BREAKING ADVANCES

473 Highlights from Recent Cancer Literature

REVIEWS

475 Th9 Cells: A Novel CD4 T-cell Subset in the Immune War against Cancer
Frédérique Végan, Lionel Apetoh, and François Ghiringhelli

480 Novel Insights into Head and Neck Cancer using Next-Generation "Omic" Technologies
Lusia Sepiashvili, Jeff P. Bruce, Shao Hui Huang, Brian O’Sullivan, Fei-Fei Liu, and Thomas Kislinger

MICROENVIRONMENT AND IMMUNOLOGY

487 Role of Chitinase 3–like-1 and Semaphorin 7a in Pulmonary Melanoma Metastasis
Bing Ma, Erica L. Herzog, Chun Geun Lee, Xueyan Peng, Chang-Min Lee, Xiaosong Chen, Sara Rockwell, Ja Seok Koo, Harriet Kluger, Roy S. Herbst, Mario Sznol, and Jack A. Elias
Précis: A member of an ancient gene family that binds the chitin in fungi and other pathogens is found to be needed to program lung microenvironments that are permissive for metastasis, with potential implications for learning how to block dissemination of many types of cancer to this common site.

497 Strict Requirement for Vector-Induced Type I Interferon in Efficacious Antitumor Responses to Virally Encoded IL12
Ignacio Melero, Jose I. Quetglas, Mercedes Reboredo, Juan Dubrot, Juan R. Rodriguez-Madrazo, Ubax Manchego, Erikuden Casales, Jose I. Riezu-Boj, Marta Ruiz-Guillen, Maria C. Ochoa, Miguel F. Samnadez, Nathalie Thieblement, Cristian Smerdou, and Sandra Herbas-Stubbbs
Précis: These findings support the argument that efficacy of a cancer gene therapy employing a viral vector for administration may be highly dependent upon a vector-induced type I interferon response, with possible implications for a broad array of translational projects currently being evaluated in the clinic.

508 PD-1/SHP-2 Inhibits Tc1/Th1 Phenotypic Responses and the Activation of T Cells in the Tumor Microenvironment
Jing Li, Hyun-Bae Jie, Yu Lei, Neil Gildener-Leapman, Sumita Trivedi, Tony Green, Lawrence P. Kane, and Robert L. Ferris
Précis: This study addresses the mechanisms through which PD-1 antibody therapy restores the ability of the immune system to recognize and attack tumors by skewing intratumoral T cells toward a more potent activation phenotype that is associated with enhanced signaling and a reversal of their immunosuppressed phenotype.

519 Host miR155 Promotes Tumor Growth through a Myeloid-Derived Suppressor Cell–Dependent Mechanism
Sugi Chen, Long Wang, Jie Fan, Cong Ye, Donye Dominguez, Yi Zhang, Tyler J. Curiel, Deyu Fang, Timothy M. Kuzel, and Bin Zhang
Précis: These findings reveal an immunosuppressive function for an miRNA thought to be solely immunostimulatory, establishing a contextual role that prompts caution for suggested strategies to manipulate its expression for cancer therapy.

MOLECULAR AND CELLULAR PATHOBIOLOGY

532 Lysophosphatidic Acid Receptor LPAR6 Supports the Tumorigenicity of Hepatocellular Carcinoma
Antonio Mazzocca, Francesco Dituri, Flavia De Santis, Addolorata Filannino, Chiara Lopane, Regina C. Betz, Ying-Yi Li, Naofumi Mukaide, Peter Winter, Cosimo Tortorella, Gianluigi Giannelli, and Carlo Sabbà
Précis: These findings link overexpression of a lysophosphatidic acid receptor during liver cancer development to upregulation of the PIM3 oncogene, which is implicated in histone modification and apoptosis, with implications for prognosis and treatment in this disease setting.

544 Human Pancreatic Cancer Tumors Are Nutrient Poor and Tumor Cells Actively Scavenge Extracellular Protein
Jurje J. Kamphorst, Michel Nofal, Cosimo Commissio, Sean R. Hackett, Wenyun Lu, Elda Grabocka, Matthew G. Vander Heiden, George Miller, Jeffrey A. Drezin, Dafna Bar-Sagi, Craig B. Thompson, and Joshua D. Rabinowitz
Précis: Scavenging of extracellular protein represents a previously unappreciated pathway of nutrient uptake in human pancreatic tumors, providing new insights into how these tumors grow in nutrient-poor conditions.
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- **554** Gain of Glucose-Independent Growth upon Metastasis of Breast Cancer Cells to the Brain
  **Précis:** This study defines a specific metabolic condition required to sustain brain metastasis, with therapeutic implications for how this deadly feature of advanced breast cancer might be eradicated.

### THERAPEUTICS, TARGETS, AND CHEMICAL BIOLOGY

- **594** Bruton Tyrosine Kinase Is a Therapeutic Target in Stem-like Cells from Multiple Myeloma
  Ye Yang, Jumei Shi, Zhimin Gu, Mohamed E. Salama, Satyabrata Das, Erik Wendlandt, Hongwei Xu, Junwei Huang, Yi Tao, Mu Hao, Reinaldo Franqui, Dana Levasseur, Siegfried Janz, Guido Tricot, and Fenghuang Zhan
  **Précis:** These findings provide a preclinical rationale for repositioning a recently approved drug to treat aggressive multiple myelomas, with immediate implications for clinical evaluation of this strategy.

### TUMOR AND STEM CELL BIOLOGY

- **554** Gain of Glucose-Independent Growth upon Metastasis of Breast Cancer Cells to the Brain
  **Précis:** This study defines a specific metabolic condition required to sustain brain metastasis, with therapeutic implications for how this deadly feature of advanced breast cancer might be eradicated.

- **566** Identification of a Functional SNP in the 3’UTR of CXCR2 That Is Associated with Reduced Risk of Lung Cancer
  Bríd M. Ryan, Ana I. Robles, Andrew C. McClary, Majda Haznadar, Elise D. Bowman, Sharon R. Pine, Derek Brown, Mohammed Khan, Kouya Shiraiishi, Takashi Kohno, Hirokazu Okayama, Ramakrishna Modali, Jun Yokota, and Curtis C. Harris
  **Précis:** A genetic polymorphism in a chemokine receptor known to drive myeloid recruitment in the tumor microenvironment confers strong protection against lung cancer, with potential implications in understanding etiology, prognosis, and therapeutic response in this widespread disease.

- **576** Perinatal and Familial Risk Factors for Brain Tumors in Childhood through Young Adulthood
  Casey Crump, Jan Sundquist, Weiwa Sieh, Marilyn A. Winkleby, and Kristina Sundquist
  **Précis:** In this large national cohort study, high birth weights associated with an increased risk of brain tumors were traced to a role for high growth rates rather than gestational age.

### CORRECTION

- **616** Correction: Crosstalk between microRNA30a/b/c/d/e-5p and the Canonical Wnt Pathway: Implications for Multiple Myeloma Therapy

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ABOUT THE COVER

Altered metabolism is a common feature of cancer cells, but little is known as to what metabolic changes benefit breast cancer brain metastases. Fructose-1,6-bisphosphatase 2 (FBP2), a rate limiting enzyme of gluconeogenesis, was found to be significantly upregulated in breast cancer brain metastasis. FBP2 empowers brain metastatic cancer cells with the ability to grow independently of glucose. For details, see article by Chen and colleagues on page 554.