

Publications of the Week

Lipolysis-Derived Linoleic Acid Drives Beige Fat Progenitor Cell Proliferation

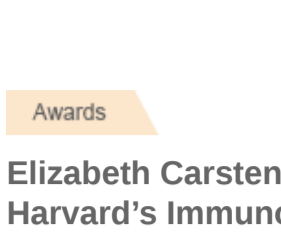
First Author: Ichitaro Abe | Senior Author: Shingo Kajimura (*pictured, back row, third from left*)
Developmental Cell | Beth Israel Deaconess Medical Center and Harvard Medical School



White adipose tissue lipolysis triggers beige adipocyte progenitor cell (APC) proliferation following cold and burn injury. Beige APCs utilize linoleic acid for mitochondrial oxidation and prostanoicid synthesis. Linoleic acid supplementation sufficiently stimulates beige APC proliferation. CD36 is required for beige APC proliferation in response to cold and linoleic acid. [Profile](#) | [Abstract](#)

T_H17 Cell Heterogeneity and Its Role in Tissue Inflammation

First Author: Alexandra Schnell | Senior Author: Vijay Kuchroo (*pictured*)
Nature Immunology | Harvard Medical School, Brigham and Women's Hospital, and the Broad Institute



Since their discovery almost two decades ago, interleukin-17-producing CD4⁺ T cells (T_H17 cells) have been implicated in the pathogenesis of multiple autoimmune and inflammatory disorders. The authors discuss the heterogeneity of T_H17 cells and the role of this heterogeneity in diverse functions of T_H17 cells from homeostasis to tissue inflammation. [Abstract](#)

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Awards

Elizabeth Carstens and Yang Claire Zeng Selected as Third Recipients of Harvard's Immuno-Engineering to Improve Immunotherapy Center Award

Wyss Institute



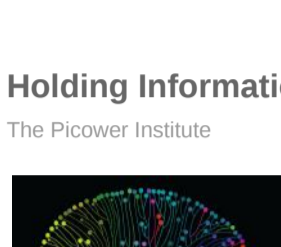
The Immuno-Engineering to Improve Immunotherapy Center at the Wyss Institute selected Drs. Elizabeth Carstens and Yang (Claire) Zeng (*pictured*) as the 2022 recipients of its annual grant award. The newly formed research team is exploring DNA origami as a vehicle for the targeted delivery of mRNA molecules encoding chimeric antigen receptors (CARs) to T cells in order to generate the cancer-fighting CAR T cells in the living body. [Read More](#)

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Local News

A 3D Model for Studying Human Spine Development

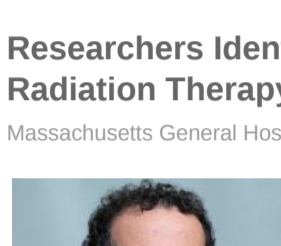
Harvard Medical School (HMS)



Researchers in the lab of HMS geneticist Dr. Olivier Pourquie (*pictured*) have created 3D cell culture models — or organoids — that mimic early spine development in humans. To the team's delight, the organoids include a ticking "segmentation clock" like those the researchers previously identified in the embryos of several species and replicated in human stem cells. Each tick of the clock triggers the formation of a regularly spaced vertebra precursor, or somite. [Read More](#)

Restoring Hearing Loss Through Regenerative Medicine

Harvard Stem Cell Institute



For Dr. Jeff Karp (*pictured*), Principal Faculty Member of the Harvard Stem Cell Institute, finding a solution to hearing loss and other medical conditions through stem-cell based regenerative medicine has been one of his lab's goals for several years. In one of his major efforts, Dr. Karp is pioneering a small molecule program designed to stimulate progenitor cells in the inner ear to grow the hair cells responsible for hearing. [Read More](#)

Holding Information in Mind May Mean Storing It Among Synapses

The Picower Institute



In a study in *PLOS Computational Biology*, scientists at The Picower Institute compared measurements of brain cell activity in an animal performing a working memory task with the output of various computer models representing two theories of the underlying mechanism for holding information in mind. The results strongly favored the newer notion that a network of neurons stores the information by making short-lived changes in the pattern of their connections, or synapses. [Read More](#)

Researchers Identify the Hormone that Drives Fatigue After Cancer Radiation Therapy

Massachusetts General Hospital (MGH)



Several years ago, Dr. David Fisher (*pictured*), Director of the Mass General Cancer Center's Melanoma Program and Director of MGH's Cutaneous Biology Research Center, and his colleagues showed that ultraviolet radiation exposure causes the skin to release β-endorphin — a "feel-good" hormone — to foster opiate-like behaviors and addiction to sun exposure. [Read More](#)

New Tool Can Assist with Identifying Carbohydrate-Binding Proteins

MIT News



One of the major obstacles that those conducting research on carbohydrates are constantly working to overcome is the limited array of tools available to decipher the role of sugars. As a workaround, most researchers utilize lectins isolated from plants or fungi, but they are large, with weak binding, and they are limited in their specificity and in the scope of sugars that they detect. Researchers in Dr. Barbara Imperiali's (*pictured*) group have developed a platform to address this shortcoming. [Read More](#)

A New Understanding of Diabetes

Whitehead Institute



Type 2 diabetes affects hundreds of millions of people around the world, is responsible for many medical complications and millions of deaths each year, and its prevalence is on the rise. New findings from the labs of Drs. Richard Young (*pictured*) and Rudolf Jaenisch revealed that insulin receptors normally function by clustering together in cells and that this clustering is defective in insulin resistance. [Read More](#)

New Technologies Revealing Cross-Cutting Breakdowns in Alzheimer's Disease

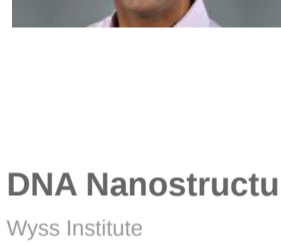
The Picower Institute



After decades of fundamental scientific and drug discovery research, Alzheimer's disease has remained inscrutable and incurable, with a bare minimum of therapeutic progress. But in a new review article in *Nature Neurosciences*, MIT scientists write that by employing the new research capability of single-cell profiling, the field has rapidly achieved long-sought insights with strong potential for both explaining Alzheimer's disease and doing something meaningful about it. [Read More](#)

Pfizer Partners with Tiny Cambridge Startup to Develop New COVID Pills

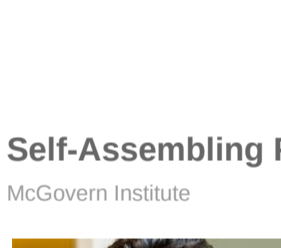
Boston Globe



The coronavirus hasn't seen the last of Pfizer yet. The pharmaceutical giant has tapped Clear Creek Bio, a tiny Cambridge startup, for help in developing new antiviral pills that treat COVID-19. Clear Creek will receive an upfront payment from Pfizer and potential milestone payments as part of a research collaboration to make new drugs that inhibit a protein that the coronavirus requires for replicating. [Read More](#)

Artificial Intelligence Tool Developed to Help Make Real-Time Diagnoses During Surgery

Brigham and Women's Hospital



When surgeons send samples to a pathologist for examination, both speed and accuracy are of the essence. A new study by investigators at the Brigham and Women's Hospital and collaborators from Bogazici University developed a method that leverages artificial intelligence to translate between frozen sections and the gold-standard approach of freezing tissues, improving the quality of images to increase the accuracy of rapid diagnostics. [Read More](#)

How a Leukemia Hijacks the Genes Needed by Blood Stem Cells

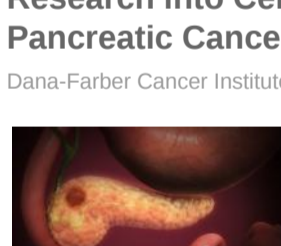
Boston Children's Hospital



As a child, Lynn Aureli didn't know that a particular genetic change contributed to her acute myeloid leukemia — an alteration that eventually would help explain the cancer's lack of response to chemotherapy. A decade after her diagnosis and treatment, Lynn's mutation enabled researchers in Dr. Vijay Sankaran's (*pictured*) lab at Dana-Farber/Boston Children's Cancer and Blood Disorders Center to gain insight into how normal stem cell production is controlled and how cancers can take advantage of the same process. [Read More](#)

DNA Nanostructures Grow Up to Become Micron-Scale Megastructures

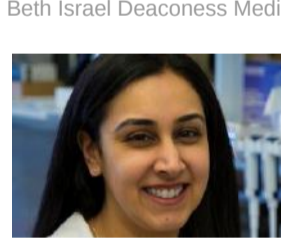
Wyss Institute



A team at the Wyss Institute and Dana-Farber Cancer Institute pre-fabricated highly diverse and stable DNA origami building blocks. This allowed them to assemble more than 1,000 DNA origami into the first multi-micron DNA megastructures with custom shapes and surfaces that can be patterned with molecular molecules at the nanoscale. "We believe that crisscross origami is the biggest leap forward in the programmable self-assembly of complex shapes since the advent of DNA origami," said Dr. William Shih (*pictured*). [Read More](#)

Self-Assembling Proteins Can Store Cellular "Memories"

McGovern Institute



As cells perform their everyday functions, they coaxed on a variety of genes and cellular pathways. MIT engineers have now turned cells to inscribe the history of these events in a long protein chain that can be imaged using a light microscope. "There are a lot of changes that happen at organ or body scale, over hours to weeks, which cannot be tracked over time," says Dr. Edward Boyden (*pictured*). [Read More](#)

Dulac and Zhuang Labs Create "Cell Atlas" of Aging in the Mouse Brain

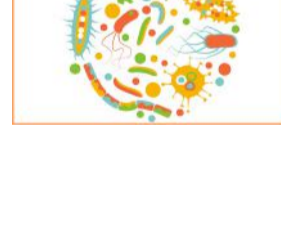
Harvard University Department of Molecular and Cellular Biology



Research led by Dr. William Allen (*pictured*), a joint postdoctoral fellow in Drs. Catherine Dulac's and Xiaowei Zhuang's labs, has generated a "cell atlas" of RNA expression in the mouse brain as it ages. Dr. Allen and his colleagues used MERFISH, a technique developed by the Zhuang lab, and single nucleus RNA sequencing to spatially map RNA expression of all genes in brain tissue from lab mice at three different ages. [Read More](#)

Research into Cellular Recycling System Reveals New Vulnerability in Pancreatic Cancer

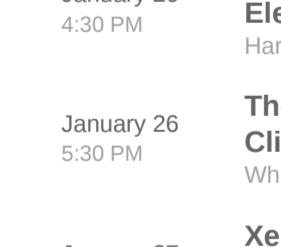
Dana-Farber Cancer Institute



Pancreatic cancer cells operate a recycling program that would be the envy of any municipality — but the only beneficiaries are the cells themselves. All cells in the body recycle minerals and nutrients, removing them from storage and breaking them down them for re-use. But in cancer cells, this process, known as autophagy — literally, "self-eating" — is cranked up to an extreme level. [Read More](#)

Researchers Identify Protein That May Protect the Heart During Certain Cancer Treatment Regimens

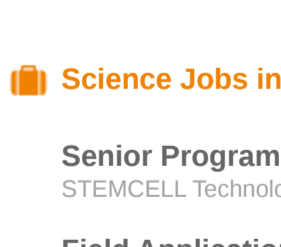
Beth Israel Deaconess Medical Centre



Anthracyclines are a class of chemotherapies effective in treating many forms of cancer, including leukemias, lymphomas, and breast cancer. However, these effective chemotherapies also cause toxic effects in the heart in about ten percent of patients that can eventually lead to heart failure. Dr. Aarti Asnani's (*pictured*) team at Beth Israel Deaconess Medical Center has identified a protein linked with the onset of anthracycline-associated cardiac toxicity. [Read More](#)

New Project Aims to Map Cellular Variation in the Healthy Human Brain

Broad Institute



People vary widely in how we think and behave and in our vulnerability to disease, and that variation can be traced at least in part to our brains. Yet scientists don't know how healthy brains vary from one individual to the next, how genes and the environment generate that variation, or how human brains vary at the cellular and molecular levels. To help answer these questions, researchers at the Broad Institute are working to create an "atlas" of variation in human brain cells. [Read More](#)

How a Mother's Microbiome Helps Shape Her Baby's Development

Broad Institute



During and after childbirth, bacteria from the mother's gut take up residence in the baby's body, forming a unique community of beneficial bacteria that will help break down food, synthesize vitamins, and help teach the baby's nascent immune system to recognize foreign organisms. A mother's microbial gifts go even further than that, according to a new study from scientists at the Broad Institute. [Read More](#)

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

Upcoming Events in Boston

January 26 11:00 AM	Managing Your Academic Identity Online Online
January 26 4:30 PM	Biomedical Informatics Entrepreneurs Salon: Iris Grossman, ElevenTx Harvard Medical School & Online
January 26 5:30 PM	The Importance of Broad Science Literacy: Lessons from Covid, Climate Change, and More Whitehead Institute & Online
January 27 12:30 PM	Xenotransplantation: Transplanting Genetically-Modified Pig Kidneys into Patients Online
February 22 12:00 PM	Stem Cells in Space Online

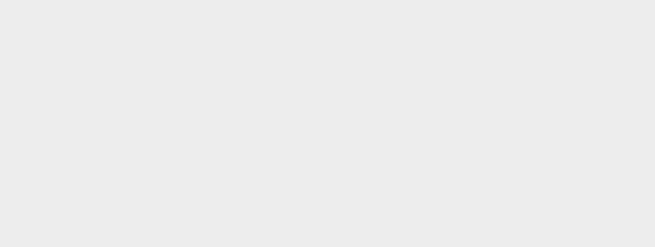
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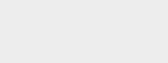

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