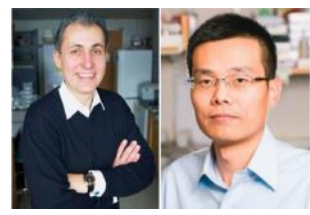


Publications of the Week

Combining p53 mRNA Nanotherapy with Immune Checkpoint Blockade Reprograms the Immune Microenvironment for Effective Cancer Therapy

First Authors: Yiding Xiao and Jiang Chen | Senior Authors: Dan Gada (pictured, left) and Arjun Soti (right) | Nature Communications | Brigham and Women's Hospital, Harvard Medical School, and Massachusetts General Hospital



Immunotherapy with immune checkpoint blockade has shown limited benefits in hepatocellular carcinoma and other cancers, mediated in part by the immunosuppressive tumor microenvironment (TME). The authors find that combining C-X-C chemokine receptor type 4-targeted p53 mRNA nanoparticles with anti-programmed cell death protein 1 therapy effectively induces global reprogramming of cellular and molecular components of the immune TME. [Abstract](#) | [Press Release](#)

Activation Pathways That Drive CD4+ T Cells to Break Tolerance in Autoimmune Diseases

First Author: Sha Harsita Krow | Senior Author: Vijay Kuchroo (pictured) | Immunological Reviews | Harvard Medical School, Brigham and Women's Hospital, and Broad Institute



Autoimmune diseases are characterized by dysfunctional immune systems that misrecognize self as non-self and cause tissue destruction. Due to a strong association of major histocompatibility complex II proteins with various autoimmune diseases, CD4+ T lymphocytes have been thoroughly investigated for their roles in dictating disease course. [Abstract](#)

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Awards

Whitehead Institute Member Pulin Li Named an Allen Distinguished Investigator

Whitehead Institute



Whitehead Institute member Dr. Pulin Li (pictured) has been selected by The Paul G. Allen Frontiers Group to be an Allen Distinguished Investigator. The Allen Distinguished Investigator program backs creative, early-stage research projects in biology and medical research that would not otherwise be supported by traditional research funding programs. Each Allen Distinguished Investigator award provides three years of research funding. [Read More](#)

Investigators Receive the Cullen Education and Research Fund Medical Engineering Prize for ALS Research

Massachusetts General Hospital



The Cullen Education and Research Fund (CERF) announced the recipients of the first CERF Medical Engineering Prize for amyotrophic lateral sclerosis (ALS) Research: Drs. Leigh Hochberg, Conor Walsh, and Sabrina Paganoni (pictured). Their "BrainGate+SoftRobotics" team is creating a series of technologies intended to improve arm and hand function for people with muscle weakness and paralysis, including people with ALS. [Read More](#)

Hopi Hoekstra Named as a 2021 AAAS Fellow

Harvard University Department of Molecular and Cellular Biology



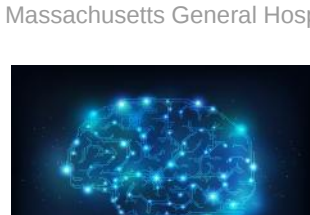
Dr. Hopi Hoekstra (pictured) has been elected to the American Association for the Advancement of Science (AAAS), joining a cohort of AAAS Fellows that includes many of the world's most distinguished scientists. It is one of the most prestigious distinctions awarded to US researchers. "It is a true honor to be selected as a Fellow along with so many colleagues I admire," says Dr. Hoekstra. [Read More](#)

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Local News

COVID-19-Associated Strokes Link to Higher Disability and Death Risk

Massachusetts General Hospital



Among the many hard lessons from the COVID-19 pandemic is that SARS-CoV-2, the virus that causes COVID-19 infections, can affect every organ system in the body, including the brain. Approximately one third of all patients with COVID-19 may develop neurological complications from infection, and many patients present to hospitals with acute ischemic stroke or "brain attack," caused by the sudden blockage of blood flow to or within the brain. [Read More](#)

Research Sheds More Light on Mechanisms Causing Rare Leukemia BPDCL

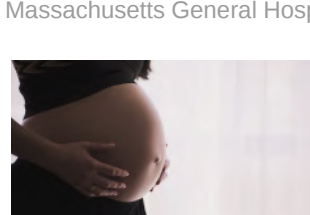
Dana-Farber Cancer Institute



A rare leukemia called blastic plasmacytoid dendritic cell neoplasm (BPDCN) is three to four times more common in people with one X chromosome, for reasons that hadn't been clear. Now, however, research led by Dana-Farber Cancer Institute scientists including Dr. Andrew Lane (pictured) has identified a genetic factor that appears to explain a large part of the discrepancy, and also sheds new light on the mechanisms causing the blood cancer. [Read More](#)

Study Shows Persistent Antibodies in Infants after COVID-19 Vaccination in Pregnancy

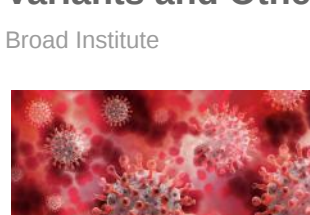
Massachusetts General Hospital



With the COVID-19 pandemic entering its third year, efforts to mitigate the risk for infection remain vitally important, especially for vulnerable populations. A recent study from Massachusetts General Hospital showed vaccination during pregnancy resulted in more lasting antibody levels in infants, when compared to babies born to unvaccinated, COVID-infected mothers. [Read More](#)

CRISPR-Based Diagnostic Technology Rapidly Detects Different COVID Variants and Other Pathogens

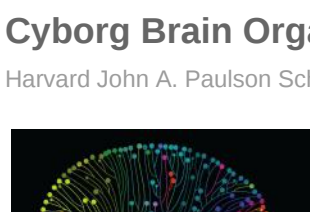
Broad Institute



Researchers at the Broad Institute of MIT and Harvard and Princeton University have developed a CRISPR-based technology that can rapidly differentiate between Omicron, Delta, and other COVID-19 variants, as well as other respiratory viruses including flu. The team used the method, known as "microfluidic Combinatorial Arrayed Reactions for Multiplexed Evaluation of Nucleic acids" (mCARMEN), during the beginning of the Omicron surge in December 2021. [Read More](#)

Cyborg Brain Organoids Offer Insight into Early Brain Development

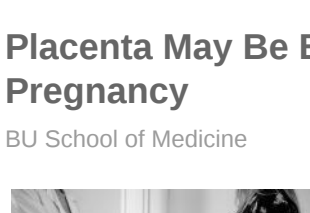
Harvard John A. Paulson School of Engineering and Applied Sciences



Since their development more than a decade ago, brain organoids — brain-like structures grown in petri dishes from human stem cells — have helped scientists better understand a range of neurological disorders, including schizophrenia, epilepsy, and autism spectrum disorders. These pea-size bundles of cells proliferate, differentiate, and self-assemble into 3D tissues that mimic the architecture, diversity, and electric signaling of the human brain at early stages. [Read More](#)

Placenta May Be Blocking SARS-CoV-2 Transmission to Babies During Pregnancy

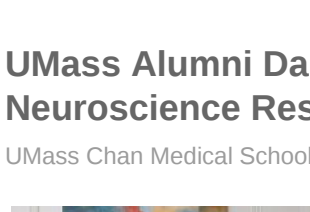
BU School of Medicine



While COVID-19 disease significantly impacts many pregnant women, the rates of transmission from mother to baby in pregnancy are very low. A new study has demonstrated that angiotensin-converting enzyme 2, the receptor that allows SARS-CoV-2 to enter cells, is found in lower levels in the placentas of women with COVID-19 in pregnancy compared to women with normal (COVID negative) pregnancies. [Read More](#)

UMass Alumni Dan and Diane Riccio Pledge \$15 Million to Advance ALS, Neuroscience Research

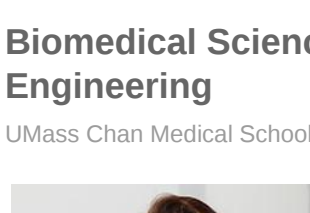
UMass Chan Medical School



UMass alumni Dan (pictured, left) and Dr. Diane Casey Riccio (center) have pledged \$15 million to UMass Chan Medical School to further expedite and support advances in neuroscience research. The gift includes \$10 million for what will be named the Riccio Amyotrophic Lateral Sclerosis (ALS) Accelerator Initiative and \$5 million to expand and endow the Riccio Fund for Neuroscience, providing seed money for research collaborations. [Read More](#)

Biomedical Sciences Student Works Toward a Future in Genetic Engineering

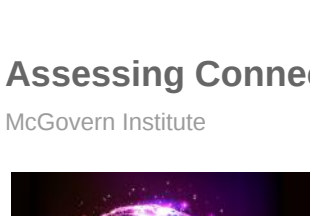
UMass Chan Medical School



Katya Makeyeva (pictured), a native of Kazakhstan, moved to the United States after high school to further her education in science. "For as long as I can remember, I always wanted to be a genetic engineer," said Makeyeva, a PhD student in the Morningside Graduate School of Biomedical Sciences. "The reason I'm so fascinated by the field is because I always wanted to target the root of human disease instead of treating symptoms." [Read More](#)

Assessing Connections in the Brain's Reading Network

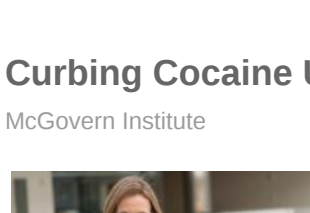
McGovern Institute



When we read, information zips between language processing centers in different parts of the brain, traveling along neural highways in the white matter. Many neuroscientists suspect that variations in white matter may underlie differences in reading ability, and hope that by determining which white matter tracts are involved, they will be able to guide the development of more effective interventions for children who struggle with reading skills. [Read More](#)

Curbing Cocaine Use

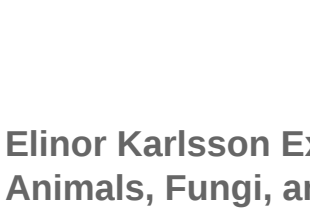
McGovern Institute



Cocaine, opioids, and other drugs of abuse disrupt the brain's reward system, often shifting users' priorities to obtaining more drug above all else. Researchers in MIT Institute Professor Dr. Ann Graybiel's (pictured) lab and collaborators at the University of Copenhagen and Vanderbilt University report that activating a signaling molecule in the brain known as muscarinic receptor 4 causes rodents to reduce cocaine self-administration and simultaneously choose a food treat over cocaine. [Read More](#)

Elinor Karlsson Explains Global Effort to Map Genomes of All Plants, Animals, Fungi, and More

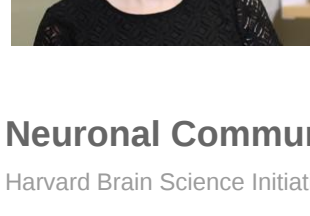
UMass Chan Medical School



Dr. Elinor Karlsson (pictured) offers insights into various applications of modern comparative genomics in a perspective piece published by the Proceedings of the National Academies of Science (PNAS). The paper is part of a special feature in PNAS on the Earth BioGenome Project, a global effort to map the genomes of all plants, animals, fungi, and other microbial life on Earth. [Read More](#)

Neuronal Communication with Opposing Signals

Harvard Brain Science Initiative



Normal brain function requires proper synaptic communication between neurons, through a specific match between release molecules (neurotransmitters) and their corresponding detectors (postsynaptic receptors). Interestingly, there are parts of the brain where neurons simultaneously release opposing neurotransmitters, glutamate and gamma aminobutyric acid, that excite and inhibit postsynaptic cells, respectively. [Read More](#)

Three Autism Risk Genes Have Similar Effects on Brain Development, but by Different Routes

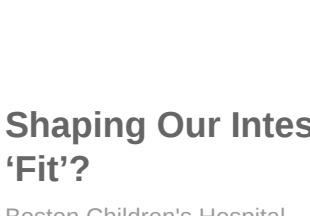
Broad Institute



Autism spectrum disorder has been associated with hundreds of different genes, but how these distinct genetic mutations converge on a similar pathology in patients has remained a mystery. Now, researchers in Dr. Paola Arlotta's (pictured) lab have found that three different autism risk genes actually affect similar aspects of neural formation and the same types of neurons in the developing human brain. [Read More](#)

Shaping Our Intestinal Microbiome: What Makes Certain Microbes More 'Fit'?

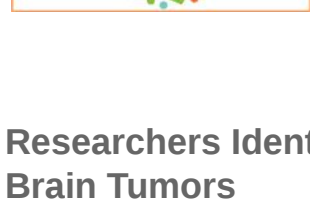
Boston Children's Hospital



We now know the microbes that live in our intestines — often called our microbiome — influence our health in many ways. The often among competing microbial species is believed to contribute to inflammatory bowel disease, immune disorders, food allergy, neurodegenerative diseases, cancer, and more. The bugs in our diets, in turn, influence that balance — which microbes thrive and which don't. [Read More](#)

Researchers Identify New Target for Treatment of Aggressive Childhood Brain Tumors

Broad Institute



More children die of brain tumors than any other type of cancer. Diffuse midline gliomas (DMGs) are a particularly deadly kind, and are difficult to treat with drugs or surgery because they're in an important part of the brain that controls breathing, heart rate, blood pressure, and movement. Now, researchers led by Dr. Pratik Mittal (pictured) and Dr. Arjun Soti (pictured) have clarified the role of a key gene linked to DMG tumor growth. [Read More](#)

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Upcoming Events in Boston

- February 15 5:00 PM Online **Count Me In: How Engaging Patients Can Accelerate Cancer Research**
- February 16 1:00 PM Online **DEI Seminar 216: Recognizing and Responding to Racism: Lessons for Health and Medicine**
- February 18 1:00 PM Online **Faculty Career Panel – Faculty Roles at Different US Institution Types**
- February 28 10:00 AM Online **2022 Rare Disease Day**
- March 2 4:00 PM MIT **SeXX and Immunity**

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Science Jobs in Boston

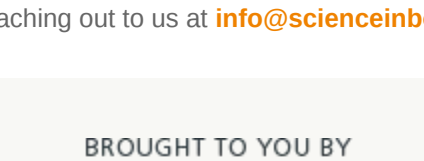
- Research Associate, Screening**
Torus Medicines
- Principal Scientist, Antibody Discovery**
Novartis
- Lab Operations Manager**
PepGen
- Principal/Senior Research Associate, Immunology**
BlueRock Therapeutics
- Lead Research Associate, in Vivo**
Dana-Farber Cancer Institute

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