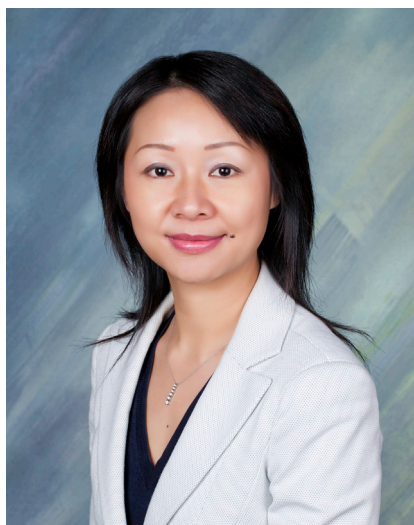# Lili Yang

Lili Yang is an associate professor of microbiology, immunology, and molecular genetics at the University of California, Los Angeles (UCLA). She and her colleagues developed allogeneic HSC-engineered iNKT cells for off-the-shelf cancer immunotherapy. In this Q&A, she describes her research journey and her opinions about the cancer immunotherapy research field.

Biography

Lili Yang received her PhD degree in biology/immunology from the California Institute of Technology (Caltech), studying with David Baltimore. She joined UCLA in 2013, and since then has been running the Yang Engineering Immunity Lab (https://www.liliyanglab.com) studying tumor immunology and cancer immunotherapy, with a special focus on stem cell-based and gene-engineered immunotherapy for cancer. Her work has resulted in over 50 peer-reviewed research publications, over 20 patents, 2 clinical trials, and 2 biotech startups. For the recognition of her scientific achievements, Lili Yang has received multiple prestigious awards, including a TR35 (Innovators Under 35) Award from the MIT Technology Review Magazine, a Director's New Innovator Award from the National Institute of Health (NIH), and an Outstanding New Investigator Award from the American Society of Gene & Cell Therapy (ASGCT).

Can you tell us about your research?

My research centers on deciphering the cellular and molecular mechanisms controlling antitumor immunity and exploiting this knowledge to devise the next generation of cancer immunotherapies. My research lab at UCLA, the Yang Engineering Immunity Lab (https://www.liliyanglab.com/), currently has two active research directions: (1) to identify new immune checkpoints and develop new immune checkpoint blockade (ICB) therapies for cancer and (2) to develop stem cell-engineered "off-the-shelf" CAR-iNKT cell therapy for treating a broad range of blood cancers and solid tumors.

Lili Yang
University of California, Los Angeles

How did you become interested in your field?

I was born in a family of engineers; both of my parents are electrical engineers, so I guess they have imprinted the engineering instinct in my genes. I became fascinated by biology when I was in middle school and became especially attracted by the subject of immunology when I was in college. This motivated me to pursue a PhD in Immunology at Caltech studying with David Baltimore, a Nobel laureate recognized for his many ground-breaking discoveries in modern molecular biology and immunology. During my PhD study, around the year 2000, cancer immunotherapy achieved several remarkable breakthroughs, including the successes of ICB therapy and CAR-T cell therapy. I saw a perfect combination of my engineering instinct and immunology interest and decided to develop my research career in the field of cancer immuno-therapy with a focus on gene and cell-engineered cancer immunotherapy.

What is one thing about your work that you love?

New scientific discovery. Curiosity is my biggest motivation, and that "wow" moment witnessing a scientific discovery is the one thing I love most about my work.

What are some of the challenges you face in your field?

The translational aspect of the cancer immunotherapy field, bringing a scientific discovery from bench to bedside, is the most exciting aspect, but it also presents the most significant challenges. One such challenge is the lack of ideal preclinical research models to faithfully predict the clinical outcomes of a new cancer immunotherapy: this brings many uncertainties at the stage of clinical translation. Other challenges include the cumbersome regulations, expensive costs, and the extremely long process (usually over 10 years) to translate a new cancer therapy, especially a gene and cell-based therapy. These challenges pose a considerable gap between scientific discoveries and their therapeutic applications in the field of cancer immunotherapy.

What do you see as the future for your field?

The field of cancer immunotherapy is booming, which will be further accelerated by rapid scientific and technological developments, such as big data and omics technologies, bioinformatics, and new gene editing tools. I would expect to see many new cancer immunotherapies being developed and benefiting many cancer patients in the coming decade.

Why did you choose to publish in a translational journal?

As mentioned above, I consider the translational aspect to be the most exciting aspect of my cancer immunotherapy research, so I see it as a perfect fit to publish my research in a translational journal.

Can you share a humorous moment from your lab or the course of your research?

My lab recently generated a set of electronic microscopy images showing our engineered allogeneic "off-the-shelf" HSC-iNKT cells attacking human tumor cells. We posted one of the images in the lab and challenged our random visitors about its content. We received many fun guesses: "blueberry on a snail," "alien creatures," etc. When they were told about the right answer, they were shocked by the incredible power and promise of cell-based cancer immunotherapy.