Metformin Decreases the Dose of Chemotherapy for Prolonging Tumor Remission in Mouse Xenografts Involving Multiple Cancer Cell Types
Dimitrios Illopoulos, Heather A. Hirsch, and Kevin Struhl

Précis: Preclinical findings suggest that combining the diabetes drug metformin with standard chemotherapy prolongs remission in multiple contexts, and may allow chemotherapy doses to be lowered in patients.

PRIORITY REPORTS

3182

STAT3 Inhibition Is a Therapeutic Strategy for ABC-like Diffuse Large B-Cell Lymphoma

Précis: Findings establish that STAT3 is essential to maintain the pathophysiology of an aggressive form of B cell lymphoma and they offer a preclinical proof of concept for STAT3 inhibition as a therapeutic approach to treat this cancer.

3189

The ABL Switch Control Inhibitor DCC-2036 Is Active against the Chronic Myeloid Leukemia Mutant BCR-ABL131I and Exhibits a Narrow Resistance Profile
Christopher A. Eide, Lauren T. Adrian, Jeffrey W. Tyner, Mary Mac Partlin, David J. Anderson, Scott C. Wise, Bryan D. Smith, Peter A. Petillo, Daniel L. Flynn, Michael W.N. Deininger, Thomas O’Hare, and Brian J. Druker

Précis: A third generation drug can overcome an acquired mutation in BCR-ABL1 that confers resistance to all currently approved targeted therapies for CML, addressing a critical unmet need to control drug resistance in this disease.

MICROENVIRONMENT AND IMMUNOLOGY

3214

Adjuvant Combination and Antigen Targeting as a Strategy to Induce Polyfunctional and High-Avidity T-Cell Responses against Poorly Immunogenic Tumors
Fernando Aranda, Diana Llopiz, Nancy Diaz-Valdés, José Ignacio Riezu-Boj, Jaione Beznartea, Marta Ruiz, Marta Martínez, Maika Durantez, Cristina Mansilla, Jesús Prieto, Juan José Lasarte, Francisco Borras-Cuesta, and Pablo Sarobe

Précis: Findings show how enhancing innate immunity with multiple adjuvant combination and improving T cell responses by targeted antigen strategies can elicit an effective immunotherapeutic response against poorly immunogenic tumors.
Aurora A is a Repressed Effector Target of the Chromatin Remodeling Protein INI1/hSNF5 Required for Rhabdoid Tumor Cell Survival
SeungJae Lee, Velasco Cimica, Nandini Ramachandra, David Zagzag, and Ganjam V. Kalpana

Précis: High expression of the mitotic kinase Aurora A may underlie the aggressive behavior of rhabdoid tumors and findings suggest that targeting Aurora A may offer a rational therapeutic strategy to inhibit these tumors.

Novel Theranostic Opportunities Offered by Characterization of Altered Membrane Lipid Metabolism in Breast Cancer Progression

Précis: This is the first study to describe the global changes in lipids that occur during breast cancer progression, highlighting new candidate prognostic markers and therapeutic targets in this important metabolic arena.

mTORC1 and mTORC2 Regulate EMT, Motility, and Metastasis of Colorectal Cancer via RhoA and Rac1 Signaling Pathways
Pat Gulhati, Kanika A. Bowen, Jianyu Liu, Payton D. Stevens, Piotr G. Rychahou, Min Chen, Eun Y. Lee, Heidi L. Weiss, Kathleen L. O'Connor, Tianyan Gao, and B. Mark Evers

Précis: mTOR kinases regulate cell proliferation and survival but new connections to metastasis revealed here for the first time offer a mechanistic rationale for certain uses of dual mTOR inhibitors in settings of advanced cancer.

FOXO1 Inhibits Runx2 Transcriptional Activity and Prostate Cancer Cell Migration and Invasion
Haijun Zhang, Yunqian Pan, Li Zheng, Chungyoul Choe, Bruce Lindgren, Eric D. Jensen, Jennifer J. Westendorf, Liang Cheng, and Haojie Huang

Précis: Mechanistic findings suggest a basis for understanding how prostate cancers metastasize to bone, a major site for disease progression in many patients.

The IL-8–Regulated Chemokine Receptor CXCR7 Stimulates EGFR Signaling to Promote Prostate Cancer Growth
Rajendra Kumar Singh and Bal L. Lokeshwar

Précis: Findings suggest that pro-inflammatory cytokine IL-8, which is elevated in the microenvironment of many tumors, may stimulate tumor cell growth in part through increasing expression of a chemokine receptor that colocalizes with EGFR and activates EGFR signaling.

Association of Specific Genotypes in Metastatic Suppressor HTPAP with Tumor Metastasis and Clinical Prognosis in Hepatocellular Carcinoma
Ning Ben, Jin-Cai Wu, Qiong-Zhu Dong, Hai-Jing Sun, Hu-Liang Jia, Guo-Cai Li, Bing-Sheng Sun, Chuan Dai, Jiong Shi, Jin-Wang Wei, Yuan-Yuan Sheng, Hai-Jun Zhou, Qing-Hai Ye, and Lun-Xiu Qin

Précis: Findings identify an HTPAP genotype and associated gene expression pattern that favors metastasis progression and that could be used to predict tumor metastasis and prognosis in HCC patients.

Large-scale Exploration of Gene–Gene Interactions in Prostate Cancer Using a Multistage Genome-wide Association Study
Julia Ciampa, Meredith Yeager, Laufey Amundadottir, Kevin Jacobs, Peter Kraft, Charles Chung, Sholom Wacholder, Kai Yu, William Wheeler, Michael J. Thun, W. Ryan Divers, Susan Gapstur, Demetrius Albanes, Jarmo Virtamo, Stephanie Weinstein, Edward Giovannucci, Walter C. Willett, Geraldine Cancel-Tassin, Olivier Cussenot, Antoine Valeri, David Hunter, Robert Hoover, Giles Thomas, Stephen Chanock, and Nilanjan Chatterjee

Précis: A large genome-wide study that incorporated modern analytic methods highlights some provocative genetic interactions with established susceptibility loci that may help elucidate roots of prostate cancer susceptibility.

Prevention and Epidemiology
### A Simple Approach to Cancer Therapy Afforded by Multivalent Pseudopeptides That Target Cell-Surface Nucleoproteins

Damien Destouches, Nicolas Page, Yamina Hamma-Kourbali, Valérie Machi, Olivier Chaloin, Sophie Frechault, Charalampios Birmpas, Panagiotis Katsoris, Julien Beyrath, Patricia Albanese, Marie Maurer, Gilles Carpentier, Jean-Marc Strub, Alain Van Dorselaer, Sylviane Muller, Dominique Bagnard, Jean Paul Briand, and José Courty

**Précis:** This interesting study defines a non-cytotoxic molecule that can efficiently localize to tumors, exert an antiangiogenesis activity, and selectively induce cancer cell death.

### Inhibition of HIF Prolyl Hydroxylase-2 Blocks Tumor Growth in Mice through the Antiproliferative Activity of TGFβ

Anne Klotzsche-von Ameln, Antje Muschter, Soulafa Mamlouk, Joanna Kalucka, Ina Prade, Kristin Franke, Maryam Rezaei, David M. Poitz, Georg Breier, and Ben Wielockx

**Précis:** Mechanistic findings deepen understanding of the anti-proliferative effects of TGFβ, offering new insights into the interaction of several crucial growth signaling pathways and suggesting possible therapeutic targets.

### Polo-Like Kinase Plk2 Is an Epigenetic Determinant of Chemosensitivity and Clinical Outcomes in Ovarian Cancer


**Précis:** Findings define a mitotic kinase as a key determinant of drug resistance in epithelial ovarian cancer, with important implications for improving the management of this often deadly disease.

### High-Throughput RNAi Screening Reveals Novel Regulators of Telomerase

Maria Antonietta Cerone, Darren J Burgess, Cristina Naceur-Lombardelli, Christopher J. Lord, and Alan Ashworth

**Précis:** Findings point to ERK8 and other kinases that modulate telomerase activity as candidate therapeutic targets to disrupt telomere maintenance in cancer.

### Targeting Tumor Hypoxia: Suppression of Breast Tumor Growth and Metastasis by Novel Carbonic Anhydrase IX Inhibitors

Yuanmei Lou, Paul C. McDonald, Arusha Oloumi, Stephen Chia, Christina Ostlund, Ardalani Ahmadi, Alastair Kyle, Ulrich auf dem Keller, Samuel Leung, David Huntsman, Blaise Clarke, Brent W. Sutherland, Dawn Waterhouse, Marcel Bally, Calvin Roskelley, Christopher M. Overall, Andrew Minchinton, Fabio Pacchiana, Fabrizio Carta, Andrea Scozzafava, Nadia Touissi, Jean-Yves Winum, Claudia T. Supuran, and Shoukat Dedhar

**Précis:** Therapeutic targeting of a metabolic enzyme that promotes survival of hypoxic cancer cells may offer a mechanistically novel and effective way to block the growth of metastatic cancer cells.
Cdk2 is Required for Breast Cancer Mediated by the Low Molecular Weight Isoform of Cyclin E

Said Akli, Carolyn S. Van Pelt, Tuyen Bui, Laurent Meijer, and Khandan Keyomarsi

Précis: Findings establish a requirement for Cdk2 in LMW-cyclin E mediated mammary tumorigenesis, arguing that human breast tumors overexpressing LMW-cyclin E are prime candidates for anti-Cdk2 therapy.

A Developmental Taxonomy of Glioblastoma Defined and Maintained by MicroRNAs

Tae-Min Kim, Wei Huang, Richard Park, Peter J. Park, and Mark D. Johnson

Précis: Findings suggest the existence of at least five distinct forms of glioblastoma that each relate to distinct stages of neural stem cell differentiation, providing an expanded framework to understand disease pathogenesis in a human neurodevelopmental context.

Phosphoglucose Isomerase/Autocrine Motility Factor Mediates Epithelial-Mesenchymal Transition Regulated by miR-200 in Breast Cancer Cells

Aamir Ahmad, Amro Aboukameel, Dejuan Kong, Zhiwei Wang, Seema Sethi, Wei Chen, Fazlul H. Sarkar, and Avraham Raz

Précis: Findings define a microRNA signaling node that links an important pathway of epithelial-mesenchymal transition to cell metabolism and survival pathways with pivotal roles in cancer.

ID4 Imparts Chemoresistance and Cancer Stemness to Glioma Cells by Derepressing miR-9*-Mediated Suppression of SOX2

Hye-Min Jeon, Young-Woo Sohn, Se-Young Oh, Sung-Hak Kim, Samuel Beck, Soonhag Kim, and Hyunggee Kim

Précis: This study connects key regulators of stem cell properties and chemotherapeutic drug resistance in brain cancer, with potential implications for improving treatment.

BRCA1 Counteracts Progesterone Action by Ubiquitination Leading to Progesterone Receptor Degradation and Epigenetic Silencing of Target Promoters

Verónica Calvo and Miguel Beato

Précis: The findings of this important study may help explain why host mutations in the BRCA1 tumor suppressor exert a tissue specificity in preferentially elevating the risk of breast cancer.
ABOUT THE COVER

Several recent studies have demonstrated the involvement of cell-surface nucleolin in angiogenesis and tumor growth. In this study, we addressed the following questions:

Does N6L (or Nucont), a synthetic ligand of cell-surface nucleolin (nM range), block angiogenesis and tumor growth? What are its mechanisms of action, its bio-distribution and finally does it target other cell surface nucleolin partner proteins?

The key findings of this study are that:

- N6L inhibits anchorage-dependent and independent growth of several tumor cell lines and blocked angiogenesis
- N6L inhibit, in vivo tumor growth in a number of mouse subcutaneous human xenograft models
- N6L bio-distribution studies indicate that N6L rapidly localizes selectively in tumor tissue (see cover figure)
- N6L is a pro-apoptotic molecule, as demonstrated by in vivo as well as in vitro experiments
- Pull-down experiments and mass-spectrometry analysis have confirmed that nucleophosmin is a partner for nucleolin and also a target (nM range) for N6L.

Immupharma group is currently developing N6L in Phase I/IIa clinical trials before initiating full efficacy studies in various indications as identified during this series of experiments. We believe that these findings pave the way for a novel approach of cancer treatment. For details, see the article by Destouches and colleagues on page 3296 of this issue.
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