Publications of the Week

Disruption of the IL-33-ST2-AKT Signaling Axis Impairs Neurodevelopment by Inhibiting Microglial Metabolic Adaptation and Phagocytic Function

First Author: Chuanfang Fu | Senior Author: Vijay Kuchroo (pictured)
Ann Romney Center for Neurologic Diseases, Brigham and Women's Hospital, Broad Institute, and Harvard Medical School

The authors examined whether cellular metabolism regulates microglial function during neurodevelopment. Microglial mitochondria bioenergetics correlated with and were functionally coupled to phagocytic activity in the developing brain. Transcriptional profiling of microglia with diverse metabolic profiles revealed an activation signature wherein the interleukin (IL)-33 signaling axis is associated with phagocytic activity. **Abstract**

Liquid Biopsy Detection of Genomic Alterations in Pediatric Brain Tumors from Cell-Free DNA in Peripheral Blood, CSF, and Urine

First Author: Mariane Pagès | Senior Author: Rodd Bandopadhayay (pictured)
Neuro-Oncology | Dana-Farber Cancer Institute, Broad Institute, Brigham and Women's Cancer Center, Boston Children's Hospital, and MIT

Profiling circulating-tumor DNA (ctDNA) in liquid biopsies has emerged as a promising approach to avoid invasive procedures. The authors systematically evaluated the feasibility of profiling pediatric brain tumors using ctDNA obtained from plasma, cerebrospinal fluid (CSF), and urine. Children with brain tumors harbor very low levels of ctDNA in blood, CSF and urine, with CSF having the most DNA detectable. **Abstract**

View All Publications

Awards

David Greer, MD, Recognized for Lifetime Achievement in Neurologic Education

Boston University School of Medicine

Dr. David Greer (pictured), Professor and Chair of Neurology, has been awarded the 2022 A.B. Baker Award for Lifetime Achievement in Neurological Education by the American Academy of Neurology. The awardee not only demonstrates leadership and devotion to neurological education, but is also someone who has published widely and influenced generations of trainees. **Read More**

Dermatology Research Fellow Receives Diversity Grant for Lupus Research

UMass Chan Medical School

Dr. Janet Lubov (pictured), a Dermatology Research Fellow at UMass Chan Medical School, hopes to help advance skin health in resource-limited communities, locally and globally, through sustainable and integrated approaches to clinical care, education, research, policy and advocacy. The Lupus Research Alliance has awarded Lubov a $15,000 Diversity Research Supplement Award for her work on cutaneous lupus erythematosus. **Read More**

Three with MIT Ties Win 2022 Churchill Scholarships

MIT News

Dr. James Diao (pictured), a graduate student in the Harvard–MIT Program in Health Sciences and Technology, received the Kanders Churchill Scholarship in Science Policy. Originally from Sugar Land, Texas, Diao graduated from Yale University with degrees in statistics and data science and molecular biophysics and biochemistry. His research aims to use clinical, genetic, and computational tools to improve health equity and outcomes for diverse populations. **Read More**

Recent Awards and Honors for the BIDMC Community

Beth Israel Deaconess Medical Center

Dr. Mary Bouxsein (pictured), Director of the Center for Advanced Orthopedic Studies, received the 2021 Adele L. Boskey Esteemed Award for Bone and Mineral Research from the American Society of Bone and Mineral Research. The award recognizes outstanding and major scientific contributions, leadership, and mentorship in the area of bone and mineral research. **Read More**

Massachusetts Life Sciences Center Invests in Women's Health Research at Tufts

Tufts Now

Furthering research into depression in women and the drugs used to treat it, the Women's Health Program of the Massachusetts Life Sciences Center (MLSC) has awarded a grant to Dr. Jamie Maguire (pictured), a Kenneth and JoAnn G. Wellner Professor in the Neuroscience Department at Tufts University School of Medicine. She joins three other Tufts scientists awarded grants from the MLSC in 2021. **Read More**

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Local News

Predicting the Future of COVID

Boston College News

Efforts to contain the spread of SARS-CoV-2 may benefit from a new analytical tool developed by a team led by biologists at Boston College, who report their computer simulation of molecular interactions can predict mutations of the virus and help develop insights into future variants of concern before they emerge. "We computationally predict what mutations allow better binding to host receptors and better evasion of antibodies," said Dr. Babak Momeni. **Read More**

Vitamin D Shows Promise for Children Newly Diagnosed with Type 1 Diabetes

UMass Chan Medical School

Adding a safe, inexpensive, and easy to administer form of vitamin D to treatment for children newly diagnosed with type 1 diabetes shows promise to improve measures of disease progression. Results of a randomized clinical trial comparing ergocalciferol supplementation to placebo, conducted by Dr. Benjamin Udoka Nwosu (pictured), is published in the January issue of the *Journal of the Endocrine Society*. **Read More**

Seeing Squid More Clearly

The Harvard Gazette

The last common ancestor of cephalopods and vertebrates existed more than 500 million years ago. In fact, a squid is more closely related to a clam than it is to a person. Even so, the two lineages independently evolved camera-lens-style eyes with very similar features. In research published in *BMC Biology*, a Harvard lab moves closer to unraveling the mystery of how squid and their cousins get their eyes. **Read More**

How mRNA Could Help Fight Cancer

Wyss Institute

With billions of shots successfully given worldwide, researchers are delving into other potential uses for mRNA technology; such as vaccines for zika and malaria, as well as therapies for sickle cell anemia and cystic fibrosis. In a Center for Adaptive Systems lab, Assistant Professor Dr. Ana Fiszbein (pictured) is exploring mRNA's potential to treat — and prevent — a disease that strikes 1.8 million Americans every year, and kills more than 600,000: cancer. **Read More**

Tightening the Grasp on Liquid Biopsies

Wyss Institute

A collaborative research effort at the Wyss Institute, led by its Core Faculty members Drs. David Walt (pictured) and George Church, has developed new tools to measure and isolate tiny membrane-enclosed extracellular vesicles (EVs), which are shed by all cells in the body. EVs carry molecular cargo from their tissues of origin that could be used to diagnose diseases, including neurological diseases and brain cancers. **Read More**

The Craving State

McGovern Institute

A deeper understanding of what addiction does to the brain and body is urgently needed to pave the way to interventions that reliably release affected individuals from its grip. At the McGovern Institute, researchers are turning their attention to addiction's driving force: the deep, recurring craving that makes people prioritize drug use over all other wants and needs. "When you are in that state, then it seems nothing else matters," says Dr. Fan Wang (pictured). **Read More**

Researchers Reduce Breast Cancer Metastasis in Animal Models by Modifying Tumor Electrical Properties

Tufts University

Researchers led by Dr. Madeleine Oudin (pictured) at Tufts University have found that manipulating voltage patterns in tumor cells using ion channel blockers already FDA-approved as treatments for other diseases can in fact significantly reduce tumor cell invasion in a dish and metastasis in an animal model of breast cancer. **Read More**

Why Do We All Feel Touch Differently?

The Brink

"When we perceive our environment, we're actually doing two things," says Boston University neurobiologist Dr. Jerry Chen (pictured), an expert on cognitive function. "We're taking in all the senses, all the physical elements of the world, at the same time, we are applying our own types of reference, subjective interpretation of what we think we're perceiving." **Read More**

Uncovering the Mysteries of Methylation in Plants

Whitehead Institute

In the days or weeks it takes to go from a seed to a sprout to a full plant, plants express hundreds of genes in different places at different times. In order to conduct this symphony of genes, plants rely in part on an elegant regulatory method called DNA methylation. In a new paper from the lab of Dr. Mary Gehring (pictured), researchers tease apart the role of proteins governing this system of genetic control. **Read More**

Synthesis Too Slow? Let This Robot Do It.

MIT News

Researchers in the lab of Dr. Bradley Pentelute (pictured), MIT Professor of Chemistry, have invented a fully automated fast-flow instrument that can synthesize peptide-nucleic acids in a single shot. By automating the process of synthesizing cell-penetrating peptide-conjugated peptide-nucleic acids (PPNAs) using the robot dubbed "Tiny Tides" by the research team, typical PPNA synthesis time was reduced from multiple days to just two hours. **Read More**

Booster Dose of mRNA COVID-19 Vaccine Is Required for Immune Protection against Omicron Variant of SARS-CoV-2

Massachusetts General Hospital (MGH)

An additional "booster" dose of Moderna or Pfizer mRNA-based vaccine is needed to provide immunity against the Omicron variant of SARS-CoV-2, according to a study by researchers at the Ragon Institute of MGH, MIT and Harvard. The results of this study indicate that traditional dosing regimens of COVID-19 vaccines available in the United States do not produce antibodies capable of recognizing and neutralizing the Omicron variant. **Read More**

Method for Delivering Immune System-Stimulating Drugs May Enhance Cancer Immunotherapy

MIT News

Stimulating the body's immune system to attack tumors is a promising way to treat cancer. However, when jumpstarting the immune system, researchers have to be careful not to overstimulate IL which can cause severe and potentially fatal side effects. A team of MIT researchers led by Dr. Darrell Irvine (pictured) has now developed a new way to deliver a stimulatory molecule called interleukin-12 directly to tumors. **Read More**

Scientists Map Skin Cells That Contribute to Diabetic Foot Ulcers

Beth Israel Deaconess Medical Center

Diabetic foot ulcerations are a devastating complication affecting more than 15 percent of people with diabetes. To gain a better understanding of what causes diabetic foot ulcers and how they might be treated, researchers at Beth Israel Deaconess Medical Center and the Emmy School of Medicine compared cells taken from patients with ulcers that healed to those taken from patients whose ulcers failed to heal. **Read More**

Engineered Particles Efficiently Deliver Gene Editing Proteins to Cells in Mice

Broad Institute

Gene editing approaches promise to treat a range of diseases, but delivering editing agents to cells in animal models and humans safely and efficiently has proven challenging. Now, researchers led Dr. David Liu (pictured) at the Broad Institute of MIT and Harvard have developed a way to get gene editing proteins inside cells in animal models with high enough efficiency to show therapeutic benefit. **Read More**

Researchers Gain Insights into How Ultrasmall Bacteria from the Environment Have Adapted to Live Inside Humans

Forsyth Institute

The microbes that live inside our mouths impact our overall health in many ways that are not yet fully understood. Among the diverse bacterial species living within our mouths is a group belonging to the Candidate Phyla Radiation (CPR). The only bacteria within the CPR to be examined in-depth are a group called TM7, which were cultivated for the first time by Forsyth Institute researcher Dr. Xuesong He (pictured) in 2014. **Read More**

In Down Syndrome Cells, Genome-Wide Disruptions Mimic a Senescence-Like State

The Picower Institute

In Down syndrome, the third copy of chromosome 21 causes a reorganization of the 3D configuration of the entire genome in a key cell type of the developing brain, a new study shows. The study's finding that neural progenitor cells, which develop into major cells in the brain including neurons, have a senescent character is remarkable and novel, said senior author Dr. Li-Huei Tsai (pictured). **Read More**

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January 19 2:00 PM	**Biomedical Informatics Entrepreneurs Salon: Caitlin Donovan, Uber Health** Online	
January 19 5:30 PM	**MassBioDrive Launch** Online	
January 26 6:30 AM	**2022 Policy Leadership Breakfast** Online	

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