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Publications of the Week

Deep-Sea Microbes as Tools to Refine the Rules of Innate Immune Pattern Recognition

First Author: Anna Gauthier *(pictured, left)*
Senior Authors: Randi Rotjan *(pictured, right)* and Jonathan Kagan *(pictured, center)*
Science Immunology | Boston Children's Hospital, Harvard Medical School, and Boston University

The assumption of near-universal bacterial detection by pattern recognition receptors is a foundation of immunology. The limits of this pattern recognition concept, however, remain undefined. The authors determined whether mammalian cells can recognize bacteria that they have never had the natural opportunity to encounter. They found that immune receptors were unable to detect most bacteria from a different ecosystem. **Profile | Abstract**

Understanding Transcription across Scales: From Base Pairs to Chromosomes

Author: Seychelle Vos *(pictured)*
Molecular Cell | MIT

The influence of genome organization on transcription is central to our understanding of cell type specification. Higher-order genome organization is established through short- and long-range DNA interactions. Coordination of these interactions, from single atoms to entire chromosomes, plays a fundamental role in transcriptional control of gene expression. Loss of this coupling can result in disease. **Abstract**

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Local News

Mice Naturally Engage in Physical Distancing, Study Finds

The Picower Institute

MIT neuroscientists including Dr. Gloria Choi *(pictured)* have identified a brain circuit that stops mice from mating with others that appear to be sick. In a study that explores how otherwise powerful instincts can be overridden in some situations, researchers from MIT's Picower Institute found that when male mice encountered a female mouse showing signs of illness, the males interacted very little with the females and made no attempts to mate with them. **Read More**

Inside the Wyss Institute Project Engineering 'Fats on Demand'

Boston Business Journal

Drs. Shannon Nangle and Marika Ziesack *(pictured)* are the co-founders of Circe, a soon-to-be spinout of the Wyss Institute. Circe, whose name is derived from the phrase "circular industries with cellular factories," engineers microbes to produce triglycerides, a type of fat that constitutes most of human body fat as well as body fat in other vertebrate animals and vegetables. **Read More**

Method Offers Inexpensive Imaging at the Scale of Virus Particles

McGovern Institute

Using an ordinary light microscope, MIT engineers have devised a technique for imaging biological samples with accuracy at the scale of 10 nanometers — which should enable them to image viruses and potentially even single biomolecules, the researchers say. The new technique builds on expansion microscopy, an approach that involves embedding biological samples in a hydrogel and then expanding them before imaging them with a microscope. **Read More**

Spying on Enzymes While They Perform Chemical Reactions Could Help Treat Gut Ailments

MIT Biology

Humans breathe oxygen, but many microbes deep within the gut don't have access to this precious resource. Instead, they breathe sulfur compounds, releasing hydrogen sulfide in the process. In order to develop potential treatments for ailments such as inflammatory bowel disease and colorectal cancer, researchers, including Dr. Emily Balskus *(pictured)*, are probing how microbes create hydrogen sulfide and which molecules they use. **Read More**

Broad Institute Launches the Eric and Wendy Schmidt Center to Connect Biology, Machine Learning for Understanding Programs of Life

Broad Institute

The Broad Institute has announced the launch of the Eric and Wendy Schmidt Center, an initiative funded by a $150 million endowment gift from the Schmidts that will catalyze a new scientific discipline at the intersection of biology and machine learning. Based in Cambridge at the Broad Institute, the center will bring together a global and collaborative network across academia and industry. **Read More**

Denitsa Milanova on MRBL – Gene Therapy for Skin Rejuvenation

Wyss Institute

Dr. Denitsa Milanova *(pictured)* is working on a project call called MRBL, which essentially enables *in situ* genetic engineering of the skin. Researchers started the project looking at the hardest problem – how to solve skin aging at the molecular level. Their gene-potentiating technology could make skin cells go back to their younger state, causing a true rejuvenating effect, by modifying the levels of the right fingerprint of genes in the skin. **Read More**

When the Heart Takes a Beating

The Harvard Gazette

A new study uncovers potential mechanisms that may contribute to "broken heart syndrome," or Takotsubo syndrome, a temporary heart condition that is brought on by stressful situations and emotions. The study indicates a heart-brain connection likely plays a role. Senior author Dr. Ahmed Tawakol *(pictured)* explains that higher activity in the stress-associated centers of the brain suggests that the individual has a more active response to stress. **Read More**

#WhylScience Q and A: A Computational and Molecular Biologist Helps Inspire the Next Generation of Scientists

Broad Institute

Dr. Elena Torlai Triglia *(pictured)* talks about the importance of supporting early-career researchers and what inspires her as a woman in science. She first trained as an experimental biologist and later started doing more computational work, gravitating toward the collaborative environment of systems biology. Beyond the lab, she is helping inspire the next generation of scientists by taking part in a pen pal program called Letters to a Pre-Scientist. **Read More**

Machine Learning Lets Researchers Tackle Tough Challenges in Biomedicine

Broad Institute

Machine learning can do a lot more for biology than make new connections within a sea of data. Dr. Brian Cleary *(pictured)*, a steering committee member of Broad's Models, Inference and Algorithms Initiative, said that unlocking the full potential of machine learning means rethinking experimental design. "To take things to the next level, you take insights about how the algorithms work, and use that to rethink how you're gathering and generating data in the first place." **Read More**

Biology Undergraduate Researchers Work with Lucy Kim, Professor of Fine Arts, to Create Melanin Images from E. coli

Boston University

Lucy Kim, an Assistant Professor of Fine Arts and a Faculty Affiliate at the Boston University Center for Antiracist Research, is working on a project with two Biology undergraduate researchers, Allison Suarez and Xingpei Zhang. Her recent project, "Melanin Images via Genetically Modified E. coli," develops a unique way to create screen-prints with melanin, which is the primary pigment of human skin, hair, and eye color and can be produced by genetically modified E. coli cells. **Read More**

Big Data Dreams for Tiny Technologies

MIT News

MIT researchers, including Dr. Giovanni Traverso *(pictured)*, have developed a screening platform that combines machine learning with high-throughput experimentation to identify self-assembling nanoparticles quickly. Researchers screened 2.1 million pairings of small-molecule drugs and "inactive" drug ingredients, identifying 100 new nanoparticles with potential applications that include the treatment of cancer, asthma, and malaria. **Read More**

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Upcoming Events in Boston

April 5
4:00 PM
Cell Types and Building Blocks of Neural Circuits
Online

April 6
4:00 PM
Biology Colloquium Series (Dr. Dianne Newman)
Online

April 6
5:00 PM
Science for All Seasons – Proteomics: Translating the Code of Life
Online

April 8
1:00 PM
Seeing the Whole Blueprint: Uncovering the Purpose of "Genomic Junk"
Online

April 8
3:30 PM
OEB Seminar: Genetic Links between Pigmentation and Mating Behavior in Drosophila
Online

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Science Jobs in Boston

Scientific Inside Sales Representative (Cell Separation)
STEMCELL Technologies Inc.

Cellular Immunotherapy / CAR T Cell Preclinical Research Technician
Dana-Farber Cancer Institute

Senior Clinical Research Associate
bluebird bio

Laboratory and Service Coordinator
Berkeley Lights

Postdoctoral Associate
Broad Institute

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