Three-dimensional tissue culture and gene expression analysis are revealing how tissues undergo dynamic remodeling in processes as diverse as organ formation and tumor invasion.

The mechanisms responsible for these processes include cell adhesion, migration, contractility, signaling and local gene expression, which can now be visualized or quantified directly. For example, as a result of these advances, we can now visualize mechanisms of salivary gland development involving dramatic tissue rearrangements orchestrated by a variety of matrix and regulatory proteins and genes.

The new tools and approaches developed for these studies should be applicable to any field where tissues are remodeled by movements of molecules and cells.

Elaine Fuchs
March 6; 10:45–11:30 a.m.
Epithelial Stem Cells: Biology and Clinical Promise

Elaine Fuchs is the Rebecca C. Lancefield Professor in Mammalian Cell Biology and Development at The Rockefeller University. She is also an investigator at the Howard Hughes Medical Institute. Fuchs has published more than 250 papers and is internationally known for her research in skin biology and associated human genetic disorders, which include skin cancers and life-threatening genetic syndromes such as blistering skin disorders.

Fuchs' current research focuses on the molecular mechanisms that underlie how multipotent stem cells respond to external cues, change their program of gene expression, exit their niche and adopt specific fates to make the epidermis, sebaceous glands and hair follicles of the skin.

In tackling the biology of normal tissue homeostasis, Fuchs has begun to explore how this process changes during wound repair and in human disorders, e.g., cancers, where tissue development goes awry.

Fuchs’ lecture will focus on stem cells of the skin and their promise for regenerative medicine.