YaleNewHaven**Health** Smilow Cancer Hospital

Distinguished Lecture Series

Tuesday, January 14, 12:00pm

Brady Auditorium | <u>Zoom</u> Access Join us in person for lunch

PRINCIPLES OF TISSUE DYNAMICS AND FUNCTION CAPTURED BY IMAGING LIVE MICE: THE POWER OF MULTIPLE LENSES

Valentina Greco, PhD

Carolyn Walch Slayman Professor of Genetics; HHMI Investigator

Needs:

Our regenerative organs, like skin, intestine and blood, undergo continuous cellular turnover: fueled by stem cell self-renewal and differentiation. Along with collaborators, we developed novel methods to visualize and manipulate stem cells and their niche in the skin epithelium of an intact, uninjured mouse to address the following fundamental questions. First, how are tissue dynamics regulated at the single stem cell level? Stem cells must choose between two fundamentally different behaviors: self-renewal or differentiation. We aim to determine how the genomic and transcriptional activities of stem cells relate to their choice to self-renew versus differentiate. Second, how do other constituent cells influence stem cells and homeostasis? Our skin comprises diverse cell types (e.g. fibroblasts, endothelial cells) and structures (e.g. extracellular matrix). We are dissecting the contributions of these individual components to stem cell regenerative potential and organ homeostasis. Third, how do cumulative mutations affect homeostasis? During normal aging, epithelial stem cells acquire mutations that are often oncogenic and yet tolerated within apparently phenotypically normal tissue. How tissues function despite diverse mutant populations is unclear. Through mosaic of mutant and wild type clones and longitudinal tracking of their metabolic and behavioral changes, we are determining how mutant clones are maintained and function within the skin. I will discuss my lab current understanding of how distinct neighboring niche cells influence the coexistence of mutant subpopulations within the epithelium as well as support this tissue ability to maintain a homeostatic steady state and function overtime.

Objectives:

- 1. Principles of scientific discoveries in teams.
- 2. Mechanisms that support stem cell fuel regeneration.
- 3. Role of niche support to stem cell regeneration over time.





Valecancer

A Comprehensive Cancer Center Designated

by the National Cancer Institute

Valentina Greco earned her undergraduate degree in Molecular Biology at the University of Palermo, Italy. She earned her PhD at the EMBL/MPI-CBG, Germany, her post-doc at the Rockefeller University, and is currently a Professor in the Genetics, Cell Biology and Dermatology Departments, and a member of the Yale Stem Cell Center and Yale Cancer Center. The Greco lab aims to define how tissues maintain themselves throughout the course of our lives in the face of continuous cellular turnover, frequent injuries, and spontaneous mutations. To do so, they developed novel tools that integrate imaging of stem cells in their niche in live mice with both genetic and cell biological approaches that empower a better understanding of the complex orchestration of tissue regeneration using the skin as a model system. Dr. Greco has been the recipient of many awards over her career, most recently the 2021 International Society for Stem Cell Research (ISSCR) Momentum Award, the 2019 NIH Director's Pioneer Award, the 2019 Yale Postdoctoral Mentoring Award, the 2018 Yale Graduate Mentor Award in the Natural Sciences. and in 2018 was named the Inaugural Holder of the Carolyn Slayman Endowed Professorship.

There is No Corporate Support for These Activities. Accreditation: The Yale School of Medicine is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians. Designation Statement: The Yale School of Medicine designates this live activity for 1 AMA PRA Category 1 Credit(s)^w. Physicians should only claim credit commensurate with the extent of their participation in the activity. Target Audience: YCC members, Smilow faculty, YSM, Nursing, Public Health Students. Faculty Disclosures: Winer- nothing to disclose. Greco - None. Financial support for serving on an Independent Data Review Committee for Cogent Biosciences. It is the policy of Yale School of Medicine, Continuing Medical Education, to ensure balance, independence, objectivity and scientific rigor in all its educational programs. Mitigation of Financial Relationships Statement: Yale CME adheres to the ACCME's Standards for Integrity and Independence in Accredited Continuing Education. Any individuals in a position to control the content of a CE activity, planners, reviewers or others are required to disclose all relevant financial relationships with ineligible entities (commercial interests). All relevant conflicts of interest have been mitigated prior to the commencement of the activity.