

Publications of the Week

An Engineered CRISPR-Cas9 Mouse Line for Simultaneous Readout of Lineage Histories and Gene Expression Profiles in Single Cells

First Author: Sarah Bowling | Senior Author: Fernando Camargo (pictured)
Cell | Boston Children's Hospital, Dana-Farber and Harvard



The authors describe the CRISPR array repair lineage tracing (CARLIN) mouse line and corresponding analysis tools that can be used to simultaneously interrogate the lineage and transcriptomic information of single cells *in vivo*. This model exploits CRISPR technology to generate up to 44,000 transcribed barcodes in an inducible fashion at any point during development or adulthood, is compatible with sequential barcoding, and is fully genetically defined. [Abstract](#)

Facultative Protein Selenation Regulates Redox Sensitivity, Adipose Tissue Thermogenesis, and Obesity

First Author: Mark Jedrychowski | Senior Author: Bruce Spiegelman (pictured)
PNAS | Dana-Farber and Harvard Medical School



Oxidation of cysteines by reactive oxygen species (ROS) initiates thermogenesis in brown and beige adipose tissues. Cellular selenols, where selenium replaces sulfur, exhibit enhanced reactivity with ROS. The authors have developed a mass spectrometric method to interrogate incorporation of selenols into proteins. Unexpectedly, this approach revealed facultative incorporation of selenium into proteins that lack canonical encoding for selenocysteine. [Abstract](#)

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Awards

Three Dana-Farber Faculty Members Elected as Fellows of the American Association for Cancer Research

Dana-Farber



Drs. Myles Brown, Alan D'Andrea and Kornelia Polyak (pictured), faculty members at Dana-Farber, are among the 19 international scientists elected to the prestigious Fellows of the American Association for Cancer Research (AACR) Academy. The mission of the AACR Academy is to recognize and honor distinguished scientists whose scientific contributions have propelled significant innovation and progress against cancer. [Read More](#)

2020 Women's Faculty Awards Honor Six for Excellence across the Career Spectrum

UMass Medical School



Six UMass Medical School faculty members, including Dr. Anastasia Khvorova (pictured), have been recognized for excellence across the career spectrum during the 2020 Women's Faculty Awards. The annual awards honor women in science and health care for achievements throughout their careers. Awardees are recognized for early career achievement, clinical service, mentoring, science and health, education, and community service. [Read More](#)

HSCI Scientist Receives Harrington Prize for Sickle Cell Research

Harvard Stem Cell Institute



Harvard Stem Cell Institute (HSCI) principal faculty member Dr. Stuart Orkin (pictured) is the recipient of the 2020 Harrington Prize for Innovation in Medicine. He is being recognized for breakthrough discoveries about red blood cells that offer new treatments for patients with sickle cell disease and beta-thalassemia, which are among the most common genetic disorders. [Read More](#)

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Local News

Study Finds that Aging Neurons Accumulate DNA Damage

MIT News



MIT neuroscientists have discovered that an enzyme called HDAC1 is critical for repairing age-related DNA damage to genes involved in memory and other cognitive functions. This enzyme is often diminished in both Alzheimer's patients and normally aging adults. In a study of mice, the researchers showed that when HDAC1 is lost, a specific type of DNA damage builds up as the mice age. [Read More](#)

A Vaccine Made at Your Bedside? A Boston-Area Startup Thinks It's Possible

Boston Business Journal



Cell therapy firm SQZ Biotechnologies Co. has spent the last several years partnering with drug giant Roche on cancer treatments. Now, the company is moving its own internal drug candidates forward, and aims to create a bedside manufacturing tool. SQZ will use its new funding to create treatments for undisclosed infectious diseases, and develop a point-of-care manufacturing system that could create multiple doses of a medication in less than 24 hours. [Read More](#)

How the Gut Microbiome May Influence ALS Outcomes

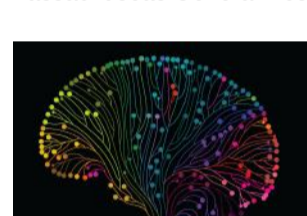
Broad Institute



A team led by Dr. Kevin Eggan (pictured) from Harvard University and the Broad Institute has identified a new gut-brain connection in the neurodegenerative disease amyotrophic lateral sclerosis, or ALS. The researchers found that in mice with a common ALS genetic mutation, changing the gut microbiome using antibiotics or fecal transplants could prevent or improve disease symptoms. [Read More](#)

Novel Treatment Using Patient's Own Cells Opens New Possibilities to Treat Parkinson's Disease

Massachusetts General Hospital



Reprogramming a patient's own skin cells to replace cells in the brain that are progressively lost during Parkinson's disease (PD) has been shown to be technically feasible, reports a team of investigators from McLean Hospital and Massachusetts General Hospital. The team reprogrammed a 69-year-old patient's skin cells to embryo-like pluripotent stem cells, and then differentiated them to take on the characteristics of dopaminergic neurons, which are lost in PD. [Read More](#)

CRISPR Enzyme Can Boost Growth of Cells with Cancer Mutations

Broad Institute



New research has shown that Cas9 can cut DNA even without any guide RNA. Moreover, Cas9, when introduced into many cell lines, ultimately favored the growth of cells with mutations in the p53 gene — the same mutations found in many cancers. To learn more about what these findings mean for CRISPR-Cas9 gene editing, the Broad Institute spoke with Dr. Uri Ben-David (pictured), who initiated the work during a postdoctoral research fellowship at the Institute. [Read More](#)

Antibodies in the Gut: Roles in Autoimmune Disease, Food Allergy... and COVID-19?

Boston Children's Hospital



"Peyer's patches serve as the immune sensors of the intestine and likely play a pivotal role in immune surveillance of materials within our digestive system," says Dr. Frederick Alt (pictured), Director of the Boston Children's Hospital Program in Cellular and Molecular Medicine. In new research, the Alt lab has discovered that components within Peyer's patches produce a core set of antibodies even in the absence of a known trigger. [Read More](#)

GreenLight Biosciences Raises \$17M to Scale Coronavirus Vaccine Development

Bostino



GreenLight Biosciences is making a big pivot. The Medford-based startup's flagship product is a pesticide alternative: an RNA-based product that targets harmful pests by modifying their gene expression and weakening them through a natural process. The CEO, Andrey Zarur (pictured), has announced plans to build out its scalable mRNA production capability to target the production of billions of doses of COVID-19 vaccines. [Read More](#)

Direct Control of Dendritic Cells for Tracking and Immune Modulation

Wyss Institute



Dr. Hua Wang (pictured) and colleagues from Harvard's Wyss Institute and School of Engineering and Applied Sciences have created a new approach that can successfully label dendritic cells (DCs) *in vivo* using an engineered sugar molecule that is taken up by the DCs, processed by their metabolism, and displayed on their surfaces. [Read More](#)

Nature-Inspired CRISPR Enzymes for Expansive Genome Editing

MIT News



A team of computational biologists in the MIT Media Lab's Molecular Machines group and the MIT Center for Bits and Atoms have successfully engineered new proteins with enhanced genome editing capabilities, significantly broadening the spectrum of DNA sequences that can be accurately and effectively accessed. These new findings stem from the group's earlier breakthrough work in the computational discovery of Cas9 proteins. [Read More](#)

Dana-Farber to Test Blood Cancer Drug in COVID-19 Patients

Dana-Farber



Scientists at Dana-Farber Cancer Institute are participating as lead investigators in a clinical test of a blood cancer drug in patients infected with the COVID-19 virus. The test follows several case reports indicating that the drug, ibuprofen, may protect against lung damage and respiratory distress caused by the virus. The ibuprofen trial, involving 46 patients, will be done at Brigham and Women's Hospital. [Read More](#)

Cervical Precancer Identified with Fluorescence, in a Step Toward Bedside Detection

Tufts Now



A team of researchers at Tufts University's School of Engineering and School of Medicine and physicians at Tufts Medical Center have developed a method using fluorescence to detect pre-cancerous metabolic and physical changes in epithelial cells lining the cervix. According to the researchers, the new imaging method opens the door to a non-invasive, early-stage bedside diagnostic. [Read More](#)

BIDMC-Developed Vaccines Protect against COVID-19 in Non-Human Primates, Study Finds

Beth Israel Deaconess Medical Center



Much remains unknown about SARS-CoV-2, the virus that causes COVID-19. Two critical questions are whether vaccines will prevent infection with COVID-19 and whether individuals who have recovered from COVID-19 are protected against re-exposure to the virus. A pair of new studies led by Dr. Dan Barouch (pictured) at Beth Israel Deaconess Medical Center (BIDMC) suggests the answer to these questions is yes, at least in animal models. [Read More](#)

Making an Impact through Chemical Engineering

MIT News



As a chemical engineer, Dr. Hadley Sikes (pictured) loves studying complex systems such as networks of chemical reactions. Sikes, an Associate Professor in MIT's Department of Chemical Engineering, devotes much of her lab's effort to devising inexpensive, highly sensitive tests for diseases such as malaria, tuberculosis, and cancer. In recent months, she has turned her attention to developing a diagnostic test for COVID-19. [Read More](#)

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Upcoming Events in Boston

May 27

1:00 PM

Virtual Grant Writing Series

Online

May 29-31

8:00 AM

American Society of Clinical Oncology Virtual Meeting

Online

May 29

12:00 PM

DF/HCC Connect: Science Seminar - Age against the Machine: How Aging Disrupts the Homeostasis of Cancer

Online

June 2

11:00 AM

MassBio Town Hall with Special Guest from HelixNano: How to Develop a Universal Coronavirus Vaccine

Online

June 4

8:00 PM

Virtual Café Scientifique: Science Behind Combating COVID-19

Online

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Science Jobs in Boston

Sr. Scientist/Principal Scientist, Infectious Disease

SQZ Biotechnologies

Principal Research Associate

Moderna

In Vivo Scientist, Neuroscience Rare Diseases

Novartis

Research Fellow, Gene Expression of Skeletal Diseases

Harvard School of Dental Medicine

Cell Processing QC Specialist, Cell Manipulation Core Facility

Dana-Farber Cancer Institute

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