Breaking Advances

2403 Highlights from Recent Cancer Literature

Reviews

2405 The Role of TLR4 in Chemotherapy-Driven Metastasis
Sophia Ran

2411 Ex Vivo Cultivation of CTCs: An Emerging Resource to Guide Cancer Therapy
Shyamala Maheswaran and Daniel A. Haber

Integrated Systems and Technologies

2416 Early Prediction of Disease Progression in Small Cell Lung Cancer: Toward Model-Based Personalized Medicine in Oncology
Núria Ruíl-Bruna, Tarjinder Sahota, José-María López-Picazo, Marta Moreno-Jiménez, Salvador Martín-Algarra, Benjamin Ribba, and Ifaki F. Trocmón
Précis: The proposed statistical framework can be used to aid personalization of disease monitoring in oncology.

2426 Cell–Cell Adhesion and Cytoskeleton Tension Oppose Each Other in Regulating Tumor Cell Aggregation
Laure Saia, Aurélie Gomes, Martine Cazales, Bernard Ducommun, and Valérie Lobajois
Précis: These findings reveal new principles that govern multicellular aggregation, possibly paving the way for new therapeutic opportunities.

Microenvironment and Immunology

2434 IL13 Receptor α2 Signaling Requires a Scaffold Protein, FAM120A, to Activate the FAK and PI3K Pathways in Colon Cancer Metastasis
Rubén A. Bartolomé, Irene García-Palmero, Sofía Torres, María López-Lucendo, Irina V. Baluyasnikova, and J. Ignacio Casal
Précis: This study identifies a scaffold protein required for downstream signaling of the IL13 receptor, which regulates invasion and metastasis in colon cancer, with potential implications for therapy in this setting.

2445 Endothelial ALK1 Is a Therapeutic Target to Block Metastatic Dissemination of Breast Cancer
Sara I. Cunha, Matteo Bocci, John Lovrot, Nikolas Eleftheriou, Pernilla Roswall, Eugenia Cordero, Linda Lindström, Michael Bartoschek, B. Kristian Haller, R. Scott Pearsall, Aaron W. Mulivor, Ravindra Kumar, Christer Larson, Jonas Bergh, and Kristian Pietras
Précis: These findings offer preclinical proof of concept for the utility of ALK1 inhibitors to treat metastatic breast cancer, with immediate implications for evaluation of this strategy in the clinic.

Prevention and Epidemiology

2457 Novel Associations between Common Breast Cancer Susceptibility Variants and Risk-Predicting Mammographic Density Measures
Précis: These findings deepen the evidence of shared genetic determinants between breast cancer risk and mammographic density measures, strengthening the likelihood of common etiologic pathways.

Précis: These epideimologic results indicate that the incidence of HPV-positive oropharyngeal cancer is higher and rising more sharply among men than women in the United States because of gender-associated sexual behaviors.
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THERAPEUTICS, TARGETS, AND CHEMICAL BIOLOGY

2478  Targeting Mitochondria with Avocatin B Induces Selective Leukemia Cell Death
      Eric A. Lee, Leonard Angka, Sarah-Grace Rota, Thomas Hanlon, Andrew Mitchell, Rose Hurren, Alex Cheng, and Robert S. Kerbel
      Précis: A natural product derived from avocado fruit can selectively eradicate leukemia cells based on a specific difference in mitochondrial function.

2489  Acquired Resistance to the Mutant-Selective EGFR Inhibitor AZD9291 Is Associated with Increased Dependence on RAS Signaling in Preclinical Models
      Précis: These results offer early insight into how acquired resistance arises to a new mutation-selective inhibitor of EGFR that is in fast-track clinical development, illustrating the inescapable cat-and-mouse chase in the evolution of cancer cell–targeting drugs in the management of cancer patients.

2501  Breast Cancer Detection by B7-H3-Targeted Ultrasound Molecular Imaging
      Sumitha V. Bachawal, Kristin C. Jensen, Katherine E. Wilson, Lu Tian, Amelie M. Lutz, and Jürgen K. Willmann
      Précis: The immunoregulator B7-H3 is differentially expressed on vascular endothelial cells of breast cancer compared with normal or benign breast pathologies, and this study offers a preclinical proof of concept for the use of B7-H3–targeted ultrasound molecular imaging to improve the diagnostic accuracy of breast cancer detection in patients.

2510  Effects of Sorafenib Dose on Acquired Reversible Resistance and Toxicity in Hepatocellular Carcinoma
      Elizabeth A. Kuczynski, Christina R. Lee, Shan Man, Eric Chen, and Robert S. Kerbel
      Précis: Reductions in the plasma levels of the tyrosine kinase inhibitor sorafenib that occur naturally in some patients represent a potential contributing cause of drug resistance, with broader implications for optimal dosing of other tyrosine kinase inhibitors.

2520  Grapefruit-Derived Nanovectors Use an Activated Leukocyte Trafficking Pathway to Deliver Therapeutic Agents to Inflammatory Tumor Sites
      Qilong Wang, Yi Ren, Jingyao Mu, Nejat K. Egilmez, Xiaoyin Zhuang, Zhongbin Deng, Lifeng Zhang, Jun Yan, Donald Miller, and Huang-Ge Zhang
      Précis: This interesting report defines and characterizes the tumor-targeting features of a readily available, generalizable, and nontoxic vehicle to improve the targeted delivery of therapeutic drugs to cancerous or precancerous sites, possibly offering a low-cost clinical formulation strategy to widen the therapeutic window for many drugs.

2530  Drug Redeployment to Kill Leukemia and Lymphoma Cells by Disrupting SCD1-Mediated Synthesis of Monounsaturated Fatty Acids
      Andrew D. Southam, Farhat L. Khanim, Rachel E. Hayden, Julia K. Constantinou, Katyazyna M. Koczula, Robert H. Mitchell, Mark R. Viant, Mark T. Drayson, and Chris M. Bunce
      Précis: The combination of two drugs found to have anticancer activity in patients is mechanistically linked in this study to decreased levels of a candidate therapeutic target involved in fatty-acid synthesis.

TUMOR AND STEM CELL BIOLOGY

2541  Grade-Dependent Metabolic Reprogramming in Kidney Cancer Revealed by Combined Proteomics and Metabolomics Analysis
      Hiromi I. Wettersten, A. Ari Hakimi, Dester Morin, Cristina Bianchi, Megan E. Johnstone, Dallas R. Donohoe, Josephine F. Trott, Omran Abu Aboud, Steven Sördingvist, Bruce Neri, Robert Wolfert, Benjamin Stewart, Roberto Perego, James J. Hsieh, and Robert H. Weiss
      Précis: This work uncovers new aspects of grade-dependent metabolic reprogramming in renal cancers that could lead to novel personalized treatments, including the use of inhibitors of glucose, glutamine, and tryptophan metabolism that are being developed in other clinical settings.

2553  Lin28B/Let-7 Regulates Expression of Oct4 and Sox2 and Reprograms Oral Squamous Cell Carcinoma Cells to a Stem-like State
      Précis: These results show how cancer stem-like properties are controlled in oral squamous cancers, and how this control system may promote drug resistance and tumor relapse in advanced cancers.
G-CSF Promotes Neuroblastoma Tumorigenicity and Metastasis via STAT3-Dependent Cancer Stem Cell Activation
Saurabh Agarwal, Anna Lakoma, Zaowen Chen, John Hicks, Leonid S. Metelitsa, Eugene S. Kim, and Jason M. Shohet

Précis: This seminal study challenges the clinical use of G-CSF as a treatment to support white blood cell counts in children with neuroblastoma, based on the ability of this factor to promote the growth of the cancer stem-like cell population in this setting.

ABOUT THE COVER
Ultrasound is a complementary imaging modality for detection of mammographically occult breast cancers, especially in patients with dense breast tissue. Diagnostic accuracy of ultrasound in these patients can be significantly improved using contrast agents targeted at molecular signatures on the tumor neovasculature. In a large scale immunohistochemical staining analysis of human tissues, it was found that B7-H3 is differentially expressed in breast cancer-associated vascular endothelial cells compared with normal, benign, and precursor lesions. Also, B7-H3-targeted ultrasound molecular imaging allowed detection of breast cancer in a transgenic mouse model of breast cancer development. For details, see article by Bachawal and colleagues on page 2501.
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