Volume 5.07: February 27, 2023

Publications of the Week

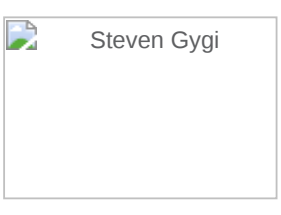
Mapping Thalamic Innervation to Individual L2/3 Pyramidal Neurons and Modeling Their 'Readout' of Visual Input

First Author: Aygul Balcioglu | Senior Author: Elly Nedivi *(pictured)*
Nature Neuroscience | The Picower Institute, MIT, Massachusetts General Hospital, and the Broad Institute

The thalamus is the main gateway for sensory information from the periphery to the mammalian cerebral cortex. The authors use new methods, combining genetic tools and scalable tissue expansion microscopy, for whole-cell synaptic mapping, revealing the number, density, and size of thalamic versus cortical excitatory synapses onto individual layer 2/3 (L2/3) pyramidal cells of the mouse primary visual cortex. **Abstract | Press Release**

Sample Multiplexing-Based Targeted Pathway Proteomics with Real-Time Analytics Reveals the Impact of Genetic Variation on Protein Expression

First Author: Qing Yu | Senior Author: Steven Gygi *(pictured)*
Nature Communications | Harvard Medical School



Targeted proteomics enables hypothesis-driven research by measuring the cellular expression of protein cohorts related by function, disease, or class after perturbation. The authors present a pathway-centric approach and an assay builder resource for targeting entire pathways of up to 200 proteins selected from >10,000 expressed proteins to directly measure their abundances, exploiting sample multiplexing to increase throughput by 16-fold. **Abstract**

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Awards

Supporting the Next Generation of Cancer Researchers

Harvard Medical School

Seven Harvard Medical School researchers have received awards from the Damon Runyon Cancer Research Foundation. Dr. Archana Krishnamoorthy *(pictured)* was named a Damon Runyon Fellow. She is studying the fundamental question of how cell division shapes the cancer genome. Understanding the mechanisms of cancer genome complexity may help identify better diagnostics and treatments for cancers linked with high levels of genome alterations. **Read More**

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Local News

Nerve–Immune Cell Interactions in the Lungs Drive the Development of Allergic Asthma

Massachusetts General Hospital

Allergic asthma — which is characterized by wheezing and breathing difficulties triggered by inhaled allergens such as pollen, mold, and pet dander — is the most common chronic disease among children, and it can persist into adulthood. New research led by Dr. Xingbin Ai *(pictured)* at Massachusetts General Hospital reveals how the relationship between nerves and immune cells in the lungs can contribute to the development of this condition. **Read More**

Tal Gilboa on Opening a Window into the Brain for Parkinson's Diagnostics

Wyss Institute

As Dr. Tal Gilboa *(pictured)* watched the condition of her mentor and family friend diagnosed with Parkinson's disease rapidly decline early in her biomedical engineering studies, she longed to apply her skills to develop a technology that would help similar patients. At the Wyss, she found that opportunity. Dr. Gilboa is now creating tools for Parkinson's diagnosis and monitoring, which could accelerate drug development efforts. **Read More**

Blood Stem Cells Are Susceptible to Ferroptosis, a Type of Cell Death

Broad Institute

The body is constantly replenishing the blood with new red and white blood cells thanks to a small but important group of cells called hematopoietic stem cells. Now, researchers led by Dr. Vijay Sankaran *(pictured)* have found that these cells are particularly vulnerable to ferroptosis, a kind of cell death triggered by iron. This study is one of the first to show that a normal cell type is also susceptible to this form of cell death. **Read More**

New Insights into How Blood Pressure Drug May Benefit Patients with Locally Advanced Pancreatic Cancer

Massachusetts General Hospital

In patients with locally advanced pancreatic cancer, treatment with a combination therapy including the blood pressure drug losartan inhibited immunosuppression and reduced the expression of genes that promote the invasion of tumor cells into normal tissue. "Our findings suggest that losartan may potentiate the benefit of [FOLFIRINOX chemotherapy followed by chemoradiation] by reducing tumor invasion and immunosuppression," explains Dr. Rakesh Jain *(pictured)*.
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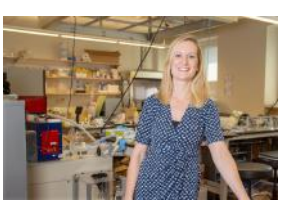
Custom, 3D-Printed Heart Replicas Look and Pump Just Like the Real Thing

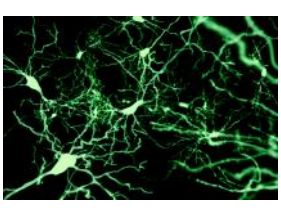
MIT News



No two hearts beat alike. The size and shape of the the heart can vary from one person to the next. These differences can be particularly pronounced for people living with heart disease, as their hearts and major vessels work harder to overcome any compromised function. MIT engineers in Dr. Ellen Roche's *(pictured)* lab are hoping to help doctors tailor treatments to patients' specific heart form and function with a custom robotic heart. **Read More**

A New Strategy for Repairing DNA Damage in Neurons

Harvard Medical School



"Use it or lose it" goes the adage, applied liberally to everything from our muscles to our minds, especially as we age. Yet when it comes to the brain, such usage is not entirely a good thing: While using brain cells may indeed help maintain memory and other cognitive functions throughout life, scientists have found that the associated activity also damages neurons by inviting more breaks into their DNA.
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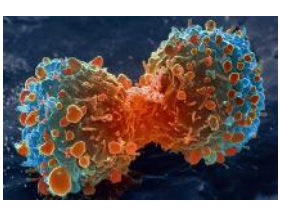
Scientists Identify Protein That's Crucial to Tumor Cells' Metabolism and Immune Evasion

Massachusetts General Hospital



By developing a new computational tool, researchers have identified a potential target for anti-cancer therapies that could simultaneously deplete tumors of energy and boost the body's immune response against them. The target, called Estrogen Related Receptor Alpha, may also represent a marker to predict which patient will benefit from immunotherapy. **Read More**

When Heartbreak Kills, Blame the Amygdala

The Harvard Gazette

Dr. Ahmed Tawakol, a cardiologist at Massachusetts General Hospital and an Associate Professor of Medicine at Harvard Medical School, led a 2021 study that probed the roots of broken heart syndrome, using a massive database of PET/CT images. The pictures were not of the heart, but of the brain, allowing the researchers to track the role that stress plays in the syndrome. **Read More**

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Upcoming Events in Boston

February 28 10:00 AM	**2023 Rare Disease Day** Massachusetts State House
March 8 12:00 PM	**Clarifying the Mysteries of Choosing Statistical and Machine-Learning Methods in Genomics Research** Online
March 14 4:00 PM	**Soma Weiss Student Research Day** TMEC Atrium
March 24 12:30 PM	**Cell Therapies for Parkinson's Disease: How Far Have We Come, and Where Are We Going?** Online
April 26 12:00 PM	**Is It Possible to Bioprint Human Hearts?** Online

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