Mount Sinai Receives U.S. Military Contract to Identify Exposure to Weaponized Infectious Agents

One of the greatest challenges facing the U.S. military is being able to determine, definitively, whether troops serving in combat zones have been exposed to weaponized infectious agents, chemicals, or radiation, or if someone has been working with materials used in making weapons of mass destruction. This knowledge would enable the U.S. military to respond immediately.

The Icahn School of Medicine at Mount Sinai is now taking an active role in such a national security initiative, which was launched recently by the Defense Advanced Research Projects Agency (DARPA)—an arm of the U.S. Department of Defense. Under the four-year, $27.8 million contract, Mount Sinai researchers and colleagues from industry and other academic institutions will work together to explore new methods of finding molecular signatures in blood that can identify exposures and the time of exposure. They will also develop field-deployable instruments that can perform these sensitive forensic and diagnostic analyses.

“The human body logs exposures in a rich biographical record that we carry around with us in our epigenomes,” says Stuart Sealfon, MD, Professor of Neurology at the Icahn School of Medicine at Mount Sinai, and Principal Investigator on the contract, which is part of DARPA’s new Epigenetic Characterization and Observation (ECHO) program. “The ECHO technology we’re developing will enable us to quickly read someone’s epigenome from a small amount of blood and measure the exposures.”

Study Links Dust at Ground Zero to Prostate Cancer

Eighteen years after the September 11 attacks, Mount Sinai Health System researchers have found a higher incidence of prostate cancer among the World Trade Center (WTC) first responders than other populations, suggesting that chronic inflammation can facilitate the development of prostate cancer.

The most recent findings, published in June in Molecular Cancer Research, were led by Emanuela Taioli, MD, PhD, Director of the Institute for Translational Epidemiology and Associate Director for Population Science at The Tisch Cancer Institute; and William Oh, MD, Chief of the Division of Hematology and Medical Oncology at the Icahn School of Medicine at Mount Sinai, and Deputy Director of The Tisch Cancer Institute.

“Our research supports the first line of evidence that acute World Trade Center dust exposure through inhalation can profoundly disturb gene expression and immune cell infiltration in the prostate,” says Dr. Taioli.
A new option is now available for Mount Sinai Health System patients and employees who have rare or chronic disorders that require complex medications such as immunotherapy or chemotherapy—the Mount Sinai Specialty Pharmacy. The facility, which opened in June at The Mount Sinai Hospital, helps patients seek insurance approval and financial assistance, and relieves the administrative burden of physicians, with the ultimate goal of improving patient outcomes.

“The Mount Sinai Specialty Pharmacy will offer patient-focused, convenient, and affordable services for all our patients,” says Donald Mashni, PharmD, Director, Specialty and Outpatient Pharmacy, Mount Sinai Health System. Specialty pharmacies dispense complex medications that require special storage and handling and ongoing clinical support and monitoring by specially trained pharmacists.

When patients and doctors present specialty prescriptions to the Mount Sinai Specialty Pharmacy, the pharmacy staff can assume the important tasks of securing insurance approval, financial assistance, and clinical counseling. Pharmacy staff also coordinate delivery to the patient’s home or to the physician’s office. “Our facility will tie everything together,” Mr. Mashni says. “The goal is to keep all patient care in-house, from diagnosis through post-treatment follow-up. This approach provides thorough and immediate communication among pharmacists and specialists. It also improves the efficiency and accuracy of the medications.”

For example, one commonly prescribed specialty drug is adalimumab, or Humira, an advanced biologic medication for severe Crohn’s disease and rheumatoid arthritis. Patients inject a pre-filled syringe every other week. The drug must be refrigerated, and each syringe must be used in full and injected in the thigh or stomach, in a different spot each time. The patient should not skip a dose or stop taking the medication without consulting a physician or pharmacist.

“Adherence to the treatment schedule is critically important,” Mr. Mashni says. “It maximizes the benefit patients get from the medication and improves outcomes.”

Specialty medications once were a niche market. But advances in drug research mean they are available for many more conditions. The U.S. Food and Drug Administration approved 39 new specialty medications in 2018, according to Specialty Pharmacy Times, and because they can be so costly, specialty drugs are expected to account for almost 50 percent of drug spending by 2020, although they represent only about 2 percent of the total prescriptions filled.

The Mount Sinai Specialty Pharmacy is launching services in therapeutic categories that include HIV, hepatitis C, inflammatory bowel disease, rheumatology, dermatology, and oncology. It shares space with the Mount Sinai employee pharmacy in the Annenberg Building and functions like a traditional specialty pharmacy but with the advantage of full integration with Mount Sinai’s hospitals and physicians. The Health System also operates two other specialty pharmacies, which are part of the Institute for Advanced Medicine and specialize in treating patients with HIV. They are the West Village Pharmacy, at the Center for Transgender Medicine and Surgery, 275 Seventh Avenue, and the St. Luke’s-Roosevelt Outpatient Pharmacy in the Samuels Clinic at Mount Sinai West.

A new Call Center, adjacent to the Mount Sinai Specialty Pharmacy at The Mount Sinai Hospital, is centralizing all of the Health System’s specialty pharmacy services and fulfillment, with Call Center staff coordinating prior authorization, financial assistance, and delivery of medications. These services are essential as the Mount Sinai Specialty Pharmacy is seeking accreditation from URAC, the gold-standard accrediting body for specialty pharmacies. URAC accreditation will allow the pharmacy to gain access to more limited-distribution drugs and get contracts with more insurance plans.

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For more information about Specialty Pharmacy services, visit mountsinai.org/locations/specialty-pharmacy.
Mount Sinai Receives U.S. Military Contract

any changes in the cells to accurately predict exposure to hazardous agents or materials.”

Current forensic and diagnostic screening methods require large instruments and are unable to detect previous exposure, according to Dr. Sealfon. The researchers will focus on creating advanced microfluidic instrumentation with a reduced footprint that can be easily deployed and moved around battlefields for the sequencing and analysis of human cells. “This level of portability could enhance the military’s ability to conduct timely surveillance of emerging threats around the world where U.S. troops or our allies are actively engaged,” he says. It could also make a difference by ensuring that medical countermeasures are undertaken when soldiers encounter hazardous nerve agents, such as sarin and VX, or other toxic agents, such as phosgene and chlorine.

Mount Sinai will draw on its considerable experience in the fields of genomics, proteomics, and epigenomics over the course of the research project. In order to detect epigenetic markers in small amounts of blood, the researchers will also leverage their strengths in the rapidly unfolding science of single cell biology. “My laboratory is an integrated computational and experimental group with cell biologists, molecular biologists, computer scientists, bioinformaticists, physicists, mathematic modelers, and database developers,” Dr. Sealfon says. “We are also fortunate to have outstanding collaborators within Mount Sinai—including Robert Sebra, PhD, Associate Professor, Department of Genetics and Genomic Sciences, and his lab—and from outside laboratories, since that gives us a broader range of expertise.”

Defense security is only one aspect of the project funded by DARPA. Just as important, according to Dr. Sealfon, is the potential application of ECHO technology in general medicine. “It could be valuable in the field of infectious disease, for example, to quickly and reliably predict if someone has a bacterial or viral infection during the influenza season, giving patients a point-of-care benefit,” he says. Another possible outgrowth of the DARPA work is the development of basic research instruments that could generate epigenetic data on single cells within minutes.

“It’s likely that medical applications from this research program will be realized in a shorter time frame than those on the military side, which are more demanding,” Dr. Sealfon says. “This may result, for example, in the next-generation sequencing technology making many of the genomic analyses we now do much faster, easier, and more accessible.”
Personalized Digital Health Screenings at Lab 100

Tucked away in an office on the campus of the Icahn School of Medicine at Mount Sinai is a futuristic medical clinic—Lab 100—that provides patients with a 90-minute comprehensive health checkup using the latest technology to measure their vital signs, their strength, cognition, balance, and dexterity. Designed as a complement to a primary care visit, Lab 100, which opened to the public in October 2018, provides patients with information that can help them lead a healthier lifestyle. It serves as a digital biometric health screening that alerts patients and practitioners to areas of their health they need to improve, such as poor sleep habits or a stronger core that can be achieved through yoga or a different exercise routine.

“Our goal is to empower patients by rapidly and transparently providing them with their own personalized health data,” says Marina Gazayeva, NP, Lab 100.

Lab 100 patients fill out an online questionnaire in advance of their appointments. When they arrive at the clinic, they visit eight health stations, including one that measures their body fat ratio and skeletal muscle mass. At the conclusion of the visit, their health results are posted on a large digital screen that serves as a point of discussion between the patient and a Lab 100 nurse practitioner. Within 24 hours after their visit, patients receive a health report card of their results, with recommendations for improving their health.

The cost of a visit, which is not covered by medical insurance but may be covered through a health spending account, is $199 for Mount Sinai Health System employees and $399 for nonemployees.

Study Links Dust at Ground Zero to Cancer (continued from page 1)

While working at Ground Zero, the first responders did not wear protective gear and were exposed to dust particles composed of volatile organic compounds from jet fuel, as well as asbestos, benzene, silica, glass fibers, polychlorinated biphenyls, polychlorinated dibenzofurans, and dioxins from the collapsed buildings. Given the fine particulate nature of the WTC dust, the researchers hypothesize that the toxins entered the blood through the lungs and eventually reached the prostate and other distal organs.

“The results of this study support our hypothesis that exposure to the dust at the World Trade Center caused chronic changes in the body,” says Dr. Oh. “The long-lasting inflammatory effect in the prostate revealed in our study calls for further investigation as to the effect of this exposure in other organs, such as the kidney or thyroid, or the central nervous system.”

In 2018, Dr. Taioli led a study published in the European Journal of Cancer Prevention, which reported that responders who spent more time working at Ground Zero and had a higher exposure to the dust cloud that formed after the WTC buildings collapsed, had more advanced stages of prostate cancer—stages III and IV—representing tumor invasion.

Interestingly, the 2018 study found that at the beginning of their service at the WTC, the responders were mostly nonsmokers of diverse ethnic backgrounds who were considerably healthier than the general population and at lower risk for cancer.

According to the recent 2019 report, approximately 20 percent of human cancers are thought to be caused by chronic infection or inflammatory states, and chronically unresolved inflammation is related to increased risk of malignant disease. When tested in the laboratory, the toxic dust was shown to induce the secretion of cytokines—small proteins involved in modulating responses to inflammation infection, cancer, and trauma.

Mount Sinai runs the largest World Trade Center Health Program Clinical Center of Excellence in the New York metropolitan region, with 25,000 patients who have consented to participate in research. A biobank of more than 600 cancer samples from first responders has helped lay the groundwork for Mount Sinai’s WTC research findings.

Dr. Taioli says the latest research raises additional questions about whether air pollution, in general, causes an inflammatory response in people. “This work has larger implications for the population exposed to environmental particulates, such as emissions from motor vehicles, industrial processes, power generation, and the household combustion of solid fuel,” she says. “Inflammation could be the common pathway driving an increase in cancer occurrence.”
Support for Organ Donations

Organ donation holds personal significance for Sara Miller, far left in photo, a Process Improvement Analyst at the Mount Sinai Health System, and Nicole Antaya, center in photo, who recently graduated from Quinnipiac University in Connecticut. They recently held an organ donor registration drive—seen here with Carolyn Forman, right, Administrative Director of the Recanati/Miller Transplantation Institute, Mount Sinai Health System—in the Guggenheim lobby to educate people and encourage them to register as donors.

When Ms. Miller was 12, she lost her older sister, Laura, to brain cancer, and her family made the difficult decision to donate Laura’s organs to others in need. As a freshman at Washington University in St. Louis, Ms. Miller started a nonprofit organization, SODA: Student Organ Donation Advocates, that supports student-led organ donation education and registration events. SODA now has 18 chapters at U.S. high schools and colleges.

Ms. Antaya, who has cystic fibrosis and underwent a double lung transplant in August 2015, founded a SODA chapter at Quinnipiac. Prior to her transplant, Ms. Antaya’s lung function was at 18 percent capacity and her life was extremely limited. “The ultimate gift of compassion and love, and life and caring—that’s organ donation,” says Ms. Antaya.

Yoga Day, and Beyond

Mount Sinai Heart faculty and staff recently participated in International Yoga Day at Guggenheim Pavilion, with multiple sessions starting at 7:30 am. However, the enthusiasm for the practice goes well beyond a one-day event. The organizer, Annapoorna S. Kini, MD, Director of the Cardiac Catheterization Laboratory, and the Zena and Michael A. Wiener Professor of Medicine, Icahn School of Medicine at Mount Sinai, practices yoga herself and recently published a list of recommended yoga and meditation techniques in the CRT Times, including a 10-minute sequence specifically for physicians in the Cardiac Catheterization Laboratory. Dr. Kini says, “At Mount Sinai, we strongly advocate yoga and meditation to counter musculoskeletal discomfort, to relieve stress, and to maintain focus and concentration.”

Administrative Fellows Are Celebrated

Hailed as “future leaders,” two young professionals recently graduated from Mount Sinai’s Administrative Fellowship Program, a two-year postgraduate program created to build a pipeline of underrepresented minorities in health care administration. The graduation of the program’s second cohort was held at the Corporate Services Center. Ellina Babar, MPA, completed a fellowship at The Mount Sinai Hospital and Mount Sinai Queens and is now an Associate Director for Operations and Planning at Mount Sinai Queens. José Cruz, MHSA, served a fellowship at Mount Sinai West and is now a Management Analyst for Mount Sinai Health Partners. In July, five new fellows started the program, and six fellows began their second year. Shana Dacon, MPH, MBA, Director, Corporate Health System Affairs, Office for Diversity and Inclusion, congratulated the graduates and thanked the leaders throughout the Health System who support the fellowship. “The program is growing,” she said. “The sky is the limit.”
The Mount Sinai Health System complies with applicable Federal civil rights laws and does not discriminate, exclude, or treat people differently on the basis of race, color, national origin, age, religion, disability, sex, sexual orientation, gender identity, or gender expression.

REGISTER NOW

8th Annual SINAinnovations

Leading a New Era of Discovery

Theme: Artificial Intelligence
Join international thought leaders as they discuss the explosive growth of artificial intelligence in health care. Sessions and lectures will include the role of artificial intelligence in imaging, robotics, and medical decision-making.

Tuesday, October 15 – Wednesday, October 16
Annenberg, Stern Auditorium
https://inside.mountsinai.org/sinainnovations/
Registration is free but required.

Theme: Artificial Intelligence—Expanding The Limits of Human Performance
An exciting 48-hour team-building competition with four topic areas: E-Sports, Mobility, and Adaptive Sports; Memory and Mental Agility; Social Connectivity and Communication; and Professional Performance in Medicine.

Friday, October 11 – Sunday, October 13
Hess Center for Science and Medicine
Davis Conference Center
https://inside.mountsinai.org/health-hackathon/
Registration is $10

Kickstart Workshop (Hackathon 101)
Thursday, October 3
6 - 9 pm
Annenberg Building
Room 5-205 Center for Innovation and Discovery
Free event

The Diversity Innovation Hub
The Office for Diversity and Inclusion
Patricia S. Levinson Center for Multicultural and Community Affairs
Meet entrepreneurs from health care research, technology, and community start-ups to explore the convergence of diversity and innovation and the power of innovation to transform health care and local communities.

Monday, October 14
1:30 pm
Hess Center for Science and Medicine
Davis Conference Center

Careers & Connections 2019
A SINAinnovations Event
Join us for a fireside chat and two panel discussions, and informal networking, which connects trainees in the life sciences with industry professionals.

Tuesday, October 15
3 - 7 pm
Hess Center for Science and Medicine

A Move, and an Exciting New Era
For Phillips School of Nursing

The Phillips School of Nursing at Mount Sinai Beth Israel—the sole nursing school of the Mount Sinai Health System—will relocate from Chelsea to East Harlem in early 2020, symbolizing an exciting new era. With a location closer to The Mount Sinai Hospital and the Icahn School of Medicine at Mount Sinai, Phillips School of Nursing students, faculty, and staff will have a greater opportunity for interprofessional learning, community partnerships, and other special initiatives.

The new site, located at 158 East 126th Street between Lexington and Third avenues, is part of the Upper Manhattan Empowerment Zone—an area enjoying a robust resurgence. The facility will encompass more than 35,000 square feet of space designed to respond to today’s technology-driven nursing curricula and to accommodate anticipated growth.

Annual Gynecologic Cancer Awareness Health Fair
To commemorate Gynecologic Cancer Awareness Month in September and promote healthy behaviors, Women’s Services at The Mount Sinai Hospital will host the annual Gynecologic Cancer Awareness Health Fair. Stop by to learn more about gynecologic cancers, risk factors, nutrition, prevention, and survivorship. Activities will include blood pressure screenings, yoga, massage therapy, healthy cooking demonstrations, art therapy, pet therapy, and more. Cancer prevention and awareness organizations, including gynecologic cancer support groups Woman to Woman and SHARE, also will be on hand to provide information about their programs.

Thursday, September 19
11 am – 3 pm
The Mount Sinai Hospital
Guggenheim Pavilion Atrium

Mount Sinai Transformation Update
For the most recent updates on Mount Sinai’s downtown transformation, please go to:
http://www.mountsinai.org/locations/downtown

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