The Promotion of Breast Cancer Metastasis Caused by Inhibition of CSF-1R/CSF-1 Signaling Is Blocked by Targeting the G-CSF Receptor

Agnieszka Swierczak, Andrew D. Cook, Jason C. Lenzo, Christina M. Restall, Judy P. Doherty, Robin L. Anderson, and John A. Hamilton

Synopsis: Swierczak and colleagues show that blockade of CSF-1R signaling promoted metastasis in two mouse mammary tumor models, with increases in serum G-CSF and neutrophils, which can be overcome by anti-G-CSFR antibodies, raising concerns about targeting CSF-1R as breast cancer therapy.

Whole-Body Irradiation Increases the Magnitude and Persistence of Adoptively Transferred T Cells Associated with Tumor Regression in a Mouse Model of Prostate Cancer

Lindsay K. Ward-Kavanagh, Junjia Zhu, Timothy K. Cooper, and Todd D. Schell

Synopsis: Ward-Kavanagh and colleagues demonstrate in a mouse model of prostate cancer that radiation conditioning promoted accumulation of granzyme B-expressing donor T cells in lymphoid organs and prostates, altering the tumor microenvironment so that subsequent rounds of T-cell therapy can promote therapeutic benefit.

Restoration of miR17/20a in Solid Tumor Cells Enhances the Natural Killer Cell Antitumor Activity by Targeting Mekk2

Hong Jiang, Ping Wang, Xiaohua Li, Qilong Wang, Zhong-Bin Deng, Xiaoying Zhuang, Jingyao Mu, Lifeng Zhang, Baomei Wang, Jun Yan, Donald Miller, and Huang-Ge Zhang

Synopsis: The Zhang laboratory reports that restored miR-17/20a expression in murine breast and colon cancer cells reprogrammed tumor cells for NK cell–mediated cytotoxicity by inhibiting MHC class I via the Mekk2–Mek5–Erk5 pathway, indicating that miR-17/20a may be a tumor suppressor.
ABOUT THE MASTER

Melody A. Swartz, PhD, is the William B. Ogden Professor of Molecular Engineering at the University of Chicago and Professor of Bioengineering at the École Polytechnique Fédérale de Lausanne (EPFL) in the Institute for Bioengineering and the Swiss Institute for Experimental Cancer Research. Dr. Swartz was trained in chemical engineering; she earned a BS at The Johns Hopkins University in 1991 and a PhD at Massachusetts Institute of Technology in 1998. Her PhD thesis was completed in the laboratory of Dr. Rakesh Jain at the Massachusetts General Hospital, where she investigated how the transport functions of lymphatic vessels were coupled to the local tissue biomechanics and developed mathematical and experimental models to understand how the lymphatics respond to edema and how they restore homeostatic fluid balance.

Dr. Swartz performed her postdoctoral studies in airway biomechanics at the Brigham and Women’s Hospital and Harvard Medical School in the laboratory of Dr. Jeffrey Drazen, where she investigated how mechanical stresses are communicated between cells to instigate stress-dependent remodeling of the extracellular matrix. She was attracted to the discipline of engineering because of its quantitative and systems-level approaches to problem solving that can be used to address fundamental biological questions. After completing her training, Dr. Swartz joined the Department of Biomedical Engineering at Northwestern University as an assistant professor in 1999. She moved to the EPFL in 2003, where she was promoted to associate professor in 2006, and then full professor in 2010. After being away for over a decade, Dr. Swartz returned to her hometown, Chicago, in 2014, as she joined the newly founded Institute for Molecular Engineering at the University of Chicago.

With her training as a bioengineer, coupled with strong interests in cancer immunology, Dr. Swartz uses quantitative and multidisciplinary approaches to investigate the roles of the lymphatic system in immunophysiology and pathophysiology, focusing her efforts on the interface between vascular biology, transport biomechanics, and immunology. Her laboratory is currently exploring the function of lymphatic drainage in maintaining local immunologic tolerance and the roles of lymphangiogenesis in pathologic tolerance in diseases including cancer. These investigators are applying the cumulative knowledge of systems immunology of the lymphatic system to develop novel immunotherapeutic approaches in cancer, including lymph node–targeting vaccine approaches.

Dr. Swartz was elected as a fellow of the American Institute for Medical and Biological Engineering in 2007, and as a fellow of the Biomedical Engineering Society in 2012. She has received numerous awards, including the Arnold and Mabel Beckman Young Investigator Award in 2002, the Biomedical Engineering Society’s Rita Schaffer Young Investigator Award in 2001, the European Research Council Investigator Awards in 2008 and in 2013, and the 2010 Robert Wener Prize for Cancer Research from the Swiss Cancer League. In recognition of her creativity in research, she was named a MacArthur Foundation Fellow in 2012.