SPECIAL ISSUE COVID-19

SEPTEMBER 2020

Giving matters

A newsletter for supporters of

University of Massachusetts UMASS Medical School

Bassick Family Foundation boosts COVID-19 research at UMass Medical School

Convalescent plasma trial

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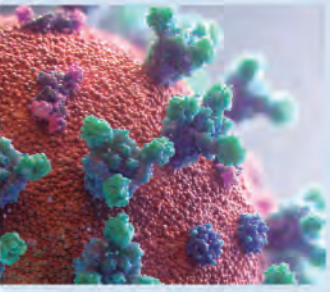

COVID-19/Pandemic Research Fund

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AS THE COVID-19 PANDEMIC rocketed around the world, John "Jack" Bassick didn't hesitate to act.

"Given the catastrophic global nature of the threat, I thought this was a once-in-a-lifetime opportunity to help solve a major, worldwide human health problem—and my family agreed," Mr. Bassick said.

The Bassick Family Foundation has supported early-stage biomedical research at UMass Medical School for many years through annual gifts to the Hudson Hoagland Society (HHS), which funds Worcester Foundation seed grants. This year, the Bassicks decided to make an additional major gift to the newly established COVID-19/Pandemic Research Fund, which supports more than 19 labs at UMMS working on therapies, vaccines and diagnostics in the fight against COVID-19.

"I expected that UMass Medical School would quickly bring to bear its considerable biomedical research resources to hopefully help solve this major human health problem," Bassick said.

The timing of this additional gift coincided with the selection of Trudy Morrison, PhD, professor of microbiology & physiological systems at UMMS, as the recipient of the 2020 Bassick Family Foundation award, announced at the HHS annual meeting in May, for her work examining how certain viruses latch on to host cells and cause infection—work that could be applied to this coronavirus.

For the past several years, Dr. Morrison and her team have been working on a potential vaccine for respiratory syncytial virus (RSV), which causes severe lower respiratory tract disease in young children and the elderly. When the COVID-19 pandemic emerged this year, Morrison knew the technology platform developed for the RSV project could be applied to this coronavirus.

The disease COVID-19 is caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). Like RSV, SARS-CoV-2 is classified as an "enveloped virus," because its genes are inside an envelope composed of a lipid membrane and virus-encoded glycoproteins inserted in that membrane. *continued on page 8*

Top: Bassick family at the 2018 Hudson Hoagland Society annual meeting.

Front row, from left are Jennifer Bassick Lisciotti, Jack Bassick, Susan Bassick and Michael Bassick. Top row, from left are Kevin Lisciotti, Haijian Lin, MD, PhD, Bo Tian, MD, PhD, and Catherine Bassick.

Inset: Trudy Morrison, PhD

Mathers Foundation helps UMMS battle COVID-19 at the genetic level

THE VIRUS THAT CAUSES COVID-19 can't survive on its own. Like all viruses, it first needs to hijack a person's own cellular machinery to replicate itself, spread the infection and cause disease.

Armed with a major new grant from the G. Harold and Leila Y. Mathers Charitable Foundation, a team of researchers at UMass Medical School is seeking to disrupt the virus's pathway of attack with a two-pronged approach: blocking its genes from replicating, and modulating the body's immune response to the virus so it doesn't rage out of control, causing the most severe form of the disease.

"This is a project of great merit and we are thankful for this support," said Thoru Pederson, PhD, the *Vitold Arnett Professor of Cell Biology*, professor of biochemistry & molecular pharmacology and associate vice provost for research at UMMS. "When the Mathers Foundation opened a special program for COVID-19 research, the fact that we already had, on campus, a coronavirus research project that they saw as among the best in the country, is something we can be proud of."

While Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) can spread throughout the body and infect many different tissues, its first target is usually the airway leading to the lungs where there are several types of cells. The virus infects some of those cells, but not all of them.

The new grant supports a project led by Robert Finberg, MD, the *Richard M. Haidack Professor of Medicine*, chair and professor of medicine; Anastasia Khvorova, PhD, the *Remondi Family Chair in Biomedical Research*, professor of RNA therapeutics; and Jonathan K. Watts, PhD, associate professor of biochemistry & molecular pharmacology. Both Drs. Watts and Khvorova work within the RNA Therapeutics Institute at UMMS. Rounding out the team are William McDougall, PhD, assistant professor of microbiology & physiological systems, and Jennifer Wang, MD, professor of medicine.

The investigators will analyze which airway cells are infected by SARS-CoV-2, then proceed to determine how specific genes, both in the virus and in the human cells, are involved in the infection and replication processes. They will also examine which genes in the host cells are involved in the immune response to the infection.

From left: Robert Finberg, MD; Anastasia Khvorova, PhD; Jonathan Watts, PhD

> "When the Mathers Foundation opened a special program for COVID-19 research...we already had, on campus, a coronavirus research project that they saw as among the best in the country..."

Dr. Finberg's team is collecting samples from COVID-19 patients' airways to determine which cells are prone to infection, which are not and how those cells react at the genetic level in the presence of the virus. That genetic information, along with data published by others, will be used by Khvorova and Watts to design novel RNA- and DNA-based molecules that can target the viral and host cell genes to treat or prevent COVID-19.

"The platform technologies we develop in this project have the potential to be applied to future viral pandemics, to be better prepared for the next emerging infectious disease," the research team wrote in the grant application made to the Mathers Foundation, which is a longtime and generous supporter of research at UMMS. ■

University of Massachusetts Medical School
UMASS

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COVID-19 convalescent plasma study helps patients, researchers

Grant from the George I. Alden Trust supported implementation at UMMS

ON APRIL 18, 2020, at the height of the COVID-19 pandemic in Massachusetts, plasma from a COVID-19 survivor was used to successfully treat a seriously ill patient at UMass Memorial Medical Center. It was the first time the therapy had been used for the disease in this state. By mid-July, 136 severely ill COVID-19 patients in the UMass Memorial Health Care system had been treated with convalescent plasma through a UMass Medical School clinical trial led by Jonathan M. Gerber, MD, the *Eleanor Eustis Farrington Chair in Cancer Research*, chief of the Division of Hematology/Oncology in the Department of Medicine, medical director of the UMass Cancer Center and associate professor of medicine and molecular, cell & cancer biology. Of those, 87 have recovered and been discharged from the hospital.

The first priority of the research was to get this study running quickly and be able to deliver potentially beneficial treatment to patients, according to Dr. Gerber. The next step is to analyze saved segments of plasma in conjunction with patient outcomes and additional laboratory correlates, in an effort to better determine the effects of plasma and how best to utilize it. Just prior to this publication going to press, UMMS scientists were gearing up to do these comprehensive analyses.

The next phase is to join other national trials. Gerber's team recently opened two new outpatient plasma trials in collaboration with Johns Hopkins University. In addition, the team is also actively pursuing a hyperimmune globulin pilot clinical trial, which would potentially be more widely available and more effective against COVID-19.

When reflecting on the implementation of the initial clinical trial, Gerber said a $100,000 grant from the George I. Alden Trust and a $100,000 commitment from UMass Memorial Health Care were instrumental in launching this program. He also credited the support of several UMMS and UMass Memorial groups, including the Cancer Research Office, the Division of Hematology/Oncology, the blood bank team, the UMass Center for Clinical and Translational Science, the critical care teams, and numerous other physicians and nurses. ■

Jonathan Gerber, MD

Dr. Justin Maykel donates plasma after recovering from COVID-19.

One gift helped many

Aiding in the launch of the convalescent plasma trial described above was Justin A. Maykel, MD, of UMMS and UMass Memorial. He was the second known COVID-19 survivor in Massachusetts to donate plasma after recovering from the disease in April.

When he learned a close colleague had gotten very sick, he said, "That created a sense of urgency and allowed us to really push this thing forward in a more forceful way." Dr. Maykel contacted Dr. Gerber, who had joined the Mayo Clinic trial but had not yet enrolled patients because of limitations in the study's eligibility criteria and design, such as limitations on dosing of plasma.

"What we ended up doing was something different from what anybody else has done, which is give one unit (of plasma) up front, but reserve the right to come back and re-dose based on how they're doing," Gerber said. "That allowed us to judiciously stockpile a small bank of our own, because we couldn't collect the plasma here due to a variety of regulatory limitations."

$100M in NIH grants awarded to UMMS to lead push

UMASS MEDICAL SCHOOL HAS BEEN AWARDED grants totaling more than $100 million to coordinate the nationwide push for fast, accessible COVID-19 testing, playing a major role in the National Institutes of Health's Rapid Acceleration of Diagnostics, or RADx, program.

UMMS has already distinguished itself as an incubator for innovative point-of-care (POC) medical technology, which provides clinical information at the site where the patient is, through the Center for Advancing Point of Care Technologies, or CAPCaT, a partnership between the Medical School and UMass Lowell.

"That center has for years been conducting national searches for small businesses, evaluating them, investing in them and helping them with clinical studies," said David McManus, MD, professor of medicine at UMMS, co-director of CAPCaT and co-principal investigator for RADx with Bryan Buchholz, PhD, chairman and professor of biomedical engineering at UMass Lowell. "That experience is why NIH asked us to help with this COVID issue and so we stepped up."

Chancellor Michael F. Collins said rapid, convenient, affordable testing could "change the course of the pandemic."

The RADx initiative was launched in late April by NIH in partnership with the Office of the Assistant Secretary of Health, the Biomedical Advanced Research and Development Authority (BARDA) and the Department of Defense, and is supported by a portion of $1.5 billion in federal stimulus funding.

The goal is to expand diagnostic testing capacity for COVID-19 in the U.S. to about 6 million tests per day by December, a huge leap from current testing capacity of about 1 million tests per day, according to a blog post by NIH Director Francis Collins, MD, PhD, who co-authored an editorial about the project in the *New England Journal of Medicine* on July 22.

Broadly, RADx works like the TV show, "Shark Tank," to identify and support promising technologies that will get more people tested more easily for the SARS-CoV-2 virus, which causes COVID-19. Dr. McManus said he was one of the "sharks" that reviews proposals and oversees administrative, scientific and strategic development among projects.

UMMS's two major RADx grants, under the program component known as RADx Tech, include collaborating with Massachusetts General Hospital to review companies' proposals and coordinating clinical studies and development with partners at University of California San Francisco, Emory University, Johns Hopkins University and Northwestern University. Laura Gibson, MD, associate professor of medicine, co-leads the RADx Tech Clinical Studies Core, within which the studies testing novel POC diagnostic devices in the U.S. are based. Studies are designed and vetted with the NIH, U.S. Food and Drug Administration and local research site teams.

David McManus, MD

"We need to get to a place where you get up in the morning, you're going about your day, you brush your teeth, you're getting your saliva sample or nasal swab, and then you run your test in your home every day to determine if you have COVID," McManus said.

More than 600 companies have completed applications and the project team is supporting about 30 companies through grants already in different phases of development. UMMS alone is already administering 14 of these grants.

NIH announced July 31 that it is investing $248.7 million in new technologies from seven biomedical diagnostic companies, identified through RADx, to address challenges associated with COVID-19 testing.

The seven technologies use different methods and formats and can be performed in a variety of settings to meet diverse needs, according to a news release from NIH. Four of the technologies introduce innovations in laboratory-based testing technologies, including next generation sequencing, CRISPR and integrated microfluidic chips that could dramatically increase

for fast, accessible COVID-19 tests

testing capacity and throughput while reducing the time to receive test results. Three technologies use platforms to provide nucleic acid and viral antigen tests that can give rapid results at the point of care, such as offices, manufacturing facilities, childcare centers, nursing homes and schools. Additionally, some of the tests offer more convenient sampling, such as saliva testing.

The approaches are less cumbersome and expensive than the nasopharyngeal swab and PCR testing by laboratories, which is highly sensitive but can take days for results and additional time to transport specimens.

Another project, which is receiving RADx support through UMMS, comes from PathogenDX, an Arizona-based technology company that has developed an ultra-accurate DNA-based customized pathogen testing platform for the food, agricultural and health sectors. Grant resources will be used to increase the testing capacity of PathogenDx's DetectX-Rv Microarray Assay of COVID-19 testing to a national level, according to a news release from the company.

PathogenDX's product is a multiplex viral diagnostic assay for the detection of SARS-CoV-2 and is currently undergoing FDA authorization. The test is designed to deliver better sensitivity and specificity than current PCR tests, while also detecting COVID-like viruses and subsequent mutations from SARS-CoV-2. With a multiplex system, thousands of samples can be tested each day.

"The NIH and UMass Medical School partnership is an incredibly synergistic collaboration," PathogenDX CEO Milan Patel said. "Technologies like our Detectx-Rv Microarray will be critical when facing the predicted upticks in the fall, in addition to the extra challenge of distinguishing different symptoms such as the flu and common cold, in addition to COVID-19."

McManus said the RADx-tech progress is on track and initial results are expected by early fall.

"This is such an opportunity for us on the national stage, to be selected among all these great medical schools and centers," said McManus. "We're very grateful that, as it's a team effort, everybody across the Medical School and UMass Memorial Medical Center stepped up to help." ■

Frequent COVID tests help keep communities safe

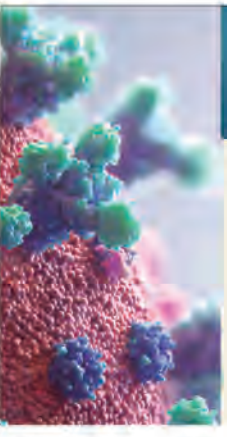
Chancellor Collins pens opinion piece in the *Boston Globe*

As colleges and universities planned for the return of students for the fall semester amid the COVID-19 pandemic, one important element in keeping everyone safe would be frequent testing for the virus, according to Chancellor Michael F. Collins in a July 30, 2020, opinion piece published in the *Boston Globe*.

He explains how UMMS brought back 2,000 students, faculty and staff in three phases to its Worcester campus beginning in May, all of whom were tested prior to their return and undergo weekly testing for the virus.

"The most essential element for a safe reopening must be frequent testing for the presence of COVID-19 infection," Chancellor Collins said in the editorial. "Our experience confirms that with low-cost, frequent testing, like that made possible by the Broad Institute, along with a rapid turnaround of results, contact tracing and isolation can wall off disease for a campus community. These principles could serve our nation well."

Read the full piece here (subscription may be required): https://bit.ly/collinsbostonglobe



COVID-19/Pandemic Research Fund at UMMS

An unprecedented challenge. Your powerful response.

When the pandemic emerged in spring 2020, UMass Medical School mobilized its groundbreaking research platform and world-class researchers to achieve rapid progress in the fight against COVID-19.

People like you took an active role in this effort by supporting the COVID-19/Pandemic Research Fund, which provides funding to work being conducted in more than 19 UMMS labs. As of August 2020, nearly $3 million has been raised.

Learn more about the fund and the work it supports at www.umassmed.edu/covid19-pandemic-research-fund.

Make your donation here:
www.umassmed.edu/supportcovid19research

Two UMMS scientists receive Harrington Scholar Awards for Coronavirus

Katherine Fitzgerald, PhD

Anastasia Khvorova, PhD

THE HARRINGTON DISCOVERY INSTITUTE at University Hospitals in Cleveland, Ohio, in collaboration with Morgan Stanley GIFT (Global Impact Funding Trust) Cures, chose Katherine Fitzgerald, PhD, and Anastasia Khvorova, PhD, to receive Harrington Scholar Awards for Coronavirus. They are among the 12 COVID-19 Rapid Response Initiative award winners, selected from among hundreds of applications submitted by physicians and scientists at 122 universities and health systems across the U.S., Canada and the U.K.

Award recipients receive grant funding and expert drug development support to advance novel therapies, next-generation vaccines and vaccine alternatives to fight COVID-19 and avert future pandemics.

Dr. Fitzgerald, the *Worcester Foundation for Biomedical Research Chair*, professor of medicine, vice chair of research in the Department of Medicine and director of the Program in Innate Immunity, is pursuing fumarate-based therapeutics and clinical trial for lung injury through the grant award. Her lab focuses on understanding the molecular mechanisms controlling the inflammatory response. Her group has made seminal discoveries in the areas of host-pathogen interactions, innate immunity and mechanisms of inflammation, including discoveries of new receptors for pathogens, new signaling molecules and defining how innate immune pathways contribute to autoimmune and inflammatory disease.

Dr. Khvorova, the *Remondi Family Chair in Biomedical Research*, professor of RNA therapeutics, is developing a multivirus therapy for COVID-19 and other pandemic-causing viruses with support from the Harrington award. Scientists in her lab identify the chemical and biological properties that drive small RNA tissue distribution, retention, cellular uptake and biological availability. Their goal is to deliver oligonucleotide and RNA-based therapies to the heart, kidneys, muscle, placenta, vasculature and brain—tissues previously not targeted by RNAi—through chemical engineering. They are investigating a cocktail of siRNA and antisense RNA oligonucleotides that are specific for SARS-CoV-2, which, in concept, could be delivered to all cell types in the lungs and target the mRNA of the virus to significantly reduce the rate of viral replication.

The call for Harrington proposals was part of a major initiative to galvanize the institute's transatlantic network of academic institutions, foundations and philanthropic partners to rapidly respond to the global pandemic. In further action, Harrington Discovery Institute will seek to organize development of COVID-19 therapies derived from academia broadly, accelerate breakthrough treatments within its portfolio, and raise capital to resource this effort through Morgan Stanley GIFT Cures, its philanthropic partnership with Morgan Stanley.

"The quality of science and potential for clinical impact are truly remarkable. Frankly, there are probably 50 projects here that show promise to protect the nation and the world," said Jonathan S. Stamler, MD, president, Harrington Discovery Institute, the *Robert S. and Sylvia K. Reitman Family Foundation Distinguished Professor of Cardiovascular Innovation* and professor of medicine at University Hospitals and Case Western Reserve University. "Our next step will be to build drug development teams around the awardees and to work with urgency to advance these treatments. We are hopeful that many of these novel therapies will be in clinical trials shortly." ■

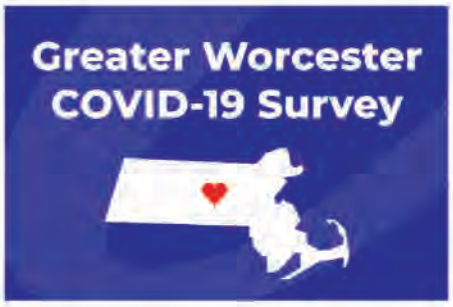
Greater Worcester COVID-19 Community Health Survey underway

Regional survey assessing pandemic impact will help local communities target relief efforts

UMASS MEDICAL SCHOOL is conducting the Greater Worcester COVID-19 Survey in Worcester, Grafton, Holden, Leicester, Millbury, Shrewsbury and West Boylston to assess how the novel coronavirus has impacted the region. Development of the survey, which went live in mid-May, was funded by a grant from the Massachusetts COVID-19 Relief Fund that was distributed through the Greater Worcester Community Foundation.

"The goal of the data is to help community leaders understand how our community members have been affected to inform how they can use their resources to meet needs," said Stephenie C. Lemon, PhD, professor of population & quantitative health sciences, chief of the department's Division of Preventive and Behavioral Medicine and co-director of the UMass Worcester Prevention Research Center at UMMS.

The online survey, which takes about 10 minutes to complete, asks respondents about changes in their lives due to COVID-19, including their health, finances, activities outside the home, access to medical care, employment, housing and food security. Questions also capture demographics such as, age, gender identity, race, education, military service and income. The names of the street a respondent lives on and the closest cross street are vital for understanding circumstances in specific neighborhoods. Providing contact information is optional for respondents who want to receive survey results, and who are willing to be contacted about the survey. The survey also provides a list of local resources for households experiencing distress due to COVID-19.



"We proposed a community-facing survey and our entire department ran with implementing it, to take the data the community provides and share it back with them as a service to the community," said Sharina Person, PhD, vice chair and professor of population & quantitative health sciences. "We will use their information to create a feedback loop that will be useful for our partners."

Dr. Lemon, Dr. Person and their department colleagues created the survey in collaboration with the City of Worcester and the Central Massachusetts Regional Public Health Alliance. The Coalition for a Healthy Greater Worcester is coordinating outreach efforts. Data collected will be analyzed and reported back to individuals and community organizations via a public dashboard. Should community agencies require specialized assessment of the data, the UMMS team is prepared to help.

"In planning their services and programs to help people in our community, agencies may require advanced analysis," said Dr. Lemon. "We will be happy to help, as our intention is to be open, transparent and collaborative in creating datasets."

The larger the number of eligible respondents who take the survey, the more informative the results will be. As of mid-July, the survey had received more than half of the targeted number of responses.

The survey is available in English, Spanish, Portuguese, Vietnamese, Albanian, Russian, Twi, Arabic and Urdu. Individuals can fill out the survey for themselves or a home-dwelling resident they care for (except for residents and employees of nursing homes and continuing care communities). Individual answers will remain anonymous. ■

Learn more about the survey: https://worcestercovid19survey.com/

Caring for our community.

Worcester Superintendent of Schools Maureen Binienda is pictured speaking with Chancellor Michael F. Collins (center) and Assistant Vice Chancellor Kola Akindele during a 2018 North Quadrant Support Services event.

Supporting students in Worcester's North Quadrant

UMMS donated funds to support Worcester Public Schools in direct response to the COVID-19 school shutdown to provide internet access to students to help them catch up via remote learning opportunities over the summer. Funds, which were raised by UMMS employees for the North Quadrant Support Services initiative, also covered books, software and staff time needed to run a virtual summer school program for kindergarten and first grade students. UMMS established the support services initiative in 2017 with grant funding from the Remillard Family Community Service Fund at UMMS to help address socioeconomic barriers to academic success faced by many of the area's K–12 students.

Protecting caregivers

After losing her grandmother to COVID-19, second-year School of Medicine student Emily Chin produced nearly 200 plastic face shields for health care workers using a 3-D printer. "When she was diagnosed with COVID and passed away, I had such a strong connection to the initiative," Chin said. "After spending five days in the hospital as her Chinese medical interpreter, I understood the importance of going into a room and feeling completely protected and safe. I realized how much of an impact these face shields make for the wellness and safety of the providers."

Caring through sharing

After fourth-year School of Medicine student Michelle Shabo recovered from a serious bout with the novel coronavirus this spring, she decided to share her story. The 28-year-old Worcester native spoke in May with multiple area news agencies, including the *Boston Globe*, *T&G*, NBC Boston and WCVB-TV, among others, about her experience to help others understand that people of all ages can contract COVID-19. "I've taken care of many patients who have had difficulty breathing. I've always had sympathy for them, but now I truly feel like I have empathy," she told WBZ-TV about her experience. Shabo, who returned to work at the Worcester field hospital in the DCU Center after her recovery, also donated plasma and signed up for plasma registries and an antibody research study.

Bassick Family Foundation *from page 1*

Morrison has developed a method to create a virus envelope with associated proteins that looks like a real virus, but without any genes inside. That construct is called a virus-like particle (VLP).

Pre-clinical testing has shown that the VLP the Morrison team engineered for the RSV project works like a vaccine, generating protective immune responses in an animal model.

For SARS-CoV-2, the key factor on the surface of the envelope that facilitates infection is called the S (spike) protein. Morrison hopes to create a VLP with the S protein on the outside of the envelope that prompts the immune system to respond. And since there are no genes within the envelope, the VLP vaccine can never cause COVID-19.

The Morrison lab was able to begin this vital work because of the Bassicks recent contributions.

"We had no funding to work on COVID-19, and now we are off and running because of the Bassick Family Foundation's generous support," said Morrison in June. "We are extremely grateful."

Morrison hopes to have VLPs developed against the SARS-CoV-2 ready for pre-clinical testing sometime in late 2020. ■