

Publications of the Week
Opposing Immune and Genetic Mechanisms Shape Oncogenic Programs in Synovial Sarcoma

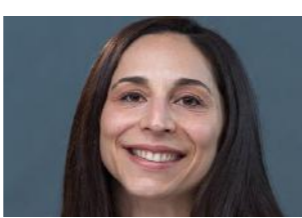
First Author: Lihnat Jerby-Arnon | Senior Author: Aviv Regev *(pictured)*
 Nature Medicine | Broad Institute of Harvard and MIT and the Koch Institute for Integrative Cancer Research



The authors studied the cancer-immune interplay in synovial sarcoma (SyS) using an integrative approach that combined single-cell RNA sequencing (scRNA-seq), spatial profiling and genetic and pharmacological perturbations. scRNA-seq of 16,872 cells from 12 human SyS tumors uncovered a malignant subpopulation that marks immune-deprived niches *in situ* and is predictive of poor clinical outcomes in two independent cohorts. [Abstract](#)

Targeting a BRAF/MAPK Pathway Rescues Podocyte Lipid Peroxidation in CoQ Deficiency Kidney Disease

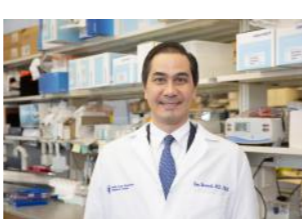
First Author: Eriene-Heidi Sidhom | Senior Author: Anna Greka *(pictured)*
 The Journal of Clinical Investigation | The Broad Institute of Harvard & MIT, Brigham & Women's Hospital and Harvard Medical School



The authors illuminated non-canonical, cell-specific roles for coenzyme Q (CoQ), independent of the electron transport chain (ETC). They demonstrated that CoQ depletion caused by Pds2 enzyme deficiency in podocytes resulted in perturbations in polyunsaturated fatty acid metabolism and the Braf/Mapk pathway, rather than ETC dysfunction. [Abstract](#)

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Local News
Coronavirus: Fact vs Fiction

CNN Audio



Dr. Dan Barouch *(pictured)* is the Director of the Center for Virology and Vaccine Research at Beth Israel Deaconess Medical Center in Boston, and is helping develop Johnson & Johnson's vaccine candidate. CNN Chief Medical Correspondent Dr. Sanjay Gupta talks to him about how this vaccine is different, and how soon it could reach Americans. [Read More](#)

Researchers Construct Molecular Nanofibers That Are Stronger Than Steel

MIT News



MIT researchers have designed small molecules that spontaneously form nanoribbons when water is added. These molecules include a Kevlar-inspired "aramid" domain in their design, which fixes each molecule in place and leads to nanoribbons that are stronger than steel. Parts of the molecules attracted to or repulsed from water, orient and guide the molecules to form a nanostructure. [Read More](#)

A High-Resolution Glimpse of Gene Expression in Cells

MIT News



Using a novel technique for expanding tissue, MIT and Harvard Medical School researchers have devised a way to label individual molecules of messenger RNA within a tissue sample and then sequence the RNA. This approach offers a unique snapshot of which genes are being expressed in different parts of a cell, and could allow scientists to learn much more about how gene expression is influenced by a cell's location or its interactions with nearby cells. [Read More](#)

Neuroscientists Identify Individual Neurons Responsible for Complex Social Reasoning in Humans

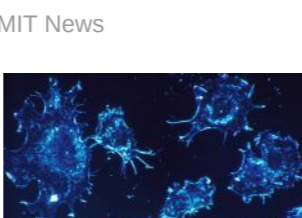
Massachusetts General Hospital



For the first time, scientists have identified the individual neurons critical to human social reasoning, a cognitive process that requires us to acknowledge and predict others' hidden beliefs and thoughts. A team of neuroscientists at Massachusetts General Hospital and MIT led by Dr. Ziv Williams *(pictured)* had a rare look at how individual neurons represent the beliefs of others by recording neuron activity in patients undergoing neurosurgery to alleviate symptoms of motor disorders such as Parkinson's disease. [Read More](#)

Robust Artificial Intelligence Tools to Predict Future Cancer

MIT News



To catch cancer earlier, we need to predict who is going to get it in the future. The complex nature of forecasting risk has been bolstered by AI tools, but the adoption of AI in medicine has been limited by poor performance on new patient populations and neglect to racial minorities. MIT researchers have improved their machine learning system developed to predict cancer risk from mammogram images, and validated their effectiveness with studies across several hospitals. [Read More](#)

For pTyr's Sake

Koch Institute for Integrative Cancer Research



Researchers in the White Lab, including Dr. Lauren Stopfer *(pictured)*, have developed a new method, SureQuant pTyr, that allows for reliable and accurate measurement of one type of cell signaling activity, tyrosine phosphorylation. Often dysregulated in cancer, tyrosine phosphorylation is a process that initiates cell signaling cascades related to proliferation, programmed cell death, and survival. [Read More](#)

We May Soon Have a Third Vaccine. Here's What You Need to Know About the Johnson & Johnson Shot

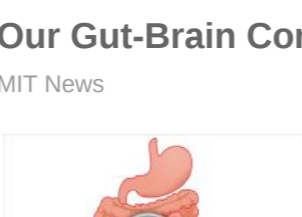
Boston Globe



A new COVID-19 vaccine from Johnson & Johnson that uses technology pioneered by the Center for Virology and Vaccine Research at Beth Israel Deaconess Medical Center made headlines when results of its late-stage clinical trials were announced. The development was hailed as good news, even though the company reported that its one-shot vaccine had a lower efficacy rate than the two-dose vaccines from Pfizer-BioNTech and Moderna. [Read More](#)

Our Gut-Brain Connection

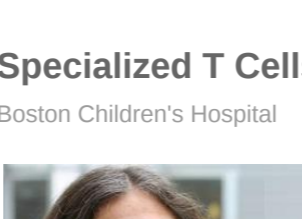
MIT News



In many ways, our brain and our digestive tract are deeply connected. Feeling nervous may lead to physical pain in the stomach, while hunger signals from the gut make us feel irritable. Recent studies have even suggested that the bacteria living in our gut can influence some neurological diseases. MIT researchers have developed an "organs-on-a-chip" system that replicates interactions between the brain, liver, and colon. [Read More](#)

Specialized T Cells Protect against the Deadliest Form of Malaria

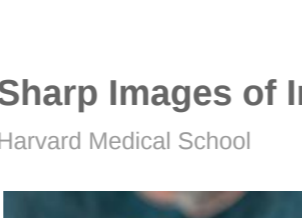
Boston Children's Hospital



Scientists in the laboratory of Dr. Judy Lieberman *(pictured)* of the Program in Cellular and Molecular Medicine have discovered that a type of lymphocyte in the blood appears to protect against blood-stage malaria. During this critical phase of the disease, symptoms develop and the disease spreads throughout the body. The team discovered that this lymphocyte was able to destroy red blood cells infected by the parasite *Plasmodium falciparum* found in Africa. [Read More](#)

Sharp Images of Immune Protein Pair Promise to Guide Drug Design

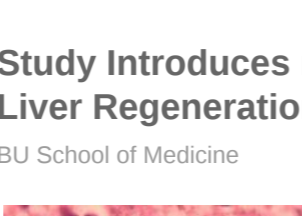
Harvard Medical School



Researchers in the Blavatnik Institute at Harvard Medical School have pieced together the near-atomic structures of a pair of proteins crucial for B cell function. The work provides invaluable details that may guide the design of new therapies that disable dysfunctional B cells or boost the activity of healthy B cells to treat diseases such as lymphoma, immune deficiencies, and autoimmune disorders. [Read More](#)

Study Introduces mRNA-LNP as a Safe Therapeutic Intervention to Harness Liver Regeneration

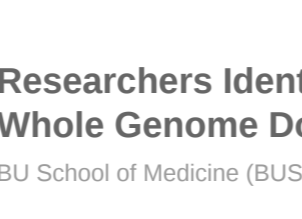
BU School of Medicine



When severely or chronically injured, the liver loses its ability to regenerate. A new study led by researchers at the Center for Regenerative Medicine now describes a safe new potential therapeutic tool for the recovery of liver function in chronic and acute liver diseases. Researchers utilized the lipid nanoparticle-encapsulated messenger RNA (mRNA-LNP) currently used in COVID-19 vaccines, to deliver regenerative factors to injured livers in a timely, controlled fashion. [Read More](#)

Researchers Identify Genetic Dependencies in Tumors that have Undergone Whole Genome Doubling

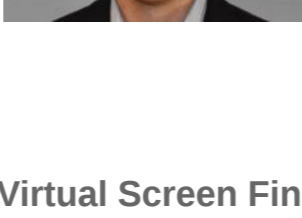
BU School of Medicine (BUSM)



BUSM researchers have identified proteins that are essential for the viability of whole genome doubled tumor cells, yet non-essential to normal cells that comprise the majority of human tissue. "Exploiting these vulnerabilities represents a highly significant and currently untapped opportunity for therapeutic intervention, particularly because whole genome doubling is a distinguishing characteristic of many tumor types," said corresponding author Dr. Neil Ganem *(pictured)*. [Read More](#)

Virtual Screen Finds Compounds that Could Combat SARS-CoV-2

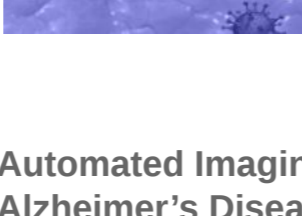
Harvard Medical School



Less than a year ago, Harvard Medical School researchers and international colleagues unveiled a platform called VirtualFlow that could swiftly sift through more than 1 billion chemical compounds and identify those with the greatest promise to become disease-specific treatments, providing researchers with invaluable guidance before they embark on expensive and time-consuming lab experiments and clinical trials. [Read More](#)

Automated Imaging Detects and Tracks Brain Protein Involved in Alzheimer's Disease

Massachusetts General Hospital



Amyloid-beta and tau are the two key abnormal protein deposits that accumulate in the brain during the development of Alzheimer's disease, and detecting their buildup at an early stage may allow clinicians to intervene before the condition has a chance to take hold. A team led by investigators at Massachusetts General Hospital has now developed an automated method that can identify and track the development of harmful tau deposits in a patient's brain. [Read More](#)

Ninning Liu on DNA Barcoding

Wyss Institute



When Ninning Liu *(pictured)* started his work-study job in college as a research assistant, he discovered a love for microscopy. At the time, he thought a good microscope image was about as close to an unambiguous answer as you could get in biology. But what if you could get information about biological function and form from the same image? Now, Ninning and his team are exploring that possibility with their generalized DNA barcoding technology platform. [Read More](#)

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Upcoming Events in Boston

February 9 4:00 PM	Biology Colloquium Series (Dr. Linda Partridge) Online
February 12 8:00 AM	Virtual Symposium: Closing the Gap Between Research and Clinical Application - Neuroimaging Indicators of Brain Structure and Function Online
February 16 12:00 PM	College of Science Connects: Research at the Frontier of Bioanalytical Chemistry Online
February 17 9:00 AM	MIT Microbiome Club Seminar: Dr. Daniela Vargas Online
February 18 12:30 PM	Bioinformatics Sponsored Systems Biology Seminar Online

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Science Jobs in Boston

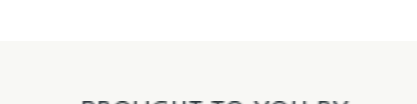
- Scientist, Microbiologist/Microbiome**
Prolacta Bioscience
- Director, Immuno-Oncology**
Dragonfly Therapeutics
- Immuno-Oncology/Cell Therapy Scientist**
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Harvard Medical School
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