Volume 3 | 1 | March 29, 2021

Publications of the Week

## Mucin O-Glycans Suppress Quorum-Sensing Pathways and Genetic Transformation in *Streptococcus Mutans*

First Author: Caroline Werlang | Senior Author: Katharina Ribbeck *(pictured)*
Nature Microbiology | MIT, Dana-Farber Cancer Institute, and Harvard

Mucus barriers accommodate trillions of microorganisms throughout the human body while preventing pathogenic colonization. In the oral cavity, saliva containing the mucins MUC5B and MUC7 forms a pellicle that coats the soft tissue and teeth to prevent infection by oral pathogens, such as *Streptococcus mutans*. Using an ex vivo saliva model, the authors identify MUC5B as an inhibitor of microbial virulence.
Abstract

## Checkpoint Blockade Toxicities: Insights into Autoimmunity and Treatment

First Author: Michael Hasan | Senior Author: Michael Dougan *(pictured)*
Seminars in Immunology | Harvard, Dana-Farber Cancer Institute, and Massachusetts General Hospital

Checkpoint blockade has transformed not only the way cancers are treated, but also highlighted the importance of mounting a proper immune response against tumors. Cytotoxic and tissue-resident T cells likely play an important role in mediating some checkpoint blockade toxicities, though high levels of cytokines and the generation of auto-antibodies in other toxicities demonstrates these mechanisms are not all shared. Abstract

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Awards

## Benjamin Ebert Is the Recipient of the 2021 Stanley J. Korsmeyer Award

Dana-Farber Cancer Institute

Dr. Benjamin Ebert *(pictured)*, Chair of Medical Oncology at Dana-Farber Cancer Institute, received the 2021 Stanley J. Korsmeyer Award from the American Society for Clinical Investigation (ASCI) for his contributions to the understanding of the genetics, biology, and treatment of myeloid malignancies. The award recognizes the achievements of ASCI members in advancing knowledge in a specific field and in mentoring life science researchers. Read More

## Alex's Lemonade Stand Foundation Awards $4.95 Million to Dana-Farber/Boston Children's Researchers as Part of Its Crazy 8 Initiative to Advance Pediatric Cancer Research

Dana-Farber Cancer Institute

Alex's Lemonade Stand Foundation, a leading funder of pediatric cancer research, has awarded a $4.95 million dollar grant to Dr. Leonard Zon *(pictured)* of Boston Children's Hospital through its Crazy 8 Initiative, which aims to provide detailed roadmaps toward cures for specific, hard-to-treat childhood cancers through collaborative research. The grant is titled "Barcoding Pediatric Leukemia for Therapeutic Purposes." Read More

## Recent Awards and Honors for the BIDMC Community

Beth Israel Deaconess Medical Center

The Pew Charitable Trusts selected Dr. Mark Andermann, Associate Professor of Medicine at Beth Israel Deaconess Medical Center (BIDMC), and Dr. Shingo Kajimura *(pictured)*, Investigator in the Division of Endocrinology, Diabetes, and Metabolism at BIDMC, to join its 2020 class of Innovation Fund investigators. The award aims to encourage collaborative projects within the Pew's biomedical network. Read More

## Harvard Medical School Awards and Recognitions: March 2021

Harvard Medical School

Dr. Stuart Orkin *(pictured)*, the David G. Nathan Distinguished Professor of Pediatrics at Harvard Medical School and Dana-Farber/Boston Children's Cancer and Blood Disorders Center, received the 2021 Gruber Genetics Prize, which will be presented at the annual meeting of the American Society of Human Genetics in October. A hematologist-oncologist and geneticist, Orkin is being recognized for his pioneering discoveries of the genetic underpinnings of blood disorders. Read More

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Local News

## Vaccination by Inhalation

MIT News

Many viruses infect their hosts through mucosal surfaces such as the lining of the respiratory tract. MIT researchers including Dr. Darrell Irvine *(pictured)* have now developed a vaccination strategy that can create an army of T cells that are ready and waiting at those surfaces, offering a quicker response to viral invaders. They induced a strong memory T cell response in the lungs of mice by giving them a vaccine modified to bind to a protein naturally present in mucus. Read More

## 'Zinc Fingers' May Help Treat Alzheimer's Disease

MIT News

Researchers including Dr. Bradley Hyman *(pictured)* have used a genetic engineering strategy to dramatically reduce levels of tau — a key protein that accumulates and becomes tangled in the brain during the development of Alzheimer's disease — in an animal model. The results, which come from investigators at Massachusetts General Hospital and Sangamo Therapeutics Inc., could lead to a potentially promising treatment for patients. Read More

## A Computational Guide to Lead Cells down Desired Differentiation Paths

Wyss Institute

A collaborative effort, led by Dr. George Church *(pictured)* at the Wyss Institute and Dr. Antonio del Sol at the Luxembourg Centre for Systems Biomedicine, has developed a computer-guided design tool called Integrative gene Regulatory Network model (IRENE), which significantly helps increase the efficiency of cell conversions by predicting highly effective combinations of cell type-specific transcription factors. Read More

## Gene Changes Linked to Severe Repetitive Behaviors

McGovern Institute

Dr. Ann Graybiel *(pictured)* has found a small set of genes that are regulated in relation to the development of stereotypic behaviors in an animal model of drug addiction. One of these genes is a susceptibility gene for schizophrenia. This finding might help to understand the biological basis of repetitive, stereotypic behaviors as seen in a range of neurologic and neuropsychiatric disorders, and in otherwise 'typical' people under stress. Read More

## Conducting the Cell

Whitehead Institute

If the cell is like an orchestra, then what conducts all of these musicians and keeps them organized and harmonized as they play a symphony? Whitehead Institute researchers including Dr. Mary Gehring *(pictured)* are showing that, like a conductor, certain key molecules tune the cell's behavior to the needs of the occasion. The knowledge of how cells give order to complicated processes could prove crucial to learning how to restore healthy function in diseased cells.
Read More

## Planting the Seed for DNA Nanoconstructs That Grow to the Micron Scale

Wyss Institute

A team of nanobiotechnologists at the Wyss Institute and the Dana-Farber Cancer Institute led by Dr. William Shih *(pictured)* has devised a programmable DNA self-assembly strategy that solves the key challenge of robust nucleation control and paves the way for applications such as ultrasensitive diagnostic biomarker detection and scalable fabrication of micrometer-sized structures with nanometer-sized features. Read More

## New Single-Cell Technology Points to Mechanism of Cancer Immunotherapy Resistance

Broad Institute

Cancer drugs called immune checkpoint inhibitors stimulate the immune system to kill cancer cells, but many patients develop resistance to these inhibitors. Researchers led by Dr. Aviv Regev *(pictured)* have identified a molecular mechanism underlying this drug resistance using a technology they developed called Perturb-CITE-seq, which allows researchers to systematically perturb many individual genes and profile RNA and protein in single cells. Read More

## Ultrasound Has Potential to Damage Coronaviruses, Study Finds

MIT News

A new study by researchers in MIT's Department of Mechanical Engineering suggests that coronaviruses may be vulnerable to ultrasound vibrations, within the frequencies used in medical diagnostic imaging. The team modeled the virus' mechanical response to vibrations across a range of ultrasound frequencies. They found that vibrations between 25 and 100 megahertz triggered the virus' shell and spikes to collapse and start to rupture within a fraction of a millisecond. Read More

## Open Access

the Harvard Gazette

In the summer of 2019, Dr. Medhi Jorfi realized that podcasting could be a solution to limited scientific resources outside of developed nations like he experienced during his education journey. In Iran, Jorfi said he faced issues like weaknesses in research methodology, lack of academia-industry collaboration, limited integration of research into the undergraduate curriculum, and lack of exposure to international exchange programs and students. Read More

## Pediatric Cancers Have Unique Genetic Vulnerabilities

Broad Institute

Most cancer drugs that target specific genetic mutations are designed for adult cancers rather than those in children, partly because pediatric cancers have fewer mutations. To look for more ways to target childhood cancers, researchers at the Broad Institute of MIT and Harvard, Dana-Farber Cancer Institute and Boston Children's Hospital decided to look for genetic dependencies in various pediatric cancers. Read More

## Unwanted Stability

Harvard Medical School

What allows the variants of SARS-CoV-2 detected in the UK, South Africa, and Brazil to spread so quickly? How can current COVID-19 vaccines better protect against them? A new study led by researchers at Harvard Medical School and Boston Children's Hospital helps answer these urgent questions. The researchers focused on a genetic change shared by all three variants called the D614G mutation. Read More

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## Upcoming Events in Boston

March 29
5:00 PM
**MIT Research Slam Public Showcase**
Online

April 1
12:00 PM
**Open Box Science Thursday Webinar Series: Targeting Microglia and Macrophages in Aging and Neurodegeneration**
Online

April 5
2:00 PM
**Ensuring Equitable Access to New Gene Therapies**
Online

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

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

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## Science Jobs in Boston

**Scientific Inside Sales Representative**
STEMCELL Technologies Inc.

**Posdoctoral Fellow in Cardiovascular, Metabolic, or Neurodegenerative Diseases**
Harvard Medical School and Brigham and Women's Hospital

**Research Scientist**
Day Zero Diagnostics

**Research Assistant I**
Boston Children's Hospital

**Research Associate/Senior Research Associate (Molecular Biology), *In Vivo* Pharmacology**
Atalanta Therapeutics

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