

Publications of the Week

Single-Cell Lineage Tracing Unveils a Role for TCF15 in Hematopoiesis

First Author: Alejo Rodriguez-Fraticelli | Senior Author: Fernando Camargo (pictured)
Nature | Harvard University and Boston Children's Hospital Stem Cell Program



The authors implemented expressible lentiviral barcoding, which enabled simultaneous analysis of lineages and transcriptomes from single adult hematopoietic stem cells (HSCs) and their clonal trajectories during long-term bone marrow reconstitution. Analysis of differential gene expression between clones with distinct behavior revealed an intrinsic molecular signature that characterizes functional long-term repopulating HSCs. [Abstract](#)

Local Externalization of Phosphatidylserine Mediates Developmental Synaptic Pruning by Microglia

First Author: Nicole Scott-Hewitt | Corresponding Author: Beth Stevens (pictured) | Senior Author: Michela Matteoli
The EMBO Journal | Boston Children's Hospital and the Broad Institute



Neuronal circuit assembly requires the fine balance between synapse formation and elimination. Microglia, through the elimination of supernumerary synapses, have an established role in this process. The authors showed that exposed phosphatidylserine represents a neuronal "eat-me" signal involved in microglial-mediated pruning. [Abstract](#)

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Awards

UMass Medical School Appoints Five Faculty Members to Endowed Chairs

UMass Medical School



The University of Massachusetts Board of Trustees has voted to approve the establishment of four newly endowed professorships and the appointment of five esteemed UMass Medical School faculty members to new or existing endowed chairs. The newly endowed faculty are: Douglas Golenbock, Gregory Vulture, Anastasia Khvorova (pictured), Erik Sontheimer, and Jennifer Reidy. [Read More](#)

Dr. Rahm Gummuluru Receives \$3.4 Million NIH Grant

BU School of Medicine



Dr. Rahm (Suryaram) Gummuluru (pictured), Professor and Vice-Chair of the Department of Microbiology at the BU School of Medicine, has been awarded a five-year, \$3.4 million R01 grant from the National Institutes of Health to study the molecular mechanisms by which HIV-1 infection of microglia and drugs of abuse synergize to promote persistent innate immune activation and neuronal damage. [Read More](#)

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Local News

Exhaled Biomarkers Can Reveal Lung Disease

MIT News



Using specialized nanoparticles, MIT engineers have developed a way to monitor pneumonia or other lung diseases by analyzing the breath exhaled by the patient. In a study of mice, the researchers showed that they could use this system to monitor bacterial pneumonia, as well as a genetic disorder of the lungs called alpha-1 antitrypsin deficiency. [Read More](#)

Dramatic Effect: Bone Disease Medications May Reverse Hearing Loss

Harvard Medical School



Preliminary findings from researchers at Massachusetts Eye and Ear may pave the way for trials to test bone density medications for hearing loss. The researchers have found that medications called bisphosphonates, which are commonly used to prevent bone density loss, were able to regrow damaged nerve connectors in the inner ear in mice with sensorineural hearing loss. [Read More](#)

CRISPR Comes to COVID: A Pandemic Pivot and the Push for a Simple Coronavirus Test

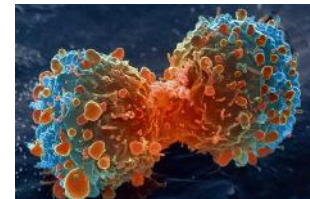
WBUR



With coronavirus tests in short supply around the country, CRISPR could help. Cambridge-based Sherlock Biosciences is using the gene-editing system in coronavirus tests approved for use in health care — the first CRISPR product to reach the market. The company hopes to come out with an at-home coronavirus test next year. [Read More](#)

A New Approach to Tailoring Cancer Therapy: Tapping into Signaling Activities in Cancer Cells

Weizmann Institute of Science



Choosing the right drug for each cancer patient is key to successful treatment, but currently physicians have few reliable pointers to guide them in designing treatment protocols. Researchers at the Broad Institute and the Weizmann Institute of Science in Israel have now developed a new method for selecting the best drug therapy for a given tumor based on assigning scores to the cells' internal messaging activities. [Read More](#)

COVID-19 Vaccine Developed by Cambridge-Based Biotech Poised for Final Testing

WDHD News



The first COVID-19 vaccine tested in the U.S. revved up people's immune systems just the way scientists had hoped, and the shots are poised to begin key final testing. The experimental vaccine, developed by the National Institutes of Health and Cambridge-based Moderna Inc., will start its most important step at the end of July: A 30,000-person study to prove if the shots really are strong enough to protect against the coronavirus. [Read More](#)

How Nutrient-Starved Cells Recycle Internal Components

Harvard Medical School



How do cells decide what to recycle when they are starving? Scientists at Harvard Medical School systematically surveyed the entire protein landscape of normal and nutrient-deprived cells to identify which proteins and organelles are degraded by autophagy. The results shed light on how cells respond to nutrient deprivation and on autophagy and protein degradation processes. [Read More](#)

Prostate Cancer Metastasis Linked to Revival of Dormant Molecular Program

Dana-Farber



Scientists have found that when prostate cancer progresses to a more dangerous metastatic state, it does so by resurrecting dormant molecular mechanisms that had guided the fetal development of the prostate gland but had been subsequently switched off. The study is an international collaboration involving Dr. Matthew Freedman (pictured) and colleagues at Dana-Farber. [Read More](#)

A Versatile Vessel for Next-Gen Therapeutics

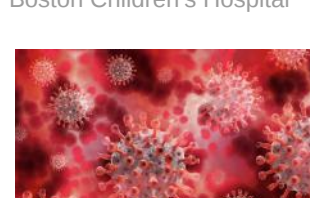
Harvard T.H. Chan School of Public Health



Harvard University's Office of Technology Development and the Harvard T.H. Chan School of Public Health have announced the launch of Vesigen Therapeutics, a startup company that aims to overcome the challenge of delivering next-generation therapeutics, such as gene-editing complexes, RNA molecules, and other large proteins, to intracellular targets in specific tissues of interest. The technology originated in the lab of Quan Lu (pictured) at the Harvard Chan School. [Read More](#)

Capturing SARS-CoV-2's Shape-Shifting Spike Protein

Boston Children's Hospital



The spike protein on the surface of SARS-CoV-2 is the main protein targeted by our antibodies and the protein used in most vaccines now in clinical trials. A study led by Boston Children's Hospital freeze-frames the spike protein for the first time in its "before" and "after" shapes. In the process, the study captured some surprising features in the "after" shape that may have implications for vaccine and therapeutic development. [Read More](#)

New Cell Profiling Method Could Speed TB Drug Discovery

Tufts Now



A new technology developed at Tufts University that combines high throughput imaging and machine learning could speed discovery of drugs to fight tuberculosis. The technology — dubbed MorphEUS — provides a rapid, efficient, cost-effective way to determine how specific compounds act to destroy *Mycobacterium tuberculosis*, the bacterium that causes tuberculosis. [Read More](#)

Erectile Dysfunction Drugs Help Destroy Misfolded Proteins in Animal Models

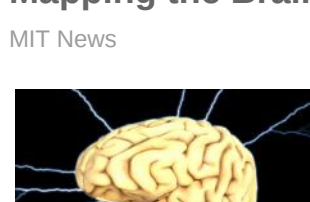
Harvard Medical School



Scientists at Harvard Medical School have identified a new mechanism for activating the cell's protein quality-control system and improving its ability to dispose of misfolded proteins. The researchers describe how PDE5 inhibitors — which include the erectile dysfunction drugs sildenafil and tadalafil — lower the accumulation of mutant proteins and reduce cell death and anatomical defects in zebrafish models of neurodegeneration. [Read More](#)

Mapping the Brain's Sensory Gatekeeper

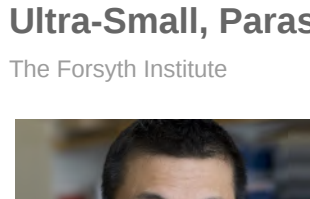
MIT News



One brain region that has been implicated in some symptoms of autism is the thalamic reticular nucleus (TRN), which is believed to act as a gatekeeper for sensory information flowing to the cortex. A team of researchers from MIT and the Broad Institute has now mapped the TRN in unprecedented detail, revealing that the region contains two distinct subnetworks of neurons with different functions. [Read More](#)

Ultra-Small, Parasitic Bacteria Found in Groundwater, Moose — and You

The Forsyth Institute



A team led by Dr. Xuesong He (pictured) at the Forsyth Institute has found that the ultra-small, parasitic *Saccharibacteria* within a mammalian host are more diverse than ever anticipated. The researchers also discovered that certain members of the bacteria are found in the oral cavity of humans, the guts of other mammals, and in groundwater. [Read More](#)

Increased Blood Sugar Levels May Decrease Benefits of Aerobic Exercise

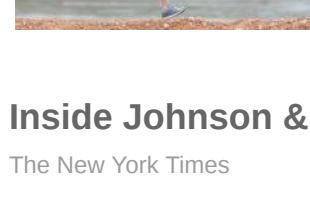
Joslin Diabetes Center via MedicalXpress



Every doctor recommends regular aerobic exercise, since greater aerobic fitness is important for achieving better overall health. But Joslin Diabetes Center scientists now have discovered that some benefits of aerobic exercise may be dampened by higher-than-normal blood sugar levels, a condition known as hyperglycemia. [Read More](#)

Inside Johnson & Johnson's Nonstop Hunt for a Coronavirus Vaccine

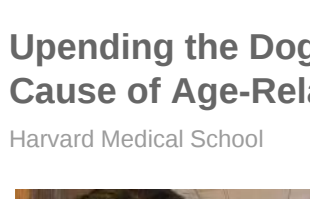
The New York Times



Each workday morning in March, Noe Mercado (pictured) drove through the desolate streets of Boston to a tall glass building on Blackfan Circle, in the heart of the city's biotech hub. Most residents had gone into hiding from the coronavirus, but Mr. Mercado had an essential job: searching for a vaccine against this new, devastating pathogen. [Read More](#)

Upending the Dogma: Study Uncovers Damage to Hair Cells as Underlying Cause of Age-Related Hearing Loss

Harvard Medical School



In a new study of human ear tissues, Dr. Pei-zhe Wu (pictured) and hearing scientists at Harvard Medical School and Massachusetts Eye and Ear have demonstrated that age-related hearing loss, also called presbycusis, is mainly caused by damage to hair cells, the sensory cells in the inner ear that transform sound-induced vibrations into electrical signals that are relayed to the brain by the auditory nerve. [Read More](#)

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Upcoming Events in Boston

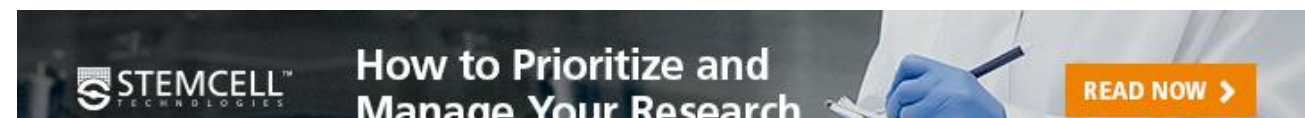
July 28 10:00 AM	Biomed Virtual Grad School Fair Online
July 29 12:00 PM	COVID-19: BioMaking Solutions – Computation-Mediated Protein Engineering of Robust Genome Editing and Anti-Viral Tools against SARS-CoV-2 Online
July 30 3:00 PM	Boston College Science on Tap: Genetic Restraints Reroute Adaptive Strategies for Attachment in Biofilms Online
August 3 3:00 PM	Rebooting Your Research Program Online
August 5 12:00 PM	Webinar: Impact of SARS-CoV-2 Infection on the Central Nervous System Online

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