

Publications of the Week
Balancing Cohesin Eviction and Retention Prevents Aberrant Chromosomal Interactions, Polycomb-Mediated Repression, and X-Inactivation

First Author: Andrea Kriz | Senior Author: Jeannie Lee (pictured)
 Molecular Cell | Massachusetts General Hospital, Harvard Medical School, and Dana-Farber Cancer Institute



Depletion of architectural factors globally alters chromatin structure, but only modestly affects gene expression. Researchers investigated cohesin imbalances by forcing its depletion or retention using degran-tagged RAD21 (cohesin subunit) or WAPL (cohesin release factor). They concluded that a balance of cohesin eviction and retention regulates X-inactivation and inter-chromosomal interactions across the genome. [Abstract](#)

TGF-β-Secreting Regulatory B Cells: Unsung Players in Immune Regulation

First Author: Guohui Huai | Senior Author: Charles Rickert (pictured)
 Clinical and Translational Immunology | Massachusetts General Hospital and Harvard Medical School



Regulatory B cells contribute to the regulation of immune responses in cancer, autoimmune disorders, allergic conditions, and inflammatory diseases. Although most studies focus on regulatory B lymphocytes expressing interleukin-10, there is growing evidence that B cells producing transforming growth factor β (TGF-β) can also regulate T-cell immunity in inflammatory diseases. [Abstract](#)

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Awards
D'Arbelloff Center Researcher Receives Prestigious NIH Award For Studies on Sex Hormones and Sex Chromosomes

Whitehead Institute



Dr. Rebecca Harris (pictured), a physician-scientist at the Whitehead Institute, has received a prestigious funding award from the National Institutes of Health (NIH) Building Interdisciplinary Research Careers in Women's Health program. This career-development program connects high-achieving early-career researchers with established investigators pursuing research in women's health and in the mechanisms underlying sex differences in health and disease. [Read More](#)

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Local News
Potential New Treatment Strategy for Breast Cancer Cells That Have Spread to the Brain

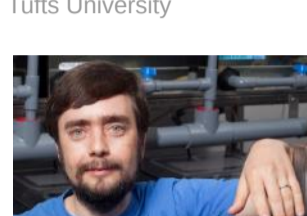
Massachusetts General Hospital



New research reveals that when breast cancer cells spread to the brain, they must boost production of fatty acids, the building blocks of fat, in order to survive. The work, which was published in *Nature Cancer* and was led by investigators at Massachusetts General Hospital and the Koch Institute of MIT, points to a potential new treatment target for shrinking brain tumors that arise secondary to breast cancer. [Read More](#)

Scientists Create the Next Generation of Living Robots

Tufts University



Dr. Michael Levin (pictured) and his team at Tufts University have created tiny, self-healing biological machines called Xenobots. They self-assemble their bodies from single frog cells, do not require muscle cells to move, and are capable of recording memory. "We are witnessing the remarkable plasticity of cellular collectives, which build a rudimentary new 'body' that is quite distinct from their default," explained Dr. Levin. [Read More](#)

How Industrialized Life Remodels the Microbiome

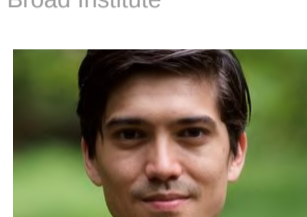
MIT News



Thousands of different bacterial species live within the human gut. Most are beneficial, while others can be harmful. A new study from a team led by Dr. Eric Alm (pictured) has revealed that these bacterial populations can remake themselves within the lifetime of their host, by passing genes back and forth. They also showed that this kind of gene transfer occurs more frequently in the microbiomes of people living in industrialized societies. [Read More](#)

New Maps Link Thousands of Genetic Variants to Disease Genes

Broad Institute



Genome-wide association studies have identified thousands of genetic variants that are associated with a wide range of diseases. But these studies often fall short of establishing what a genetic variant does to bring about a particular trait or disease. To address this problem, Dr. Jesse Engreitz (pictured), along with collaborators, developed a model that predicts the genes that enhancers regulate in specific cell types. [Read More](#)

Monoclonal Antibodies for COVID-19 Need to Be "Tuned" to the Immune System

Massachusetts General Hospital



Caution is needed in developing monoclonal antibody therapeutics for SARS-CoV-2. Caroline Atyeo, Dr. Galit Alter (pictured), and their colleagues are studying the ability of antibodies to target infected cells through Fc receptors, key immune regulatory receptors that connect antibody-mediated (humoral) immune responses to cellular effector functions. [Read More](#)

How Chronic Stress Leads to Hair Loss

The Harvard Gazette



In a mouse study published in *Nature*, Dr. Ya-Chieh Hsu (pictured) and her team found that a major stress hormone puts hair follicle stem cells into an extended resting phase, without regenerating the follicle or the hair. They identified the specific cell type and molecule responsible for relaying the stress signal to the stem cells, and showed that this pathway can be potentially targeted to restore hair growth. [Read More](#)

A Safer Way To Deploy Bacteria as Environmental Sensors

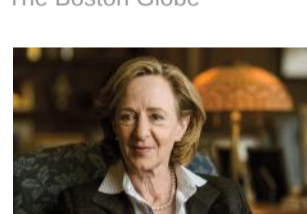
MIT News



Scientists have developed many strains of engineered bacteria that can be used as sensors to detect environmental contaminants. If deployed in the natural environment, these sensors could help scientists track pollutant levels. MIT engineers have now devised a way to encase bacterial sensors in a tough hydrogel shell that prevents them from escaping into the environment and potentially spreading modified genes to other organisms. [Read More](#)

MIT Scientists Launch Future Founders Initiative to Help Solve Biotech's 'Missing Women' Problem

The Boston Globe



A group of prominent MIT scientists released a report that showed male faculty at the school start companies at a higher rate than their female peers, and proposed a way to help close the gap. "If we can't advance discoveries at the same rate for women and men, that means there are drugs, therapies, devices, and diagnostics that are not getting to where they can actually benefit people," said MIT President Emerita Dr. Susan Hockfield (pictured). [Read More](#)

Thirteen New Alzheimer's Disease Genes Identified In First-of-Its-Kind Human Genome Study

Massachusetts General Hospital



In the first study to use whole genome sequencing to discover rare genomic variants associated with Alzheimer's disease (AD), researchers have identified 13 such variants. This study also establishes new genetic links between AD and the function of synapses. Identifying less-common gene mutations that increase the risk for AD is important because they may hold critical information about the biology of the disease, said senior author Dr. Rudolph Tanzi (pictured). [Read More](#)

Synthetic Mucus Can Mimic the Real Thing

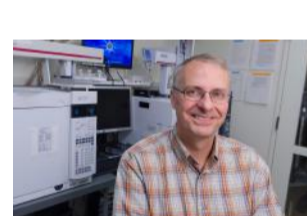
MIT News



Mucus is made from mucins — proteins that are decorated with sugar molecules. In a new study, researchers from MIT led by Dr. Laura Kiessling (pictured) generated synthetic mucins with a polymer backbone that more accurately mimics the structure and function of naturally occurring mucins. The team also showed that these synthetic mucins could effectively neutralize the bacterial toxin that causes cholera. [Read More](#)

Matthew Vander Heiden Named Director of the Koch Institute

MIT News



Dr. Matthew Vander Heiden (pictured), an MIT Professor of Biology and a pioneer in the field of cancer cell metabolism, has been named the next Director of MIT's Koch Institute for Integrative Cancer Research. Vander Heiden will succeed Dr. Tyler Jacks, who has served as Director for more than 19 years, first for the MIT Center for Cancer Research and then for its successor, the Koch Institute. [Read More](#)

A Pain in the Tooth

The Harvard Gazette



Researchers report in *Science Advances* that they have uncovered a new function for odontoblasts, the cells that form dentin, the shell beneath the tooth's enamel that encases the soft dental pulp containing nerves and blood vessels. "We found that odontoblasts, which support the shape of the tooth, are also responsible for sensing cold," said pathologist Dr. Jochen Lennerz, one of the paper's senior authors. [Read More](#)

Research Reveals Why Redheads May Have Different Pain Thresholds

Massachusetts General Hospital



Dr. David Fisher (pictured) and his colleagues studied a strain of red-haired mice that, as in humans, contains a variant that lacks melanocortin 1 receptor function and also exhibits higher pain thresholds. They found that loss of melanocortin 1 receptor function in mice caused the animals' melanocytes to secrete lower levels of proopiomelanocortin, which is subsequently cut into different hormones, including one that sensitizes to pain and one that blocks pain. [Read More](#)

An Itching Question

The Harvard Gazette



New research led by Drs. Isaac Chiu (pictured) and K. Frank Austen offers new clues about the underlying mechanisms of itch. The work, which was conducted in mice, points to a key molecular player known as cysteine leukotriene receptor 2 that may be a new target for designing treatments to target intractable chronic itch. [Read More](#)

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April 22 3:00 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

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