The Georgetown-Howard Universities Center for Clinical & Translational Science

2025 KL2 Mini-Symposium Series:

Skin Stem Cells: Coping with Stress

Dr. Elaine Fuchs

Georgetown University Medical Center
Warwick Evans Conference Room, Building D
4000 Reservoir Rd, NW, Washington DC 20007

February 25, 2025
12:00PM-1:00 PM

KEYNOTE SPEAKER

Elaine Fuchs, Ph.D., Howard Hughes Medical Institute, The Rockefeller University, New York, NY USA. Elaine Fuchs is renowned for her research in skin biology, its stem cells and associated disorders, including cancers and inflammation, and has published >380 manuscripts. She received her Ph.D. from Princeton, postdoctorate at MIT, and has been faculty at University of Chicago and now Rockefeller University, where she is an Investigator of the Howard Hughes Medical Institute. Her awards include the National Medal of Science, L'Oreal-UNESCO Award, International Society for Stem Cell Research Innovation Award, the Gairdner International Award and the Franklin Medal. Fuchs holds membership in the National Academy of Sciences, National Academy of Medicine, American Philosophical Society, Pontifical Academy of Sciences, and the Royal Society.

ABSTRACT

During my graduate studies at Princeton, I heard a seminar by a professor at MIT, who was able to culture cells from human skin that could be passaged many times and still make skin. He called them keratinocytes, but these were the first stem cells ever to be cultured. Our adult stem cells are what enable our tissues to make and repair themselves. In the skin, our epithelial stem cells are responsible for making hair and for producing and maintaining the barrier that keeps harmful microbes out and retains our body fluids. The skin is our first line of defense between the body and the outside world, and as such, its stem cells must withstand the daily barrage of assaults our skin is subjected to, including scrapes and scratches, the sun's UV rays, pathogens, toxic chemicals and extremes in temperature. A skin stem cell's longevity and capacity for proliferation also makes these special cells vulnerable to accumulating mutations that can ultimately give rise to skin squamous cell carcinoma, one of the most common and potentially life-threatening cancers world-wide.

I went to MIT to train with this professor, and in my own laboratory, we have been dissecting the molecular mechanisms that underlie these various features of the skin and its stem cells. We use high throughput, state-of-the-art technologies to uncover their mysteries—How do our stem cells provide us with a brand new body surface every 4 weeks time? How does a wound heal, and how do the stem cells know when the wound is healed? In common chronic inflammatory disorders like psoriasis or atopic dermatitis, what causes the skin to suddenly become inflamed and why sometimes years later, does inflammation recur in the same place as before? The phenomenon suggests that the skin can remember that it has encountered inflammation before, but what is this memory and how does it work? Finally, what goes wrong when a stem cell acquires an oncogenic mutation that sets it on a path to cancer? I will address some of these questions in my presentation, and explain some of the experiments that we've done to find the answers. Our ultimate hope is that in understanding how this essential body tissue works, our studies will provide avenues for new and improved treatments for human disorders not only of the skin but of other barrier epithelial tissues, such as our oral tissues, lung and intestine.
My journey towards this goal continues with the same level of passion as I had when I first began my career. In science, if you continue to ask questions that you truly want to know the answers to, it is impossible to lose your motivation and your excitement.

HOST & KL2 SCHOLAR

Bonnie Carney, PhD is a Research Scientist in the Burn Research Laboratory at MedStar Health Research Institute, an Assistant Professor of Biochemistry and Surgery at Georgetown University and a 2023 GHUCCTS KL2 Scholar. Dr. Carney's research focuses on mechanistic pathophysiology of post-burn hypopigmented hypertrophic scar development. She is dissecting altered melanocyte biology using cells and tissues from post-burn hypertrophic scar with altered pigmentation, with the ultimate goal to improve patient outcomes.

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****Space is limited for in-person attendance**
Lunch will be provided**

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