### BREAKING ADVANCES

**Highlights from Recent Cancer Literature**

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### REVIEWS

**DNA Damage Response and Growth Factor Signaling Pathways in Gliomagenesis and Therapeutic Resistance**
Massimo Squatrito and Eric C. Holland

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**MicroRNA Regulation of Cancer Stem Cells**
Can Liu and Dean G. Tang

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### MEETING REPORTS

**Circulating Tumor Cell Isolation and Diagnostics: Toward Routine Clinical Use**
Anja van de Stolpe, Klaus Pantel, Stefan Sleijfer, Leon W. Terstappen, and Jaap M.J. den Toonder

5955

**Systems Biology: Confronting the Complexity of Cancer**
Andrew J. Gentles and Daniel Gallahan

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### INTEGRATED SYSTEMS AND TECHNOLOGIES

**Using Tandem Mass Spectrometry in Targeted Mode to Identify Activators of Class IA PI3K in Cancer**
Xueimei Yang, Alexa B. Turke, Jie Qi, Youngchul Song, Brent N. Bexer, Todd W. Miller, Pasi A. Jänne, Carlos L. Arteaga, Lewis C. Cantley, Jeffrey A. Engelman, and John M. Asara

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**Précis:** Defining the upstream acting tyrosine kinase pathways that activate PI3K signaling in different tumors may help inform clinical decisions about personalized strategies for cancer treatment.

### MICROENVIRONMENT AND IMMUNOLOGY

**Blocking Hypoxia-Induced Autophagy in Tumors Restores Cytotoxic T-Cell Activity and Promotes Regression**
Muhammad Zaeem Noman, Bassam Janji, Bozena Kaminska, Kris Van Moer, Sandrine Pierson, Piotr Przanowski, Stéphanie Buat, Guy Berchem, Pedro Romero, Fathia Mami-Chouaib, and Salem Chouaib

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**Précis:** This study establishes a crucial causal link between hypoxia-induced autophagy in tumor cells and their resistance to killing by antigen-specific cytotoxic T cells, revealing a major role for autophagy in mediating immune escape in cancer.

**Mast Cell Targeting Hampers Prostate Adenocarcinoma Development but Promotes the Occurrence of Highly Malignant Neuroendocrine Cancers**
Paola Pittoni, Claudio Tripodo, Silvia Piconese, Giorgio Mauri, Mariella Parente, Alice Rigoni, Sabina Sangaletti, and Mario P. Colombo

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**Précis:** Findings demonstrate a dual role for mast cells in the progression of prostate cancer, arguing that therapeutic targeting of mast cells may be beneficial in early but not late stages of this disease.

**Human NK Cells Are Alerted to Induction of p53 in Cancer Cells by Upregulation of the NKG2D Ligands ULBP1 and ULBP2**
Sonja Textor, Nathalie Fiegler, Annette Arnold, Angel Porgador, Thomas G. Hofmann, and Adelheid Cerwenka

5998

**Précis:** Findings show how p53 mediates an important aspect of its tumor suppressor function by stimulating natural killer cells, a powerful arm of the innate immune system that can destroy tumor cells.

### MOLECULAR AND CELLULAR PATHOBIOLOGY

**Activated Notch1 Induces Lung Adenomas in Mice and Cooperates with Myc in the Generation of Lung Adenocarcinoma**
Thaddeus D. Allen, Elena M. Rodriguez, Kirk D. Jones, and J. Michael Bishop

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**Précis:** This study offers a preclinical genetic proof-of-concept that targeted inhibitors of the Notch pathway should be useful to treat lung adenocarcinomas and other solid tumors driven by oncogenic Myc.
**THERAPEUTICS, TARGETS, AND CHEMICAL BIOLOGY**

**Biological Roles of the Delta Family Notch Ligand Dll4 in Tumor and Endothelial Cells in Ovarian Cancer**

**Précis:** Findings define a functionally important role for a Notch receptor ligand of the Delta family in both the tumor and endothelial compartments of ovarian cancer, with potential implications to leverage outcomes of anti-VEGF treatment.

**Vitamin D3 Enhances the Apoptotic Response of Epithelial Tumors to Aminolevulinate-Based Photodynamic Therapy**
Sanjay Anand, Clara Wilson, Tayyaba Hasan, and Edward V. Maytin

**Précis:** This important study shows how vitamin D3 can be used as a simple, nontoxic, and highly effective preconditioning regimen to enhance the response of epithelial tumors to a combination drug phototherapy, perhaps broadening its clinical applications.

**Endothelial Cells Create a Stem Cell Niche in Glioblastoma by Providing NOTCH Ligands That Nurture Self-Renewal of Cancer Stem-Like Cells**
Thant S. Zhu, Mark A. Costello, Caroline E. Talsma, Callie G. Flack, Jessica G. Crowley, Lisa L. Hamm, Xiaobing He, Shawn L. Hervey-Jumper, Jason A. Heth, Karin M. Muraszko, Francesco DiMeco, Angelo L. Vescovi, and Xing Fan

**Précis:** This important human study expands concepts of how the tumor endothelium supports cancer growth, in providing not only a blood supply but also a niche to feed self-renewal of cancer stem-like cells.

**DLL4-Notch Signaling Mediates Tumor Resistance to Anti-VEGF Therapy In Vivo**
Ji-Liang Li, Richard C.A. Sainson, Chern Ein Oon, Helen Turley, Russell Leek, Helen Sheldon, Esther Bridges, Wen Shi, Cameron Snell, Emma T. Bowden, Herren Wu, Partha S. Chowdhury, Angela J. Russell, Craig P. Montgomery, Richard Poulson, and Adrian L. Harris

**Précis:** Findings implicate the DLL4-Notch signaling pathway in mediating resistance to the widely administered antiangiogenic drug bevacizumab, suggesting that a combined blockade could enhance its efficacy.
ABOUT THE COVER

Mast cells are best known for their primary involvement in allergic reactions, but have recently been reappraised as important players in either cancer promotion or inhibition. Pittoni and colleagues report that mast cells are enriched and degranulated in areas of adenocarcinoma in prostate tumor-bearing mice and patients, and foster tumor growth through MMP-9 provision. However, mast cell–targeted therapy in this setting has a dark side, originating from the previously unrecognized capacity of mast cells to control neuroendocrine prostate tumor variants. For details, see the article by Pittoni and colleagues on page 5987 of this issue.