**Highlights from Recent Cancer Literature**

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**Angiopoietin-2: An Attractive Target for Improved Antiangiogenic Tumor Therapy**
Damien Gerald, Sudhabak Chintharlapalli, Hellmut G. Augustin, and Laura E. Benjamin

**MEETING REPORT**

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**Ion Channels and Transporters in Cancer: Pathophysiology, Regulation, and Clinical Potential**
Stine F. Pedersen and Christian Stock

**PRIORITY REPORTS**

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**G-protein Inactivator RGS6 Mediates Myocardial Cell Apoptosis and Cardiomyopathy Caused By Doxorubicin**
Jianqi Yang, Biswanath Maity, Jie Huang, Zhan Gao, Adele Stewart, Robert M. Weiss, Mark E. Anderson, and Rory A. Fisher

1668

**Trp53 Inactivation in the Tumor Microenvironment Promotes Tumor Progression by Expanding the Immunosuppressive Lymphoid-like Stromal Network**
Gang Guo, Luis Marrero, Paulo Rodriguez, Luis Del Valle, Augusto Ochoa, and Yan Cui

**CLINICAL STUDIES**

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**Phase I Trial of Recombinant Modified Vaccinia Ankara Encoding Epstein–Barr Viral Tumor Antigens in Nasopharyngeal Carcinoma Patients**

**INTEGRATED SYSTEMS AND TECHNOLOGIES**

1689

**Earlier Detection of Breast Cancer with Ultrasound Molecular Imaging in a Transgenic Mouse Model**
Sanitha V. Bachawal, Kristin C. Jensen, Amelie M. Lutz, Sanjiv S. Gambhir, Francois Tranquart, Lu Tian, and Jürgen K. Willmann

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**Collections of Simultaneously Altered Genes as Biomarkers of Cancer Cell Drug Response**
David L. Masica and Rachel Karchin

**MICROENVIRONMENT AND IMMUNOLOGY**

1709

**Therapeutic Efficacy of Bifunctional siRNA Combining TGF-β1 Silencing with RIG-I Activation in Pancreatic Cancer**
Jonathan Ellermeier, Jiwu Wei, Peter Duewell, Sabine Hoves, Mareike R. Stieg, Tina Adunka, Daniel Noerenberg, Hans-Joachim Anders, Doris Mayr, Hendrik Poeck, Gunther Hartmann, Stefan Endres, and Max Schnurr

**Précis:** Vaccination of nasopharyngeal carcinoma patients targeting two pathogenic viral antigens produces potent immune responses after they have completed chemoradiotherapy.
LOX-Mediated Collagen Crosslinking Is Responsible for Fibrosis-Enhanced Metastasis
Thomas R. Cox, Demelza Bird, Ann-Marie Baker, Holly E. Barker, Melissa W-Y. Ho, Georgina Lang, and Janine T. Erler

Précis: The fibrotic status of a metastatic niche that is determined by the extracellular matrix plays a pivotal role in determining colonization of new sites by circulating tumor cells.

Evidence for a Role of the PD-1:PD-L1 Pathway in Immune Resistance of HPV-Associated Head and Neck Squamous Cell Carcinoma

Précis: HPV-associated oropharyngeal cancers, which are increasing in incidence in the developed world, evade immune surveillance through an escape pathway that is actively being targeted in clinical trials.

IFN-γ–Mediated Downregulation of LXA4 Is Necessary for the Maintenance of Nonresolving Inflammation and Papilloma Persistence
Chunhui Wang, Mingjie Xiao, Xiaoman Liu, Chen Ni, Jianhong Liu, Ulrike Erben, and Zhihai Qin

Précis: By helping resolve an inflammatory response, IFNγ blockade can promote tumor regression by reprogramming the inflammatory microenvironment.

Myeloid-Specific Expression of Ron Receptor Kinase Promotes Prostate Tumor Growth
Devikala Gurusamy, Jerilyn K. Gray, Peterson Pathrose, Bishwesh K. Kulkarni, Fred D. Finkleman, and Susan E. Waltz

Précis: This study suggests a new strategy to treat prostate tumors, by blocking a tyrosine kinase that supports tumor-associated macrophages that drive immune escape.

HLA-Restricted CTL That Are Specific for the Immune Checkpoint Ligand PD-L1 Occur with High Frequency in Cancer Patients
Shamaila Munir, Gitte Holmen Andersen, Özcan Met, Marco Donia, Thomas Mørch Frøsig, Stine Kiaer Larsen, Tobias Wierenfeldt Klausen, Inge Marie Svane, and Mads Hald Andersen

Précis: PD-L1-specific cytotoxic T cells described for the first time in this study may be useful to harness for cancer immunotherapy to defeat mechanisms of immune escape used in various cancers mediated by the PD1 pathway.
1821  Dormant Cancer Cells Contribute to Residual Disease in a Model of Reversible Pancreatic Cancer


**Precise:** A novel mouse model reveals essential roles for deregulated c-Myc in the initiation, progression, maintenance, and recurrence of pancreatic ductal adenocarcinoma.

1831  Proliferation-Independent Control of Tumor Glycolysis by PDGFR-Mediated AKT Activation

Cong Ran, Huan Liu, Yasuyuki Hitoshi, and Mark A. Israel

**Precise:** Findings argue that tyrosine kinase growth factor signaling directly affects glucose metabolism in glioma and is not a secondary response to enhanced proliferation, as suggested in other cancer models.

1844  Telomere Length and Telomerase Activity Impact the UV Sensitivity Syndrome Xeroderma Pigmentosum C

Gerlind J. Stout and Maria A. Blasco

**Precise:** Findings reveal a role for the DNA repair protein XPC in telomere stability and how activation occurs for the ALT pathway of telomere maintenance, a broadly important aspect of tumor formation.

1855  xCT Inhibition Depletes CD44v-Expressing Tumor Cells That Are Resistant to EGFR-Targeted Therapy in Head and Neck Squamous Cell Carcinoma

Momoko Yoshikawa, Kenji Tsuchihashi, Takatsugu Ishimoto, Toshihumi Yae, Takeshi Motoharu, Eiji Suqihara, Nobuyuki Onishi, Takashi Masuko, Kunio Yoshizawa, Shuichi Kashiwabara, Makio Mukai, Seiji Asoda, Hiromasa Kawanami, Tanekazu Nakagawa, Hideyuki Saya, and Osamu Nagano

**Precise:** Cells that express variant isoforms of the stem cell-determining factor CD44 rely on the activity of a cystine transporter subunit that affects redox status and EGFR function.

1867  MicroRNA-Related Genetic Variants Associated with Clinical Outcomes in Early-Stage Non–Small Cell Lung Cancer Patients

Xia Pu, Jack A. Roth, Michelle A.T. Hildebrandt, Yuanqing Ye, Hua Wei, John D. Minna, Scott M. Lippman, and Xifeng Wu

**Precise:** This large study of non-small cell lung cancer suggests that miRNA-related polymorphisms can predict clinical outcomes at a level that may be superior to other markers developed previously.

1876  Genetic Variation in Transforming Growth Factor Beta 1 and Mammographic Density in Singapore Chinese Women

Eunjung Lee, David Van den Berg, Chris Hsu, Giske Ursin, Woon-Puay Koh, Jian-Min Yuan, Daniel O. Stram, Mimi C. Yu, and Anna H. Wu

**Precise:** Host genetic polymorphisms in a key growth factor in breast cancer may help identify women at an increased risk of breast cancer.

1883  Identification of Inherited Genetic Variations Influencing Prognosis in Early-Onset Breast Cancer

Sajjad Rafiq, William Tapper, Andrew Collins, Soffia Khan, Ioannis Politopoulos, Sue Gerty, Carl Blomqvist, Fergus J. Couch, Heli Nevanlinna, Jianjun Liu, and Diana Eccles

**Precise:** This study maps host genetic variations that affect risks of poor prognosis in early onset breast cancer patients, with implications for how aggressive treatments should be used to improve survival outcomes.

1892  Focused Ultrasound Delivers Targeted Immune Cells to Metastatic Brain Tumors

Ryan Alkins, Alison Burgess, Milan Ganguly, Giulio Francia, Robert Kerbel, Winfried S. Wels, and Kullervo Hynynen

**Precise:** Noninvasive MR-guided focused ultrasound allows targeted natural killer cells to circumvent the blood-brain barrier and treat HER2-amplified breast metastasis in the brain.

1900  Caveolin-1–LRP6 Signaling Module Stimulates Aerobic Glycolysis in Prostate Cancer

Salahaldin A. Tahir, Guang Yang, Alexei Goltssov, Ki-Duk Song, Chengzhen Ren, Jianxiang Wang, Wenjun Chang, and Timothy C. Thompson

**Precise:** This study offers mechanistic insights into how aerobic glycolysis is increased in prostate cancer, possibly revealing critical targets for effective antimetabolic therapy in this setting.
| 1912 | Mixed Lineage Kinase MLK4 Is Activated in Colorectal Cancers Where It Synergistically Cooperates with Activated RAS Signaling in Driving Tumorigenesis
Miriam Martini, Mariangela Russo, Simona Lamba, Elisa Vitelli, Emily Hannah Crowley, Francesco Sassi, Davide Romanelli, Milo Frattini, Antonio Marchetti, and Alberto Bardelli

Precis: Findings support the development of small molecule inhibitors of the kinase MLK4 to treat the significant number of KRAS-mutant colorectal cancers that arise in humans. |
| 1922 | A Novel Inhibitor of STAT3 Homodimerization Selectively Suppresses STAT3 Activity and Malignant Transformation
Xiaolei Zhang, Ying Sun, Roberta Pireddu, Hua Yang, Murali K. Uslug, Harshani R. Lawrence, Wayne C. Guida, Nicholas J. Lawrence, and Said M. Sebti

Precis: STAT3 provides critical support in cancer cells and the immune microenvironment in tumors, but bioactive small molecule inhibitors that offer tractable qualities for clinical translation have been elusive. |
| 1934 | Alkaline Phosphatase ALPPL-2 Is a Novel Pancreatic Carcinoma-Associated Protein
Pooja Dua, Hye Suk Kang, Seung-Mo Hong, Ming-Sound Tsao, Soyun Kim, and Dong-Ki Lee

Precis: An aptamer selection strategy identifies an enzyme that may be useful for blood-based detection of pancreatic cancer. |
| 1946 | mTOR Complex 2 Is Involved in Regulation of Chl-Dependent c-FLIP Degradation and Sensitivity of TRAIL-Induced Apoptosis
Liqun Zhao, Ping Yue, Fadlo R. Khuri, and Shi-Yong Sun

Precis: Findings show how mTORC2 stabilizes the FLIP apoptotic regulators, thereby connecting mTORC2 signaling to death receptor-mediated apoptosis. |
| 1958 | PhosphoProfile of DPYD Variations Relevant to 5-Fluourouracil Sensitivity Using Real-time Cellular Analysis and In Vitro Measurement of Enzyme Activity
Steven M. Offer, Natalie J. Wegner, Croix Fossum, Kangsheng Wang, and Robert B. Diasio

Precis: An understanding of the contribution of DPYD alleles to 5-FU toxicity will facilitate the generation of clinically relevant predictive tests and promote the individualization of treatment based on genotype. |

TUMOR AND STEM CELL BIOLOGY

| 1969 | Involvement of Lyn and the Atypical Kinase SgK269/PEAK1 in a Basal Breast Cancer Signaling Pathway

Precis: This study addresses a rationale to target basal breast cancers, also known as triple negative breast cancers, which present a major clinical challenge due to their aggressive nature and lack of targeted treatments. |
| 1981 | FOXC2 Expression Links Epithelial–Mesenchymal Transition and Stem Cell Properties in Breast Cancer
Brett G. Hollier, Agata A. Tinnirello, Steven J. Werden, Kurt W. Evans, Joseph H. Taube, Tapasree Roy Sarkar, Nathalie Sphyris, Maryam Shariati, Sreedevi V. Kumar, Venkata L. Ballula, Jason I. Herschkowitz, Rudy Guerra, Jeffrey T. Chang, Naoyuki Miura, Jeffrey M. Rosen, and Sendurai A. Mani

Precis: Findings of this study suggest a rational new target for anti-EMT therapy of cancer stem cells, perhaps relevant to many types of malignancy. |
| 2003 | Characterization of a Novel PERK Kinase Inhibitor with Antitumor and Antiangiogenic Activity
Charity Atkins, Qi Liu, Elisabeth Minthorn, Shu-Yun Zhang, David J. Figueroa, Katherine Moss, Thomas B. Stanley, Brent Sanders, Aaron Goetz, Nathan Gaul, Anthony E. Choudhry, Hasan Alsaid, Beat M. Jucker, Jeffrey M. Axten, and Rakesh Kumar

Precis: Inhibition of PERK kinase, which controls the unfolded protein response (UPR), a near universally elevated process in cancer cells, was also found unexpectedly to affect amino acid metabolism, blood vessel density, and vascular perfusion in tumors. |

| 2003 | Genetic Amplification of the NOTCH Modulator LNX2 Upregulates the WNT/β-Catenin Pathway in Colorectal Cancer
Jordi Camps, Jason J. Pitt, Georg Emons, Amanda B. Hummon, Chanelle M. Case, Marian Grade, Tamara L. Jones, Quang T. Nguyen, B. Michael Ghadimi, Tim Beissbarth, Michael J. Dillipiantonio, Natasha J. Caplen, and Thomas Ried

Precis: Notch and Wnt signaling pathways are upregulated by overexpression of a ligand for the endocytic adaptor protein Numb, a Notch inhibitory protein, coordinately stimulating both of these critical oncogenic pathways in colorectal cancer. |
ABOUT THE COVER

Inactivation of the tumor suppressor p53 frequently occurs in tumors and tumor-associated stromal cells. This study shows that p53 dysfunction in tumor-associated stroma of B16F1 melanoma favors tumor establishment and progression by promoting an inflammatory microenvironment. Using immunofluorescence, it was found that lymphoid-like fibroblastic reticular cells, which express ER-TR7 (green), GP38 (red), and α-SMA (blue), were markedly expanded in the tumor microenvironment lacking functional p53. The expansion of this specialized stromal network was associated with augmented myeloid derived suppressor cells and angiogenesis. For details, see the article by Guo and colleagues on page 1668.