

Publications of the Week

Structure-Guided Design of Pure Orthosteric Inhibitors of  $\alpha\text{IIb}\beta\text{3}$  That Prevent Thrombosis but Preserve Hemostasis

First Author: Brian Adair | Senior Author: M. Amin Arnaout (pictured)  
Nature Communications | Massachusetts General Hospital and Harvard Medical School



The inhibition of vascular thrombosis by antagonizing platelet integrin  $\alpha\text{IIb}\beta\text{3}$  cannot be achieved without compromising hemostasis, thus causing serious bleeding. It is speculated that this adverse outcome results from drug-induced conformational changes in  $\alpha\text{IIb}\beta\text{3}$  but direct proof is lacking. The authors reported the structure-guided design of peptide Hr10 and a modified form of the partial agonist drug tirofiban, that act as "pure" antagonists of  $\alpha\text{IIb}\beta\text{3}$ . **Abstract**

Hyperactivation of Sympathetic Nerves Drives Depletion of Melanocyte Stem Cells

First Author: Bing Zhang | Senior Author: Ya-Chieh Hsu (pictured)  
Nature | Harvard University and the Harvard Stem Cell Institute



Empirical and anecdotal evidence has associated stress with accelerated hair greying (formation of unpigmented hairs), but so far there has been little scientific validation of this link. The authors reported that, in mice, acute stress leads to hair greying through the fast depletion of melanocyte stem cells. They also found that the stress-induced loss of melanocyte stem cells was independent of immune attack or adrenal stress hormones. **Abstract**

Mechanism of Adrenergic  $\text{Ca}_v1.2$  Stimulation Revealed by Proximity Proteomics

First Author: Guoxia Liu | Senior Author: Marian Kalocsay (pictured)  
Nature | Harvard University and the Harvard Stem Cell Institute



Increased cardiac contractility during the fight-or-flight response is caused by  $\beta$ -adrenergic augmentation of  $\text{Ca}_v1.2$  voltage-gated calcium channels. However, this augmentation persists in transgenic murine hearts expressing mutant  $\text{Ca}_v1.2$   $\alpha_1C$  and  $\beta$  subunits that can no longer be phosphorylated by protein kinase A. The authors identified the mechanism by which  $\beta$ -adrenergic agonists stimulate voltage-gated calcium channels. **Abstract**

Increased Expression of Schizophrenia-Associated Gene C4 Leads to Hypoconnectivity of Prefrontal Cortex and Reduced Social Interaction

First Author: Ashley Comer | Senior Author: Alberto Cruz-Martin (pictured)  
PLOS Biology | Boston University



Increased expression of the immune gene C4 has been linked to a greater risk of developing schizophrenia; however, it is not known whether C4 plays a causative role in this brain disorder. Using confocal imaging and whole-cell electrophysiology, the authors demonstrated that overexpression of C4 in mouse prefrontal cortex neurons leads to perturbations in dendritic spine development and hypoconnectivity, which mirror neuropathologies found in schizophrenia patients. **Abstract**

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Awards

Sheldon Benjamin Selected as Director by American Board of Psychiatry and Neurology

UMass Med Now



The American Board of Psychiatry and Neurology has selected Dr. Sheldon Benjamin (pictured) as one of its eight Psychiatry Directors. Dr. Benjamin, Interim Chair of Psychiatry and Professor of Psychiatry and Neurology, began his four-year, renewable term on January 1. "I consider this one of the most important roles that I'll have in organized medicine because the deliberations of the board get at the core of what is expected of people in our specialty," said Benjamin. **Read More**

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Local News

A Rat Had Basically No Brain. But It Could Still See, Hear, Smell, and Feel.

Northeastern University



One day, a scientist in Dr. Craig Ferris's (pictured) lab was scanning the brains of very old rats when he found that one could see, hear, smell, and feel just like the other rats, but it was walking around with basically no brain—due to a condition called hydrocephalus. This phenomena led Dr. Ferris to investigate how powerful the brain remains, even when tight on space. **Read More**

Researchers Uncover Mechanism for How Common Gene Therapy Vectors Enter Cells

Harvard Medical School



Researchers led by Dr. Luk H. Vandenberghe (pictured) at Massachusetts Eye and Ear have identified a novel cellular entry factor for adeno-associated virus vector (AAV) types—the most commonly used viral vectors for *in vivo* gene therapy. AAVs are vectors or vehicles that are created from a virus that is made harmless by molecular engineering, and have shown promise transporting genetic therapy treatments to affected tissues. **Read More**

Moderna, National Institutes of Health Join to Develop Coronavirus Vaccine

The Street



Moderna has disclosed that it is working with the National Institutes of Health to develop a vaccine to combat coronavirus. The disease has infected hundreds of people in China. The first U.S. case of coronavirus has been diagnosed in Washington state. "Moderna's mRNA vaccine technology could serve as a rapid and flexible platform that may be useful in responding to newly emerging viral threats, such as the novel coronavirus," the company said in a statement. **Read More**

Ingestible Medical Devices Can Be Broken Down with Light

MIT News



A variety of medical devices can be inserted into the gastrointestinal tract to treat, diagnose, or monitor gastrointestinal disorders. Many of these have to be removed by endoscopic surgery once their job is done. However, MIT engineers have now come up with a way to trigger such devices to break down inside the body when they are exposed to light from an ingestible LED. **Read More**

With These Neurons, Extinguishing Fear Is Its Own Reward

MIT News



When you expect a really bad experience to happen and then it doesn't, it's a distinctly positive feeling. A new study of fear extinction training in mice, led by Dr. Susumu Tonegawa (pictured), may suggest why: The findings not only identify the exact population of brain cells that are key for learning not to feel afraid anymore, but also show that these neurons are the same ones that help encode feelings of reward. **Read More**

We Know Exercise Is Good for Your Skin. This Protein Mimics Those Effects in Mice

Northeastern University



A team of Northeastern researchers has outlined a mechanism that improves the ability of skin cells in aging mice to heal wounds. The team found that low doses of a protein called interleukin 15 improved the capacity of skin to heal in old mice by mimicking some of the anti-aging benefits of exercise. In the human body, that protein is critical for the process of energizing all cells, and it is found in abundance in people who exercise more. **Read More**

Making Sense of the Self

Beth Israel Deaconess Medical Center



Interoception is the awareness of our physiological states; it's how animals and humans know they're hungry, and how they know when they've had enough to eat. But precisely how the brain estimates the state of the body and reacts to it remains unclear. Neuroscientists at Beth Israel Deaconess Medical Center have shed new light on the process, demonstrating that a region of the brain called the insular cortex orchestrates how signals from the body are interpreted and acted upon. **Read More**

New Living Machines Are Created in the Lab

Tufts Now



Imagine miniature self-repairing living robots that could move and safely deliver drugs inside the human body or help with environmental remediation. Even more importantly, imagine using such synthetic creations to teach us how to control the formation of organs for regenerative medicine. Now researchers at Tufts University led by Dr. Mike Levin (pictured) report that they have created such living machines, that they call xenobots. **Read More**

Tidying Up Deep Neural Networks

McGovern Institute



Visual art has found many ways of representing objects, from the ornate Baroque period to modernist simplicity. Artificial visual systems are somewhat analogous: from relatively simple beginnings inspired by key regions in the visual cortex, recent advances in performance have seen increasing complexity. A new model from the McGovern Institute has re-imposed a brain-like architecture on an object recognition network. **Read More**

Putting a Finger on the Switch of Chronic Parasite Infection

Whitehead Institute



*Toxoplasma gondii* is a parasite that chronically infects up to a quarter of the world's population, causing toxoplasmosis. It can transition from an acute infection stage into a quiescent life cycle stage and effectively barricade itself inside of the host's cells. New research from Dr. Sebastian Lourido (pictured) has identified a sole gene whose protein product is the master regulator, which is both necessary and sufficient for these parasites to make the switch. **Read More**

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Interesting Articles

Trump Restrictions on Fetal Tissue Research Unsettle Key Studies and Scientists

The Washington Post



A recent Trump administration decision to limit funding of research that uses fetal tissue is already disrupting research into major diseases, including AIDS, Down syndrome and diabetes, scientists say. The controversial federal funding rules, announced seven months ago, are reshaping scientists' research paths and the grants they seek from the National Institutes of Health. **Read More**

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Upcoming Events in Boston

January 28 3:00 PM	First Annual "Patient Safety in a Digital World" Symposium Dana Farber Cancer Institute
January 29 8:00 AM	Program for Chairs of Clinical Services Harvard Longwood Campus
January 30 5:00 PM	MassBio Young Professionals Event: Trivia Night FUJIFILM
February 4 5:00 PM	Venture Funding Happy Hour at M2D2! M2D2
February 5 8:00 AM	Are Your Trade Secrets Walking Out The Door? MassBio

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Other Science Jobs in Boston

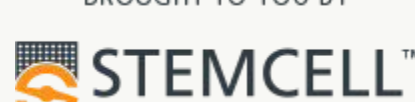
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Sana Biotechnology
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