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Publications of the Week

RAF1 Amplification Drives a Subset of Bladder Tumors and Confers Sensitivity to MAPK-Directed Therapeutics

First Author: Rose Bradley | Senior Author: Kent Mouw (pictured)
The Journal of Clinical Investigation | Dana-Farber Cancer Institute, Brigham and Women's Hospital, and Beth Israel Deaconess Medical Center

Bladder cancer is a genetically heterogeneous disease and novel therapeutic strategies are needed to expand treatment options and improve clinical outcomes. The authors identified a unique subset of urothelial tumors with focal amplification of the *RAF1* (CRAF) kinase gene. *RAF1*-amplified tumors had activation of the RAF/MEK/ERK signaling pathway and exhibited a luminal gene expression pattern.

Profile | Abstract

A 3D-Bioprinted Multiple Myeloma Model

First Author: Di Wu | Senior Authors: Kenneth Anderson, Dhanminder Chauhan, and Yu Shrike Zhang (pictured, second row, ninth from left)

Multiple myeloma (MM) is a malignancy of plasma cells accounting for approximately 12% of hematological malignancies. In this study, the fabrication of a high-content *in vitro* MM model using a coaxial extrusion bioprinting method is reported, allowing formation of a human bone marrow-like microenvironment featuring an outer mineral-containing sheath and the inner soft hydrogel-based core.

Profile | Abstract

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Awards

Seven from MIT Receive National Institutes of Health Awards

McGovern Institute

On October 5, the National Institutes of Health announced the names of 106 scientists who have been awarded grants through the High-Risk, High-Reward Research program to advance highly innovative biomedical and behavioral research. Seven of the recipients are MIT faculty members including Dr. Seychelle Vos (pictured), who studies the interplay of gene expression and genome organization.

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MCO Graduate Students Maati Mckinney and Anastasia Repouliou Awarded Research Fellowships

Harvard Department of Molecular and Cellular Biology

Fellowship funding for graduate students fuels research at universities around the world, and the MCO (Molecules, Cells, and Organisms) Program is no exception. Maati McKinney *(pictured, left)* was awarded fellowships by both the National Science Foundation Graduate Research Fellowship Program and the National Graduate Degrees for Minorities in Engineering and Science Consortium. Anastasia Repouliou *(right)* earned a PhD Fellowship from the Boehringer Ingelheim Fonds.

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Local News

Unraveling the Mystery of Touch

Harvard Medical School

Some parts of the body — our hands and lips, for example — are more sensitive than others, making them essential tools in our ability to discern the most intricate details of the world around us. A new study led by researchers in Dr. David Ginty's *(pictured)* lab at Harvard Medical School has unveiled a mechanism that may underlie the greater sensitivity of certain skin regions.

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Investigators at McLean Receive Award to Test Xenon Gas as Treatment for Opioid Use Disorder

McLean Hospital

Researchers at McLean Hospital, in collaboration with Nobilis Therapeutics, have been awarded a grant to test a novel xenon gas-based treatment for opioid use disorder. The investigators have not yet tested the effects of xenon on opioid withdrawal symptoms. However, others have shown that xenon rapidly lowers the activity of the sympathetic nervous system, which drives the symptoms experienced by individuals during opioid withdrawal.

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New Scientific Resource Will Help Uncover the Genetic Underpinnings of Type 2 Diabetes

Massachusetts General Hospital

Investigators have developed a resource for analyzing how genetic variants in cells that drive type 2 diabetes may contribute to the disease. The resource, called TIGER (for Translational human pancreatic Islet Genotype tissue-Expression Resource), is available to the scientific community to help advance diabetes-related research. "Knowing the gene behind a given genetic association is the first step for identifying potential drug targets," says Dr. Josep Mercader *(pictured)*.

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Study Results Support Stem Cell Transplantation for Older Patients with Myelodysplastic Syndromes

Dana-Farber Cancer Institute

Although stem cell transplantation is the only current therapy with the potential to cure myelodysplastic syndromes, it is rarely used as an initial treatment for older patients because it hasn't been proven superior to other therapies. New research by Dr. Corey Cutler *(pictured)* and other Dana-Farber Cancer Institute investigators stands to overturn that practice.

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Research Points to a Strategy for Overcoming Colorectal Cancers' Immunotherapy Resistance

Massachusetts General Hospital

Immune checkpoint inhibitors boost a patient's immune response against cancer cells, but not all cancers respond to the treatment. New research indicates that the location where cancer cells grow and a lack of a certain type of immune cells called dendritic cells may be responsible for this resistance. In mice, boosting dendritic cell numbers caused colorectal cancer liver metastases that were resistant to immune checkpoint inhibitors to become sensitive to the treatment.

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BIDMC Researchers Confirm High Toxin Levels Linked to More Severe *C. difficile* Infection

Beth Israel Deaconess Medical Center

Estimated to cause almost half a million infections per year, the bacterium *Clostridioides difficile*, also known as *C. difficile* or *"C. diff,"* can cause diarrhea and inflammation of the large intestine. In a new publication, researcher-physicians at Beth Israel Deaconess Medical Center (BIDMC) used a novel, highly-sensitive test to measure the amount of toxin produced by *C. difficile* in the stool of patients with suspected infections.

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Forsyth Researchers Reveal That Oral TM7 Bacteria May Protect Humans from Pathogenic Bacteria

Forsyth Institute

A group of bacteria called TM7 live in the human body by growing on the surfaces of other microbes, known as host bacteria. Ever since this arrangement was discovered, many scientists have assumed TM7 were harmful to humans, while their host bacteria were health promoting. A new paper published by Forsyth Institute researchers incuding Dr. Batbileg Bor *(pictured)* finds the opposite effect — TM7 decreased periodontal inflammation and bone loss in a mouse model.

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Richard Merkin Renews Support for Transformative Science at Broad

Broad Institute

For more than a decade, Dr. Richard Merkin has supported research at the Broad, enabling scientists to develop new genome-editing technologies, gain insight into how DNA is organized in cancer cells, and devise methods for discerning the function of genetic variants. Dr. Merkin is making a new transformative gift to the Broad Institute to further advance the Merkin Institute and the Merkin Fellows.

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Massage Helps Injured Muscles Heal Faster and Stronger

The Harvard Gazette

Massages feel good, but do they actually speed muscle recovery? Turns out, they do. Scientists in Dr. Dave Mooney's *(pictured)* lab applied precise, repeated forces to injured mouse leg muscles and found that they recovered stronger and faster than untreated muscles, likely because the compression squeezed inflammation-causing cells out of the muscle tissue.

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Single-Cell Exploration of the Mouse Brain Reveals New Cell Type

Broad Institute

The 100 billion cells in the human brain have a vast array of specializations — distinct shapes, types, functions, and connectivities — all of which contribute to the cellular diversity underlying our complex behavior as humans. Yet scientists don't know all the cell types in the brain. A new study is bringing scientists one step closer to a more thorough understanding of the cellular make-up of the brain.

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Enhancing Drug Delivery with Ultrasound

MIT Alumni

It can be difficult to get drugs to disease sites along the gastrointestinal tract, which spans the mouth, esophagus, stomach, small and large intestine, and anus. Invasive treatments can take hours as patients wait for adequate amounts of drugs to be absorbed at the right location. The same problem is holding back newer treatments like gene-altering therapies.

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Riaan Research Initiative Funds Cockayne Syndrome Gene Replacement Therapy Research at UMass Chan Medical School

UMass Chan Medical School

Riaan Research Initiative, a nonprofit organization, and UMass Chan Medical School are entering into an agreement to fund, research, and develop a gene replacement therapy to combat Cockayne syndrome, a fatal autosomal recessive disorder. The research will be led by Drs. Ana Rita Batista *(pictured, left)* and Miguel Sena-Esteves *(right)*, utilizing a mouse model that exhibits the severe phenotype seen in Cockayne syndrome patients.

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New Study Reveals Lung Cell Roles in Pulmonary Immunity

BU School of Medicine

Lung immunity is essential to combat all pulmonary diseases, including COVID-19, pneumonia, lung cancer, asthma and chronic obstructive pulmonary disease. Lung immunity differs from the systemic immunity which is the normal focus of biomedical investigations and interventions, but factors influencing the establishment and regulation of lung immunity are mostly still unknown. Now, a new study reveals lung cell roles in guiding the immune system.

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Artificial Networks Learn to Smell Like the Brain

McGovern Institute

Using machine learning, a computer model can teach itself to smell in just a few minutes. Animals from fruit flies to humans all use essentially the same strategy to process olfactory information in the brain. But neuroscientists who trained an artificial neural network to take on a simple odor classification task were surprised to see it replicate biology's strategy so faithfully.

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Interesting Articles

Maria Zuber Testifies before Congress on Striking the Right Balance between Research Security and Openness

MIT News

The United States must perform a careful balancing act to secure federally funded research against improper interference from China and other foreign governments without shutting down valuable international scientific research collaborations, MIT Vice President for Research Maria Zuber said this week in testimony before Congress.

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Upcoming Events in Boston

October 19 7:00 PM	**Communicating about Science in a World of Misinformation: A Conversation with Linda Henry and Rick Berke** Online	
October 20 9:00 AM	**Jumpstarting Your Start Up** Online	
October 28 - 29 8:00 AM	**Forsyth Scientific Symposium: Oral Microbiome — Beyond Bacteria** Forsyth Institute	
November 1 6:30 PM	**Entrepreneurship at the Koch Institute** Online	
November 4 10:00 AM	**MassBio Digital Health Impact 2021** Online	

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