

Publications of the Week

A RIPK1-Regulated Inflammatory Microglial State in Amyotrophic Lateral Sclerosis

First Author: Lauren Milfin | Senior Authors: Chengyu Zou and Junying Yuan (pictured)
PNAS | Harvard, Boston Children's Hospital, and the Broad Institute



Amyotrophic lateral sclerosis (ALS) is a devastating neurodegenerative disease. Inhibition of receptor-interacting serine/threonine-protein kinase 1 (RIPK1), a kinase which regulates cell death and neuroinflammation, has been efficacious in treating mouse models of ALS. RIPK1 inhibitors have reached phase 2 clinical trials in ALS patients. The authors explored the impact of RIPK1 inhibition on microglial-mediated neuroinflammation in ALS mouse models. [Abstract](#)

Chemokines and the Immune Response to Cancer

First Author: Aleksandra Ozga | Senior Author: Andrew Luster (pictured)
Immunity | Massachusetts General Hospital and Harvard



Chemokines are critical in directing immune cell migration necessary to mount and then deliver an effective anti-tumor immune response; however, chemokines also participate in the generation and recruitment of immune cells that contribute to a pro-tumorigenic microenvironment. The authors reviewed the role of the chemokine system in anti-tumor and pro-tumor immune responses. [Abstract](#)

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Local News

Tiny Brains Grown in 3D-Printed Bioreactor

The Picower Institute



Scientists led by Dr. Mriganka Sur (pictured) from The Picower Institute for Learning and Memory at MIT have grown small amounts of self-organizing brain tissue, known as organoids, in a tiny 3D-printed system that allows observation while they grow and develop. The current advance uses 3D printing to create a reusable and easily adjustable platform that costs only about \$5 per unit to fabricate. [Read More](#)

An On-Off Switch for Gene Editing

Whitehead Institute



Researchers developed a new gene editing technology called CRISPRoff that allows them to control gene expression with high specificity while leaving the sequence of the DNA unchanged. Designed by Whitehead Institute Member Dr. Jonathan Weissman (pictured) and collaborators, the method is stable enough to be inherited through hundreds of cell divisions, and is also fully reversible. [Read More](#)

New Nanosensor Holds Promise for Diagnosing, Treating Neurological Disease

Northeastern University



Dr. Heather Clark (pictured), Professor of Bioengineering and Chemistry at Northeastern, and Dr. James Monaghan, Associate Professor of Biology, along with colleagues at Northeastern and researchers from the University of California, San Francisco, developed a DNA-based nanosensor that detects a specific neurotransmitter, acetylcholine, as it's released and picked up by target cells in living animals. [Read More](#)

Pain Receptors Linked to the Generation of Energy-Burning Fat Cells: Implications for Obesity Therapy

Joslin Diabetes



A new source of energy expending brown fat cells has been uncovered by researchers at the Joslin Diabetes Center, which they say points towards potential new therapeutic options for obesity. "The capacity of brown and beige fat cells to burn fuel and produce heat, especially upon exposure to cold temperatures, have long made them an attractive target for treating obesity and other metabolic disorders," said Dr. Yu-Hua Tseng (pictured). [Read More](#)

Study Provides Novel Platform to Study how SARS-CoV-2 Affects the Gut

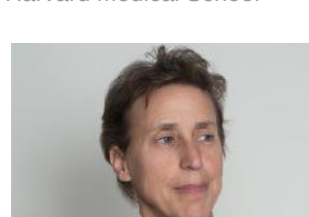
Boston University School of Medicine



How could studying gastrointestinal cells help the fight against COVID-19, which is a respiratory disease? According to a team led by Dr. Gustavo Mostoslavsky (pictured, left) at the Boston University Center for Regenerative Medicine and Dr. Elke Mühlberger (right) from the National Emerging Infectious Diseases Laboratories, testing how SARS-CoV-2 affects the gut can potentially serve to test novel therapeutics for COVID-19. [Read More](#)

Success in Sight

Harvard Medical School



Harvard Medical School researchers have taken an important step toward developing a gene therapy to treat retinitis pigmentosa (RP), an inherited form of progressive blindness. The team in Dr. Cornie Cepko's (pictured) lab showed that using a harmless virus to deliver the gene *Txnip* improved cone cell survival and helped preserve daylight vision in mouse models of RP. [Read More](#)

One Lab's Deep Exploration of a Key Cellular Machine Reveals New Disease Mechanisms and Therapeutic Opportunities

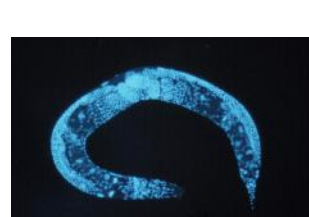
Broad Institute



Dr. Cigall Kadoch (pictured) and her group have studied a DNA-regulating complex called BAF and uncovered several new links to cancer and other diseases. The complex is essential in regulating gene activity, because it remodels the architecture of the tightly wound DNA in the cell to allow only specific genes to be expressed at any given time. BAF is also mutated in more than 20 percent of cancers. [Read More](#)

Some Like It Hot

Harvard Medical School



Researchers working with tiny worms called *Caenorhabditis elegans* — a common lab organism used to study basic principles of biology — know not to raise the temperature above about 80 degrees Fahrenheit because the worms start to die. Yet some populations of *C. elegans* in the wild thrive above that temperature, such as those that live in Athens, Georgia, and Ceres, South Africa. The worms belong to the same species, so why do they have such different tolerances to heat? [Read More](#)

Finding a Path to Neuroscience — and Blazing a Trail

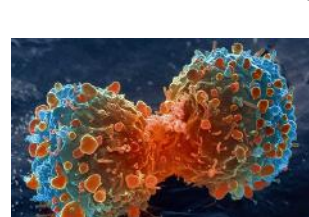
Tufts University



Najah Walton (pictured), a PhD student at the Tufts University Graduate School of Biomedical Sciences, is already mentoring younger students interested in careers in science. Her research focuses on understanding the neurological mechanisms that lead to depression. She looks at naturally produced steroids in the brain called neurosteroids, how they're impacted by chronic stress, and why chronic stress makes people vulnerable to mood disorders. [Read More](#)

Exercise Benefit in Breast Cancer Linked to Improved Immune Responses

Massachusetts General Hospital



Exercise training may slow tumor growth and improve outcomes for females with breast cancer — especially those treated with immunotherapy drugs — by stimulating naturally occurring immune mechanisms, researchers at Massachusetts General Hospital and Harvard Medical School have found. Tumors in mouse models of human breast cancer grew more slowly in mice put through a structured aerobic exercise program than in sedentary mice. [Read More](#)

Seeking the Cellular Mechanisms of Disease, With Help From Machine Learning

MIT News



Dr. Caroline Uhler (pictured) is currently working to synthesize two distinct types of genomic information: sequencing and the 3D packing of DNA. "If some genes in the DNA are not used, you can just close them off and pack them very densely. But if you have other genes that you need often in a particular cell, you'll have them open and maybe even close together so they can be co-regulated," said Dr. Uhler. [Read More](#)

Erik Sontheimer Co-Leading Efforts to Develop Gene Editing Toolkit by NIH Somatic Cell Genome Editing Consortium

University of Massachusetts Medical School



Dr. Erik Sontheimer (pictured) and five other University of Massachusetts Medical School scientists are among the members of the National Institutes of Health's (NIH) Somatic Cell Genome Editing Consortium to publish a paper in *Nature* outlining the program's goals to accelerate and benchmark the development of safer, more effective methods to edit the genomes of disease-relevant somatic cells in patients. [Read More](#)

Drop by Drop

Harvard Medical School



Dr. Lakshya Bajaj (pictured) is studying cyanobacteria, which contain cell compartments called carboxysomes that suck in carbon dioxide and break it down into oxygen and carbon. He plans to look for signs of liquid phase separation around carboxysomes in the microorganisms. He hopes the work will one day contribute to mitigating climate change by illuminating what carboxysomes are doing. [Read More](#)

Harnessing Antibodies as Pathogen Hunters

Tufts University



Dr. Chuck Shoemaker, a Professor at Tufts University, is currently working to harness antibodies' unique skillset as pathogen hunters. Ultimately, he aims to turbocharge their abilities in the lab, and use the resulting über-antibodies as components of new treatments for deadly diseases. Shoemaker works specifically with antibodies from camelids (animals like alpacas), which have a simpler structure than most other mammalian antibodies. [Read More](#)

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Upcoming Events in Boston

- April 22 3:30 PM **OEB Seminar Series: Marie Dacke** Online
- April 22 4:00 PM **Colloquium on Brain and Cognition with Dr. Mathew Diamond** Online
- April 26 11:00 AM **Marble Center Distinguished Seminar: Dr. Joe DeSimone** Online
- April 26 12:00 PM **Research Connection Live: BWH Research Cores and Resources Fair** Online
- April 28 1:30 PM **General Overview of Career Opportunities for Graduate Students and Postdocs** Online

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STEMCELL Technologies
- Scientific Inside Sales Representative, Cell Separation**
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Broad Institute

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