

PEOPLE & IDEAS

Xiaoyu Hu: Let the data guide you

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Xiaoyu Hu is a professor and director of the Institute for Immunology at Tsinghua University. Her lab is interested in understanding the molecular mechanisms underlying the transcriptional, translational, and metabolic mechanisms of the key cell types involved in host defense and inflammatory responses: macrophages and intestinal epithelial cells (IECs). We recently spoke with Xiaoyu about her current work, the benefits of a multidisciplinary team, and how being part of journal editorial boards brings her intellectual stimulation and inspiration for her own lab.

Please tell us a little about yourself and how you first became interested in science.

I was born and raised in Shanghai, spending my early childhood in the narrow alleys of an old neighborhood. My life took a turn when we moved to Beijing, following my parents' job relocation. It was during my years at Peking University middle school and high school that I first encountered the world of science. These schools provided ample free time after classes, which I spent engaging in various student-organized interest groups. These groups covered a wide range of topics, from physics and chemistry to biology and literature, and were a hub of active and enthusiastic learning. This environment left a lasting impression on me, shaping my perception of science as a field of fun and exploration, rather than simply hard work. I realized that curiosity is not just a fleeting interest, but an enduring force that can guide one through the sometimes-tedious world of scientific inquiry.

Tell us about your career trajectory, and what led you to becoming a group leader.

I am eternally grateful to Dalong Ma, who supervised my undergraduate research in his lab at Peking University Medical Center. In the mid-1990s, his lab was among the few in China capable of conducting molecular immunology experiments. It was here,

doing my undergraduate project of constructing a plasmid expressing interleukin-2, that my passion for immunology was cemented—it was love at first sight. This passion led me to New York City for my PhD study, where I was fortunate to be guided by my mentor Lionel Ivashkiv and committee members including Carl Nathan.

While enjoying my time in New York City, I encountered an unexpected yet transformative opportunity with the establishment of the Institute for Immunology at Tsinghua University (IITU) in 2014 by Chen Dong. I was privileged to be among the immunologists who joined this newly minted institute and have witnessed its growth. In China, there's a saying that translates to "do not forget the well digger when you enjoy the drinking water." This year marks the 10th anniversary of IITU, which has evolved into one of the premier immunological research entities in Asia and serves as a hub for bridging Eastern and Western immunologists. Despite the inevitable twists and turns, the experiences, laughter, and tears at IITU have forged a shared treasure and cherished memory for all of us who have been part of this remarkable decade-long journey.

How did you first become interested in studying host defense and inflammatory responses?

Working under Lionel Ivashkiv was an extraordinary part of my journey. He taught



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me that the heart of research is its power to make a real difference in patients' lives. This lesson has stayed with me and continues to guide my work today. I remember Lionel, clad in a suit and tie after his clinical service, heading straight to the darkroom to examine the gels I had just developed. He never made extravagant statements about how human immunology should be conducted. Instead, it was his transition between a bustling life as a physician and lab work that epitomized the achievements possible for a true physician-scientist. Although my path diverged toward research after receiving

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my medical degree, precluding me from practicing medicine, Lionel's accomplishments illuminated a clear path that understanding human inflammatory diseases through rigorous scientific inquiry is not only feasible but also exciting.

What are you currently working on and what projects are you most excited about?

My research over the past decade has centered on the critical role of myeloid cells in maintaining homeostasis and their involvement in various inflammatory processes. The primary focus has been on macrophages, delving into the mechanisms of macrophage activation and function, as well as exploring the biology of tissue-resident macrophages. While my lab continues our journey in understanding macrophage biology, my interests are increasingly drawn toward other myeloid cell populations that have not been as extensively studied yet. Currently, what excites me the most is investigating the role of mast cells in both physiological contexts and in disease settings. This shift represents an exciting new direction for our research, offering the potential to unravel novel aspects of myeloid cell biology.

Please tell us about some work in your field that you are currently interested in.

Recently, I've been captivated by the resurgence of interest in granulocyte research. Granulocytes, being evolutionarily ancient and predating the emergence of the adaptive immune system, evidently play crucial and conserved roles in a variety of physiological and pathological conditions. I am convinced that there are still undiscovered aspects of granulocyte biology waiting to be explored, aspects that I believe will significantly excite the immunological community in the years ahead.

What are some of the qualities that you learned during your graduate studies or postdoc that you maintain and foster in your own lab?

I learned to be open-minded on what to discover from the experiments conducted. Let the data guide you, not the other way around. This will increase the likelihood of making genuine discoveries. I encourage my students and postdocs to be adventurous and not to be too tethered to my hypotheses, which, to be honest, are wrong about 90% of the time. The

trainees are thus fully immersed in the joy (and pain) of scientific discoveries and not simply acting as extra pairs of hands for their PIs [principal investigators]. While the "extra pair of hands" approach might seem efficient initially, I believe that in the long run, it is detrimental for unleashing creativity from young and talented minds.

I can see that you did your PhD, postdoc, and assistant professorship in New York. Scientists are often told that moving countries is beneficial for their careers; did you find this to be true in your case? Would you offer the same advice to your graduate students?

It is certainly true in my case. I would highly recommend my trainees to venture aboard and to expose themselves to different cultures. After spending a considerable amount of time in New York City, a melting pot of diversity, one striking realization was not about how people from various backgrounds differ, but rather how similar they are, regardless of race, belief, gender, and other factors. In fact, we are genetically one single species. People from all walks of life share common emotions—they relish the taste of good food and wine, feel joy when their views are appreciated and respected, and experience distress when faced with discrimination and isolation. This understanding speaks to me that equality is not just a slogan but a daily practice in how to interact with trainees, colleagues, and superiors.

I'm interested in your work of serving on the editorial board for different journals; this sounds like a big commitment in addition to your roles as a PI and director. What do you feel you get out of this work?

Serving on the editorial boards of various journals is indeed a significant commitment. However, I need continuous stimulation from new ideas and inspirations, and without these, I tend to feel a sense of boredom. Being part of an editorial board offers me that much-needed intellectual stimulation. There is a limit to what a single lab can achieve without overextending itself. So, having the opportunity to engage with the latest research from brilliant minds around the world is not only stimulating but also deeply satisfying. I've found that this role offers a sort of escape or relief from the daily rigors and chaos of my primary work.

As a follow-up question, the publishing industry is undergoing many changes, and over the coming years will need to adapt to challenges such as the use of AI and ensuring open access. Is there anything you'd like to change or something you'd like to see happen in academic publishing in the future?

In our discussions with colleagues, the term "story" frequently comes up, as in the phrase, "I have a nice story to pitch to journal x." Over time, I've grown increasingly bothered about the implications of this term. The notion of a story suggests that research should unfold like a children's book, complete with a clear beginning, a climax, and a "happily ever after" ending. However, as immunologists, we recognize the complexity and challenge of advancing our field. Real discoveries often don't follow this neat narrative arc; they might lack an engaging start, a dramatic high point, and typically don't have a fairy-tale conclusion. Ideally, the scientific community and publishers should embrace and even promote findings that don't fit this storybook mold. Honestly, being a player in the game myself, I must admit that I do not have sufficient wisdom finding a solution to this issue. The *Journal of Experimental Medicine*, for instance, has a long-standing tradition of valuing the core significance of research and highlighting groundbreaking discoveries. My hope is that the journal will continue to uphold these values, fostering a more inclusive and realistic approach to scientific publication.

What do you most enjoy about your work as a group leader?

What I find most rewarding about being a group leader is the exchange of ideas among individuals with diverse expertise. My lab members came from various disciplines such as stem cell, neuroscience, cardiovascular research, and veterinary medicine. I learn as much from them as they do from me, and this mutual learning process is truly a joy.

While not in the lab, how do you like to spend your time, or alternatively, how would you like to spend your time?

The priority is to get enough sleep. With that accomplished, I am a soccer fan and would love to watch live soccer games in various European cities.