Acute and Fractionated Irradiation Differentially Modulate Glioma Stem Cell Division Kinetics
Xuefeng Gao, J. Tyson McDonald, Lynn Hlatky, and Heiko Enderling
Précis: Different types of radiation treatment for aggressive brain tumors exert distinct effects on stem cells, with profound implications for treatment regimens currently used.

The Planar Cell Polarity Pathway Drives Pathogenesis of Chronic Lymphocytic Leukemia by the Regulation of B-Lymphocyte Migration
Markéta Kaucká, Karla Plevoňová, Šárka Pavlová, Pavlína Janovská, Archana Mishra, Jan Verner, Jiřina Procházková, Pavel Krejčí, Jana Kotasová, Petra Ovesná, Boris Tichý, Yvona Brychtová, Michael Doubek, Alois Kozubík, Jiří Mayer, Šárka Pospíšilová, and Vítězslav Bryja
Précis: A class of molecules regulating cell polarity in circulating chronic lymphocytic leukemia cells mediates key pathogenic interactions with their microenvironment that determine prognosis.

Autoantibody Signatures Involving Glycolysis and Splicesome Proteins Precede a Diagnosis of Breast Cancer among Postmenopausal Women
Jon J. Ladd, Timothy Chao, Melissa M. Johnson, Ji Qiu, Alice Chin, Rebecca Israel, Sharon J. Pitteri, Jianning Mao, Mei Wu, Lynn M. Amon, Martin McIntosh, Christopher Li, Ross Prentice, Nora Disis, and Samir Hanash
Précis: Circulating proteins, free autoantibodies, and protein-antibody complexes are defined in breast cancer patients, with possible implications for earlier detection of disease.
Acidity Generated by the Tumor Microenvironment Drives Local Invasion

Precis: Striking findings show that tumor invasion into adjacent normal tissues proceeds in the direction of low pH and that simply lowering the acidity of adjacent tissues in vivo by administering sodium bicarbonate is sufficient to block invasion.

Interstitial Flow in a 3D Microenvironment Increases Glioma Invasion by a CXCR4-Dependent Mechanism
Jennifer M. Munson, Ravi V. Bellamkonda, and Melody A. Swartz

Precis: Strategies to alter interstitial flow patterns in brain tumors may combat invasive dissemination and therapeutic failures occurring in this disease.

Localized Immunotherapy via Liposome-Anchored Anti-CD137 plus IL-2 Prevents Lethal Toxicity and Elicits Local and Systemic Antitumor Immunity
Brandon Kwong, S. Annie Gai, Jamal Elkhader, K. Dane Wittrup, and Darrell J. Irvine

Precis: A nanoparticle-based platform for intratumoral delivery of potent immunotherapeutic agents enables antitumor immunity while avoiding systemic toxicities.

Id-1 Is a Key Transcriptional Regulator of Glioblastoma Aggressiveness and a Novel Therapeutic Target

Precis: A factor associated previously with angiogenesis support is found to control the aggressiveness and self-renewal potential of glioblastoma, the most common and deadly primary adult brain tumor.

FoxA1 Specifies Unique Androgen and Glucocorticoid Receptor Binding Events in Prostate Cancer Cells
Biswajoyti Sahu, Marko Laakso, Paivi Pihlajamaa, Kristian Ovaska, levgenni Sinielnikov, Sampsa Hautaniemi, and Olli A. Jänne

Precis: The findings of this study raise questions about the precise specificity of accepted androgen receptor pathways in castration-resistant prostate tumors under androgen-deprived states.

ALX1 Induces Snail Expression to Promote Epithelial-to-Mesenchymal Transition and Invasion of Ovarian Cancer Cells
Hong Yuan, Hiroaki Kajiyama, Satoko Ito, Nobuhisa Yoshikawa, Toshinori Hyodo, Eri Asano, Hitoki Hasegawa, Masao Maeda, Kiyofumi Shibata, Michinari Hamaguchi, Fumiataka Kikkawa, and Takeshi Senga

Precis: A homeobox transcription factor implicated in mesenchymal differentiation and craniofacial development upregulates the EMT regulator Snail to drive invasion and metastasis.

Epigenetic Regulator Smchd1 Functions as a Tumor Suppressor

Precis: Results identify a chromatin modifier that may act through the same pathways as MLL chimeric proteins in driving a variety of hematopoietic cancers.

Prospective Analysis of Body Mass Index, Physical Activity, and Colorectal Cancer Risk Associated with β-Catenin (CTNNB1) Status
Tepppei Morikawa, Aya Kuchiba, Paul Lochhead, Reiko Nishihara, Mai Yamauchi, Yu Imamura, Xiaoyun Liao, Zhi Rong Qian, Kimmie Ng, Andrew T. Chan, Jeffrey A. Meyerhardt, Edward Giovannucci, Charles S. Fuchs, and Shuji Ogino

Precis: Obesity and low physical activity associate with increased risk of colorectal cancers that do not involve β-catenin, the chief target of the WNT pathway, but not risk of β-catenin-positive colorectal cancers, which may be more aggressive.
THERAPEUTICS, TARGETS, AND CHEMICAL BIOLOGY

1611 Imatinib Radiosensitizes Bladder Cancer by Targeting Homologous Recombination
Boling Qiao, Martin Kerr, Blaz Groselj, Mark T.W. Teo, Margaret A. Knowles, Robert G. Bristow, Roger M. Phillips, and Anne E. Kiltie

Précis: The tyrosine kinase inhibitor Gleevec may have additional uses to radiosensitize tumors that are defective in non-homologous end joining (NHEJ), with the potential to greatly expand clinical applications of this agent.

1621 Targeting XRCC1 Deficiency in Breast Cancer for Personalized Therapy
Rebeka Sultana, Tarek Abdel-Fatah, Rachel Abbotts, Claire Hawkes, Nadia Albarakati, Claire Seedhouse, Graham Ball, Stephen Chan, Eman A. Rakha, Ian O. Ellis, and Srinivasan Madhusudan

Précis: Findings suggest how XRCC1 deficiency in breast cancer can inform choice of targeted chemotherapies for treatment, based on the synthetic lethality that can be achieved with the inhibition of particular mechanisms of DNA double-strand break repair.

ABOUT THE COVER

Intravital image of tumor growth within a dorsal window chamber. HCT116/GFP-expressing tumors were grown within a dorsal window chamber, where its growth was monitored over time. Images were captured following excitation with an Argon laser at 488 nm and emission was collected with a 498–538 nm bandpass filter using an Olympus FV1000 multiphoton microscope. Tumor at day 14 was pseudo-colored red in order to superimpose the tumor image on day 4 (green). Growth was quantified along radial lines from the centroid of the day 4 tumor and compared with registered images of the peritumoral pH to correlate growth and invasion to acidity. For details, see article by Estrella and colleagues on page 1524.

TUMOR AND STEM CELL BIOLOGY

1635 HER2 Drives Luminal Breast Cancer Stem Cells in the Absence of HER2 Amplification: Implications for Efficacy of Adjuvant Trastuzumab

Précis: HER2 selectively regulates the cancer stem cell population in luminal breast cancers, perhaps explaining the clinical benefits of adjuvant trastuzumab therapy in tumors where the HER2 gene is not amplified.