

The secret of lymph: How lymph nodes help cancer cells spread

By Katie Regan

For decades, physicians have known that many kinds of cancer cells often spread first to lymph nodes before traveling to distant organs through the bloodstream. New research from the Children's Medical Center Research Institute at UT Southwestern (CRI) provides insight into why this occurs, opening up new targets for treatments that could inhibit the spread of cancer.

The study, published last month in *Nature*, found melanoma cells that pass through the lymph nodes pick up a protective coating, allowing them to survive high levels of oxidative stress in the blood and go on to form distant tumors.

Most cancer deaths happen after cancer spreads to other parts of the body through a process known as metastasis. This occurs when cancer cells from the primary tumor spread through blood vessels or migrate through lymphatic

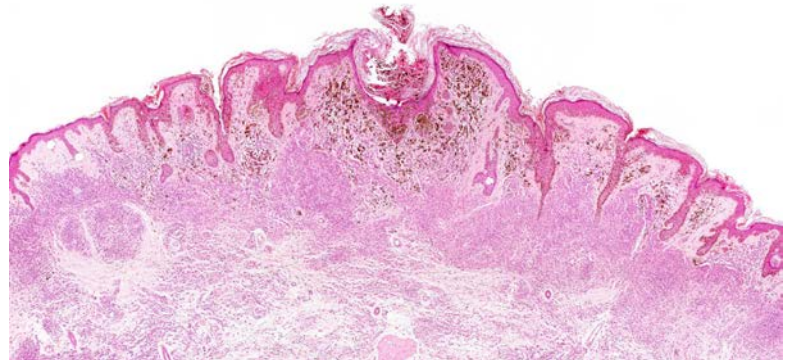


Drs. Jessalyn Ubellacker and Sean Morrison of the Children's Medical Center Research Institute at UT Southwestern

vessels before entering the blood.

"Previous research has focused on how cancer cells metastasize through the blood, but very little was known about how these cells compare to cells that metastasize through lymphatics," said Dr. Sean Morrison, Director of CRI,

Professor of Pediatrics at UT Southwestern, and a Howard Hughes Medical Institute (HHMI) Investigator. "Our data suggest that passing through the lymphatics can promote the survival and spread of melanoma cells by protecting the cells from the oxidative stress they



The study found that melanoma cells (above) pass through the lymph nodes and pick up a protective coating, allowing them to survive high levels of oxidative stress and go on to form distant tumors.

normally experience during metastasis."

The researchers observed how human melanoma cells behaved when injected intravenously or into the lymphatic system of mice. They found that cancer cells injected into lymph nodes had a better chance of surviving and forming tumors than those injected directly into the blood.

Researchers hypothesized this difference could be explained by the high levels of oxidative stress cancer cells experience when they migrate through the blood. Exposure to oxidative stress in the blood is one reason why metastasis is a very inefficient process in which most cancer cells die before

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Mother delivers quadruplets just months after brain surgery

UTSW care team oversees successful births of first set of rare quadruplets at Clements University Hospital during pandemic



Katie and Chris Sturm are the proud parents of four baby boys born July 3 at William P. Clements Jr. University Hospital. The quadruplet deliveries marked the first for the hospital.

By Nyshicka Jordan

Katie Sturm had nearly gotten over the shock of learning she was pregnant with quadruplets when in February she suffered a seizure at work. Diagnosed with a brain tumor, she was referred to UT Southwestern where the tumor was removed in March.

Then 18 weeks later, on July 3 and in the midst of a COVID-19 pandemic surge in Texas, the 27-year-old mother gave birth to four boys – the first set of quadruplets ever delivered at UT Southwestern's William P. Clements Jr. University Hospital.

The C-section delivery was performed 32 weeks into Mrs. Sturm's pregnancy and involved a team of about 21 physicians, nurses, and health care staff. Even prior to birth, each baby was assigned a team of three health care providers in the Neonatal Intensive Care Unit (NICU). Because the mother had tested negative for COVID-19,

doctors said they did not have to make any major adjustments to carry out the delivery during the pandemic.

"The delivery could not have gone better. After all the routine preparation and other precautions, it all occurred without any hiccups," said Dr. Patricia Santiago-Muñoz, a high-risk pregnancy specialist and Professor of Obstetrics and Gynecology who has experience in high-order multiple-birth deliveries.

The odds of a mother having quadruplets are about 1 in 700,000. The fraternal quadruplet newborns – Austin, Daniel, Jacob, and Hudson – ranged in weight from 3.5 pounds to 4.3 pounds at birth. They remained in the NICU between four and seven weeks each to gain weight, improve breathing ability, and learn to feed from a bottle.

"The boys really did quite well and about what you'd expect for babies born at 32 weeks," said Dr. Becky Ennis, Medical

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UT System Board of Regents honors faculty as 'outstanding' educators

By Patrick Wascovich

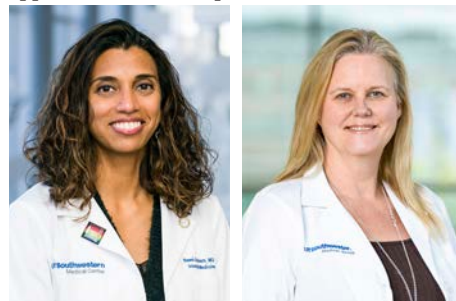
Dr. Reeni Abraham, Associate Professor of Internal Medicine, and Dr. Julie Champine, Professor of Radiology, have been recognized with the UT System's highest educational honor – the Regents' Outstanding Teaching Award – for their academic prowess and mentoring talent.

With their selection as recipients of 2020 Regents' Outstanding Teaching Awards (ROTA), UT Southwestern now has 53 faculty members who have been honored with the Regents' award, which recognizes outstanding teaching, mentoring, and personal commitment to students and the learning process.

"Dr. Abraham and Dr. Champine are exemplary scholars and educators, as evidenced by their inclusion in the UT Southwestern Academy of Teachers, and we are delighted that the Board of Regents has recognized their commitment to our students and other learners. Their dedication and talents as teachers enable UT Southwestern to prepare outstanding future physicians and scientists who will improve the health and well-being of our community and those beyond," said Dr. Daniel K. Podolsky, President of UT Southwestern.

Drs. Abraham and Champine, both Distinguished Teaching Professors at UTSW, are among 11 educators receiving health awards this year. Due to ongoing COVID-19 safety protocols, the 2020 ROTA event was presented virtually to UT System faculty members during the Board of Regents' Aug. 20 meeting.

"These awards demonstrate the Board's appreciation for exceptional educators at each



Dr. Reeni Abraham

Dr. Julie Champine

of the 14 UT institutions," Board of Regents Chairman Kevin P. Eltife said. "Their dedication to teaching excellence and student success is instrumental to achieving our education, research and health care missions."

Recipients receive a certificate, a medallion, and \$25,000 in appreciation for their impact on students and their institutions.

"Great teachers inspire, motivate, and challenge their students," UT System Chancellor James B. Milliken said. "We honor these outstanding educators for their service to Texas and Texans."

Dr. Reeni Abraham

Dr. Abraham, who joined the UTSW faculty in 2009, serves as the Internal Medicine Clerkship co-Director and as a Colleges mentor. She passionately strives to create a safe educational environment in which learners continually grow in the application of evidence-based medicine, aspire to view medicine with empathy from their patients' perspectives, and employ reflection in their daily practice.

She has worked as a perioperative specialist, coordinating the care of patients with many comorbidities across health care systems. Most recently, she has focused clinically as an academic hospitalist at both William P. Clements Jr. University Hospital and Parkland Memorial Hospital, as well as a palliative care physician at Parkland.

Dr. Abraham is winner of the 2018 Gold Humanism Scholar Award, a 2019 inductee into the UT System's Kenneth I. Shine Academy of Health Science Education, and a 2020 selection into the UT Southwestern Academy of Teachers (SWAT). The Academy represents an elite group of UTSW educators who strive to provide an academic and organizational environment that fosters excellence in teaching at all levels. Dr. Abraham said that three words – "joy in practice" – serve as the inspiration for the medical education system she aims to create for UTSW learners and the future patients and society they will serve.

"Autonomy – the principle that all people desire to direct their own life and need the freedom to try out and test new ideas – is the

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SURGICAL MILESTONES

UT Southwestern successfully completes its first living-liver, HIV-positive liver transplant surgeries.

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DIVERSITY ACCOLADES

Two UTSW programs honored for efforts to encourage underrepresented groups to enter STEM fields.

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SPACE-AGE SCIENCE

Dr. Benjamin Levine collaborates with NASA to study the effects of spaceflight on the heart.

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IN MEMORIAM

Dr. Roger H. Unger: Esteemed endocrinologist and diabetes authority

By Patrick Wascovich

Dr. Roger H. Unger, a longtime Professor of Internal Medicine, a preeminent authority on glucagon and the development of diabetes, and the founding Director of the Touchstone Center for Diabetes Research at UT Southwestern, died Aug. 23. He was 96.

Over a 64-year career at UT Southwestern, Dr. Unger elucidated the role of glucagon and insulin in regulating blood glucose in both normal and diabetic individuals. His leadership helped to establish UT Southwestern as a leading clinical and research center for the accurate diagnosis and effective treatment of conditions related to the endocrine system.

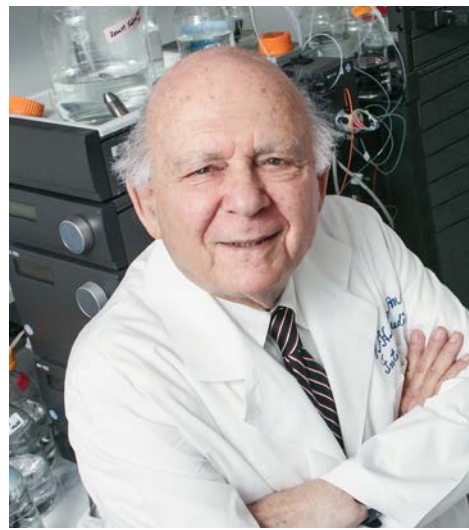
"Dr. Unger was a visionary endocrinologist who helped shape research and clinical practice in the field for more than 60 years," said Dr. Daniel K. Podolsky, President of UT Southwestern. "His outstanding contributions in endocrinology and metabolism set the foundation for many of the important discoveries in these areas. He was at the forefront of identifying the essential role of glucagon in the pathogenesis of diabetes, and he introduced the concept of lipotoxicity, the process by which an overaccumulation of fat products causes tissue damage responsible for Type 2 diabetes and metabolic syndrome."

A native of New York, Dr. Unger came to UT Southwestern in 1956 and was one of the institution's longest-serving faculty members before retiring in July. He was elected to the

National Academy of Sciences in 1986 and to the American Academy of Arts and Sciences in 1994. His many distinguished honors include the Rolf Luft Award in 2014 from the Karolinska Institutet, the prestigious Swedish medical university that is also home to the Nobel Assembly. At UT Southwestern, he served as Director of the Touchstone Center from 1986 to 2007 and held the Touchstone/West Distinguished Chair in Diabetes Research.

At UT Southwestern and at the Dallas Veterans Affairs Medical Center, where he also practiced as a physician, Dr. Unger focused on understanding and defining the interrelationships among obesity, diabetes, and metabolic syndrome, a collection of risk factors that increases an individual's chances of developing heart disease and Type 2 diabetes. Through decades of scientific investigation, Dr. Unger's work provided crucial insights into how glucagon, a hormone produced by the pancreas that raises glucose levels, plays a central role in causing diabetes.

"Roger was a fiercely independent thinker, and he had to fight to get his revolutionary ideas accepted," said Dr. Michael Brown and Dr. Joseph Goldstein, who shared the 1985 Nobel Prize in Physiology or Medicine for their groundbreaking discovery of the low-density lipoprotein (LDL) receptor that is the basic mechanism of cholesterol metabolism. "Roger's discoveries rewrote textbooks and forever changed our conception of glucose metabolism."



Dr. Roger H. Unger

In 1959, Dr. Unger developed a test to measure concentrations of glucagon and established that glucagon was a true pancreatic hormone released in opposing partnership with insulin to maintain normal blood glucose (sugar) levels. In 1978, he and Dr. Philip Raskin, Professor of Internal Medicine, showed that the glucagon-suppressing hormone somatostatin normalized glucose levels of Type 1 diabetic patients.

"Roger used his radioimmunoassay to show that diabetes is a bi-hormonal disease. High blood glucose is caused not only by insulin deficiency or resistance, which decreases glucose removal from blood, but also by elevated levels of glucagon, which increase glucose production," said Dr. Brown, Professor of Molecular Genetics and Internal Medicine, and Dr. Goldstein, Professor and Chair of Molecular Genetics and Professor of Internal Medicine.

In recognition of his seminal scientific discoveries, Dr. Unger won the 1964 Lilly Award from the American Diabetes Association (ADA) before going on to receive the highest awards of the ADA, the European Association for the Study of Diabetes, and The Endocrine Society – the Banting Medal (1975), the Claude Bernard Memorial Medal (1980), and the Fred Conrad

Koch Award (1983), respectively. He also held honorary degrees from the Universities of Liege and Geneva.

Dr. Raskin said lab life with Dr. Unger was exciting and fulfilling. "He was a kind, sweet man who took me under his wing when I was young. He taught me about science, diabetes, and also about life," Dr. Raskin recalled. "Working with Roger was always fun. He was so full of ideas about what to study, and ideas flowed from him like water off a duck's back."

Dr. Philipp Scherer, Professor of Internal Medicine and Cell Biology and Director of the Touchstone Diabetes Center, said Dr. Unger had an unsurpassed intellectual curiosity and was invaluable as a colleague, mentor, and friend.

"Dr. Unger was thinking outside the box before it became fashionable. His willingness to question established dogmas and to ask simple but pointed questions were eye-opening to our research," Dr. Scherer said. "His groundbreaking research, along with his mentorship to many past and current leaders on campus and a large number of scholars throughout the world, establish him as one of the founding pillars on which the reputation of this institution is built."

Dr. Brown, a Regental Professor, is Director of the Erik Jonsson Center for Research in Molecular Genetics and Human Disease. He holds The W.A. (Monty) Moncrief Distinguished Chair in Cholesterol and Arteriosclerosis Research and the Paul J. Thomas Chair in Medicine.

Dr. Goldstein, a Regental Professor, holds the Julie and Louis A. Beecherl, Jr. Distinguished Chair in Biomedical Research and the Paul J. Thomas Chair in Medicine.

Dr. Podolsky holds the Philip O'Bryan Montgomery, Jr., M.D. Distinguished Presidential Chair in Academic Administration, and the Doris and Bryan Wildenthal Distinguished Chair in Medical Science.

Dr. Raskin holds the Clifton and Betsy Robinson Chair in Biomedical Research.

Dr. Scherer holds the Gifford O. Touchstone, Jr. and Randolph G. Touchstone Distinguished Chair in Diabetes Research, and the Touchstone/West Distinguished Chair in Diabetes Research.

Neurosurgery Chair Batjer honored with AANS Harvey Cushing Medal

By Rachel Stowe Master

Growing up as a left-handed pitcher in West Texas, Dr. Hunt Batjer dreamed of taking the mound for the New York Yankees. Brain surgeon was his backup plan.

Drafted out of high school by the Baltimore Orioles – which already had a deep pitching staff – he took his father's advice and accepted a baseball scholarship to UT Austin. But a rotator cuff injury ended his baseball career, and he applied to medical school at UT Southwestern.

Now internationally recognized as a leading cerebrovascular surgeon, Dr. Batjer is the 2020 recipient of the Harvey Cushing Medal, the highest honor bestowed by the American Association of Neurological Surgeons (AANS). Established in 1976 and given annually, the award recognizes AANS members for distinguished service and accomplishments in the field

of neurosurgery.

"This is a wonderful honor that in my field is somewhere between a lifetime achievement award and our Neurosurgical Hall of Fame," said Dr. Batjer, Chair and Professor of Neurological Surgery, a part of the Peter O'Donnell Jr. Brain Institute at UT Southwestern.

Dr. Batjer's academic pursuits and research in ischemic and hemorrhagic stroke and brain injuries have resulted in nine books and 467 peer-reviewed publications and book chapters. He also has presented 53 endowed lectureships and served as a visiting professor in 63 medical institutions worldwide.

Active in organized medicine leadership for the length of his career, he is a past President of the Congress of Neurological Surgeons, the Society of University Neurosurgeons, the Neurosurgical Society of America, the Society of Neurological Surgeons, and the American Association of Neurological

Surgeons, as well as serving in many other leadership roles.

In addition to his never-ending passion for cerebrovascular problems, Dr. Batjer has focused much of his career on traumatic brain injury, particularly in sports. He spent eight years as co-Chair of the NFL Head, Neck, and Spine Committee, which developed the league's concussion protocol.

"It was through hard work in that arena that we were able to enact 40 rules changes that further defined and protected defenseless players," he said. "One of those was moving the restraining line 5 yards forward, which reduced concussions on kickoffs by 40 percent."

Dr. Batjer continues to work with the University Interscholastic League (UIL), the governing body for public middle, junior high, and high schools in Texas. The UIL's Medical Advisory Committee oversees safety issues for more than 1 million student-athletes.

He came aboard the UTSW faculty

in 1983 and served for 13 years before joining the Northwestern University Feinberg School of Medicine in Chicago. In 2012, he was recruited back to UT Southwestern to take the reins as Chair of Neurological Surgery. Dr. Batjer plans to retire from UTSW at the end of December.

"A career in academic neurosurgery is a truly amazing venture," he said. "I have always loved the challenge and the opportunities involved in taking on very complicated patients and diseases and throwing everything you have at it to offer them a healthy future. To this date, that is my most important passion."

The 2020 Harvey Cushing Medal will be formally presented at the 2021 AANS Annual Scientific Meeting in Vancouver.

Dr. Batjer holds the Lois C.A. and Darwin E. Smith Distinguished Chair in Neurological Surgery.



Dr. Hunt Batjer

More online: Read the full story on [Center Times Plus](https://www.utsouthwestern.edu/ctplus) at [utsouthwestern.edu/ctplus](https://www.utsouthwestern.edu/ctplus).

NEWS

MAKERS

Goodspeed, Tavakkoli named Dedman Family Scholars

UT Southwestern's two newest Dedman Family Scholars in Clinical Care – Dr. Kimberly Goodspeed and Dr. Anna Tavakkoli – are both enthusiastically pursuing improved patient outcomes through new multidisciplinary efforts. One focuses on developmental disorders and rare diseases affecting young people, while the other is tackling obesity management in adults.

The Dedman Foundation established the Dedman Family Endowed Program for Scholars in Clinical Care in 2009 with a \$12 million gift to the Southwestern Medical Foundation.

The gift was matched to create a \$24 million endowment to help recruit the most promising early career physicians to UTSW and launch their careers under the mentorship of senior clinicians and clinical scientists. The program includes a four-year grant worth up to \$150,000 annually for each recipient to cover research expenses and salaries.



Dr. Kimberly Goodspeed Dr. Anna Tavakkoli

Dr. Goodspeed, an Assistant Professor of Pediatrics and Neurology, cares for children and young adults with autism spectrum disorder and intellectual disability, many of whom have a specific genetic mutation as the etiology of their developmental disability.

"Many of these genetic developmental disorders are rare diseases, so expert care is limited, although the research community is increasingly focused on developing targeted therapies for each individual disorder," she said. "In order to prepare for clinical trials on the horizon, we must have a deep understanding of what these patients struggle with most and how their disorders evolve over their lives."

Dr. Tavakkoli, an Assistant Professor of Internal Medicine and Population and Data Sciences, plans to help develop a multidisciplinary program for obesity management. "We are starting a bariatric endoscopy program to complement an existing metabolic weight loss clinic, which can provide a minimally inva-

sive treatment option for weight loss. We are also collaborating with the Center for Human Nutrition to grow a clinical and translational research program that can help identify additional novel therapies in the future," she said.

Obesity and its complications already affect more than a third of DFW residents, she noted. The goal of her multidisciplinary obesity program is to comprehensively address this growing issue and curb the obesity trend in North Texas.

Both faculty members joined UTSW in 2018. Dr. Goodspeed completed her pediatrics residency at UT Southwestern/Children's Medical Center and became the first neurodevelopmental disabilities resident to complete the six-year program. Dr. Tavakkoli completed her residency in internal medicine at New York Presbyterian/Columbia University Medical Center and received advanced training in gastroenterology and endoscopy at the University of Michigan University Hospital.

Daughter gives her mother the gift of a lifetime

By Lori Sundeen Soderbergh

Imagine if you could save your parent's life by donating a piece of your own. That's what happened when the first living-donor liver transplant took place last year at UT Southwestern. During a simultaneous seven-hour surgery, a Texas daughter donated 60 percent of her liver to her mother.

Nearly a year later, both mother and daughter have recovered so well that they are urging others on the transplant waiting list to consider applying for this program that launched last year.

"I was very lucky to be chosen for UT Southwestern's first living-donor liver transplant," said Pamela Arrington, a 68-year-old Dallas resident. "I told my daughter that she didn't have to give me any gifts for the rest of her life, because she gave me life."

Her daughter, 45-year-old Robin Neely, said her liver has regrown to normal size and she was back to usual activities after two months. "I would do it again," said Mrs. Neely, a Frisco mother of four whose supportive husband Chris was at her side.

Mrs. Arrington didn't learn of her daughter's intention to be a donor until she'd nearly completed all of the required testing and paperwork. After talking through it together, the entire family felt comfortable putting their trust in the expertise of the UT Southwestern team.

Several years of work to build a liver transplant program at UT Southwestern went into achieving this milestone. The program was launched in 2007 and gained traction under the direction of Dr. Jorge Marrero, Professor of Internal Medicine and Medical Director of the Liver Transplant Program. In 2018, Dr. Parsia Vagefi, Chief of the Division of Surgical Transplantation, Associate Professor of Surgery, and a liver transplant specialist, was recruited to UTSW and brought Dr. Steven Hanish, an expert in living-donor liver transplantation. Dr. Hanish serves as the Surgical Director of the Liver Transplant Program and the Living-Donor Liver Transplantation Program.

Under their direction, the program rapidly grew to complete 95 liver transplants in 2018 and 115 during 2019, representing the highest volume program in North Texas. The team felt ready to take on the challenge of living-donor surgery.

A perfect match

While the clock was ticking, Phil Arrington, married to Pamela since 1971, kept an anxious



The gift of life is all in the family: (l to r) Phil Arrington, Pamela Arrington, Robin Neely, and Chris Neely in 2020.

"I told my daughter that she didn't have to give me any gifts for the rest of her life, because she gave me life."

— Pamela Arrington

watch in the waiting room. "My wife and daughter were both in major surgery at the same time. I'd never felt anything like that before," he admitted. "The skilled care by all the staff at Clements was outstanding and the procedure went like clockwork."

Mother and daughter spent five days at William P. Clements Jr. University Hospital. "We saw each other right before the surgery and every day in the hospital," Mrs. Neely said.

In several ways, the Arrington/Neely family was a perfect fit for this type of surgery. "Robin went through rigorous testing successfully and she enjoys good health. Her mom, Pamela, was sick enough from cirrhosis to greatly benefit



From left: Drs. Hanish, Vagefi, Marrero, and Mufti lead the UTSW Liver Transplant Program.

from transplantation, but unfortunately not high enough on the waiting list to get a deceased donor transplant in time. So, living-donor liver transplant was the ideal option for her," said Dr. Hanish, also Associate Professor of Surgery.

According to Dr. Arjmand Mufti, Medical Director of the Living-Donor Liver Transplant Program and Associate Professor of Internal



Both mother and daughter were in William P. Clements Jr. University Hospital for five days after their surgeries.

Medicine, the liver is the only internal organ that has the ability to regenerate. The liver performs more than 200 vital functions, directing metabolism, glucose, lipids, clearance of toxins, bile production, and clotting factors – to name just a few.

The UTSW living-donor program is one way to shorten the waiting list for a liver transplant and save lives. Every patient on the list has a MELD (model for end stage liver disease) score that determines their priority for transplant. According to the United Network for Organ Sharing (UNOS), nearly 40,000 organ transplants took place nationwide in 2019. Of these, 8,896 were liver transplants.

"Many people on the waiting list are stuck in limbo like Mrs. Arrington; they have symptoms of liver disease which interfere with their daily life but do not have access to a deceased donor transplant given their low MELD score. These are people we can help through living-donor liver transplantation," Dr. Vagefi explained.

Since UT Southwestern's first living-donor liver surgery in November 2019, two more surgeries have occurred under the program and more are in the planning stages.

Dr. Vagefi holds the Ernest Poulos, M.D. Distinguished Chair in Surgery.

More online: Read the full story on *Center Times Plus* at utsouthwestern.edu/ctplus.

UTSW performs first HIV-positive-to-HIV-positive organ transplant in Texas

By Patrick McGee

Less than three weeks after getting on an organ transplant list for HIV-positive patients, John Welch got the call. A liver was available from a deceased donor, and it was an excellent match.

On July 1, the 53-year-old Dallas man became the first recipient of an HIV-positive-to-HIV-positive organ transplant in Texas at UT Southwestern's William P. Clements Jr. University Hospital.

"The organ I got was from a young man, and I think it's rejuvenating this old, tired bag of bones. Maybe I'll be 25 again," Mr. Welch said with a laugh.

A team of transplant doctors, surgeons, and infectious disease specialists completed the surgery without complications. UT Southwestern physicians have performed more than 3,000 solid organ transplants.

"I had the utmost confidence in the team at UT Southwestern. I never had better treatment," said Mr. Welch, now recovering at home. "Everyone there is genuinely concerned and really cares about the patient."

His current condition is a significant contrast from where he was in 2016 when he learned on the same day that he was HIV-positive and had cirrhosis of the liver. He quit drinking alcohol for good and started taking antiviral medication to keep HIV at bay.

Mr. Welch's liver transplant took place under the HIV Organ Policy Equity Act, or HOPE Act, a federal law that allows HIV-positive people to become organ donors by matching them with HIV-positive recipients. Before the law was passed in 2013,



After recovering from his transplant surgery, John Welch (right) has returned to hobbies he enjoys, such as playing the piano.

hospitals were prohibited from taking organs from HIV-positive donors. UT Southwestern's status as a prominent academic medical center qualified it to become one of the sites in which HOPE Act transplants can take place under the auspices of a clinical trial.

"If he had not had access to this organ, he would have probably had to wait a much longer time to get his liver transplant, and he would have gotten much sicker," said Dr. David Wojciechowski, Medical Director of the Kidney Transplantation Program and an Associate Professor of Internal Medicine and Surgery.

Before the transplant, Mr. Welch was in the early stages of liver failure,

suffering from mild confusion and memory loss. Now, except for medication and follow-up appointments, doctors expect a near-normal life for Mr. Welch, in part because nearly all of the other 115 organ recipients in the HOPE program nationwide have enjoyed strong recoveries.

Dr. Wojciechowski led the transplant planning efforts, while the patient's HIV status was tended to by Dr. Ricardo La Hoz, an infectious disease specialist and an Associate Professor of Internal Medicine.

"We use all the information that we have available on the donor and the recipient to design an HIV therapy that will cover both," Dr. La Hoz said, explaining that his team

"I want to do something with purpose. What I want to do is raise awareness that HIV-positive people can be organ donors, and I am a walking testament to that."

— John Welch



John Welch received a liver transplant at UT Southwestern on July 1.

will continue to monitor the patient's test results to make sure that the HIV infection stays controlled. If it does not, the antivirals will be adjusted. Dr. La Hoz said that to date no patient who has received an organ transplant under the HOPE Act nationwide has developed uncontrolled HIV infection, known as HIV virologic failure.

Dr. Wojciechowski said the organ donor had been recently diagnosed with HIV and was not on any antiviral medication. This means he would not have built up any resistance to the medication, which bodes well for the recipient.

Mr. Welch said he found it meaningful that he got the call about an available organ during Gay Pride Month, and he wants his case to stand as an example.

"I want to do something with purpose," he said. "What I want to do is raise awareness that HIV-positive people can be organ donors, and I am a walking testament to that."

Mr. Welch said his trust in UT Southwestern doctors stemmed from a nearly fatal case of pneumonia he had in late 2016. Hospitalized at Parkland Memorial Hospital, he was so ill that he lost 90 pounds. He noticed that the doctors taking care of him wore ID badges that identified them as UT Southwestern faculty and, he said, "They saved my life. They absolutely saved my life."

As he follows up with his UTSW team of doctors, Mr. Welch is taking every precaution he can to avoid SARS-CoV-2, the virus that causes COVID-19. He recently had a piano delivered to his home to play the gospel music he enjoyed as a child in church in Louisiana, and he looks forward to returning to his hugely supportive circle of friends and his hobby of restoring antique lamps and jewelry.

"That space in between birth and death is for living and loving and all those things that bring joy and happiness to the world," he said.

FOCUS: COVID-19 CRISIS

Infectious disease detective: Dr. Mamta Jain leads COVID-19 trials



Dr. Mamta Jain checks equipment in the COVID-19 unit at Clements University Hospital.

By Patrick Wascovich

Dr. Mamta Jain has come a long way from the studious, shy teen who once felt like an outsider in West Texas and avoided science in college. Now one of UT Southwestern's top infectious disease specialists, she is leading some of the country's most promising COVID-19 clinical trials here.

"There is never a dull moment in infectious diseases. Being an infectious disease doctor is like being a detective; you do a lot of digging and put the pieces of the puzzle together," said Dr. Jain, a Professor of Internal Medicine in the Division of Infectious Diseases and Geographic Medicine.

"During this pandemic, I feel an even stronger commitment to my specialty and patients. We are reminded that new viruses emerge and can spread quickly. We need to be prepared for these infections and develop tools to fight them through nontherapeutic and therapeutic mechanisms, as well as vaccines," she said.

Patients at William P. Clements Jr. University Hospital and Parkland Memorial Hospital, as well as outpatients served through a recently established clinic at the Paul M. Bass Administrative and Clinical Center, have volunteered for about a dozen clinical studies testing different strategies or therapies to improve outcomes for those infected with the virus. These include trials evaluating the use of convalescent plasma; the safety and efficacy of remdesivir, both alone and in combination with other anti-inflammatory agents; the safety and efficacy of other drugs such as sarilumab or atovaquone; and the tolerability of anti-spike monoclonal antibodies.

Her workweek routinely involves all seven days. It starts with Dr. Jain working with her team to review all new COVID-19 admissions at both hospitals to see who may qualify for one of the ongoing trials. She then follows up with those currently in studies by reviewing labs and monitoring for side effects, making adjustments to medications if needed and ensuring that serious adverse events are recorded and reported. The work spills into the weekend as labs are followed and she meets with patients to discuss the studies so that drugs can be administered on Monday.

Matching patients to the most promising trials is key, she said.

"After reviewing the charts, contacting our primary teams, then discussing the pros and cons of participating in a clinical trial with the patient and family, we repeat the process multiple times between the two hospitals," Dr. Jain said. "Sometimes these interactions are frustrating, especially when a patient hears the word 'research' and just says no without realizing that they may be turning down perhaps the only therapeutic opportunity available."

The long weeks have turned into months as anxious and ill patients are served by a tired but resilient infectious diseases team.

"When patients do not do well that takes a toll on you over time," she said. "The carrot that keeps you going is that some hospitalized patients do come off mechanical ventilators or oxygen requirements go down and they are discharged home."

Serendipitous journey

Dr. Jain's journey into the world of infectious diseases has been a winding path rather than a superhighway, the result of several "aha!" moments and supportive mentors who inspired her through words and actions.

Born in India, she was 5 years old when her family immigrated to Canada as her father started his internal medicine training in Ontario. After Dr. Bal Khandelwal completed a rheumatology fellowship in Toronto, the family relocated to Texas and soon settled in Midland, where Dr. Jain's father practiced as a rheumatologist for the next 35 years. In high school, she and her two younger siblings – sister Samta Khandelwal Kundu and brother Dr. Niraj Khandelwal – attended Robert E. Lee High School, a bastion of West Texas oilfield culture where every sporting event is punctuated with enthusiastic fans honoring the Rebels.

"My parents wanted to move to a small town because they were worried about bringing up two girls in a large city," Dr. Jain explained. "Being in a small town, however, also meant not having access to Indian groceries, culture, religion, etc. I felt out of place in high school because we were Indian immigrants in a place that was not always very trusting or welcoming of immigrants. So, we had to excel at school, and I became a 'math

and science' student."

Her high school efforts paid off, as her grades and test scores allowed her to attend Princeton University. Soon at Princeton, though, Dr. Jain was at best treading water.

"Academically, I struggled in classes like calculus, which used to be my strength. I lost a lot of self-confidence that year and began to explore other avenues," she said.

The call to medicine

By her junior year, Dr. Jain was well grounded but faced another reality: She was on the wrong educational track.

"I began to think about science and medical school again, and after some soul searching, I decided to try medicine," she said. "However, I was a political science major and had not taken any science classes, so after graduating I spent the next two years in a post-baccalaureate pre-med program at the University of Pennsylvania. Looking back, I'm glad that I stretched myself and received a liberal arts education. I learned to write and think analytically and persuasively at Princeton."

She earned her medical degree from Baylor College of Medicine in Houston, where she also completed her residency training. During residency, she met an inspirational faculty member who helped guide her to her chosen field. "My interest in infectious disease developed after my rotation with Dr. Daniel Musher, an icon in the field. He is a very demanding attending, meticulous with details, but an incredible teacher," she said. "I was fascinated by the diversity within the field of infectious disease. I was also considering hematology/oncology, but I finally chose infectious disease because most people with infections improve or are cured."

During residency, Dr. Jain met and married Dr. Rajeev Jain, who was completing his gastroenterology fellowship at UT Southwestern. She arrived on campus in 1999 to begin her infectious disease fellowship and has never left. Not surprisingly, she found yet another inspiring figure in Dr. William Lee, a renowned liver disease expert and UTSW Professor of Internal Medicine.

"The decision to spend two years doing hepatology research was another turning point for me. I learned a lot about clinical trials from Dr. Lee," Dr. Jain said.

Fast forward to 2020

Twenty-one years later, all of those sometimes-painful decisions and abrupt educational turns have prepared Dr. Jain for another challenging pathogen – COVID-19. Her daunting work schedule is balanced by early-morning jogs, a strong family unit, and a circle of friends.

"My husband, Rajeev, my sons Anand and Akash – who are 18 and 15, respectively – and my extended family are very supportive. They help keep me going," Dr. Jain said.

Prior to her 2020 shift to the COVID-19 battle, Dr. Jain spent years conducting clinical investigations into HIV and its comorbidities – hepatitis C, hepatitis B, and influenza. She and her research team have conducted seminal

“There is never a dull moment in infectious diseases. Being an infectious disease doctor is like being a detective; you do a lot of digging and put the pieces of the puzzle together.”

– Dr. Mamta Jain



Dr. Jain with her family: husband Dr. Rajeev Jain (left) and sons Anand (top) and Akash

investigations involving the epidemiology, clinical outcomes, and treatment of HIV patients and those with hepatitis C.

Similarly, COVID-19 clinical trials are needed to find new therapies to decrease morbidity and mortality, Dr. Jain said. And although battling this pathogen has provided unique opportunities and challenges, nothing would make her happier than to see COVID-19 finally fade into a distant memory.

"This pandemic is going to change many things in our lives and has already had a devastating impact," Dr. Jain said. "It is very satisfying to know that in some small way you are contributing to improving patients' lives and at the same time generating new knowledge that will help others who may become infected in the future."

Dr. Lee holds the Meredith Mosle Chair in Liver Disease, established in his honor.

More online: Read the full story on *Center Times Plus* at utsouthwestern.edu/ctplus.

UTSW collaborates with partners to build COVID-19 patient registry



Registered Nurse Shelby Golson attends to a patient in the COVID-19 ward.

By Patrick McGee

In an effort to improve treatment for patients with COVID-19, UT Southwestern has established a patient registry with its partner institutions to collect health records of North Texans who have either been treated or tested for the disease.

The COVID-19 Registry Collaborative (CRC) includes records from UT Southwestern as well as Children's Medical Center Dallas, Texas Health Resources, and Parkland Health & Hospital System, representing the first time these four institutions have collaborated to create a combined registry.

Strict protocols are in place to

protect patient privacy, and all studies will require the same protections that apply to other patient registry research. No identifiable patient data will be shared without consent, and use of the patient registry must first be approved by the COVID-19 Registry Collaborative and the Institutional Review Board, which protects the rights, privacy, and welfare of human participants in research.

By September, the clinical registry had gathered data on more than 100,000 patients, about 25,000 of whom tested positive for the disease. Negative and positive results give researchers important data points to compare and explore risk factors and outcomes. The registry has more than 1.2 million data variables from 21 participating North Texas hospitals.

"We're hoping that this will give us an opportunity to look at the data that we have captured in treating and managing our COVID-positive patients and be able to

learn something from it and change patient management and health outcomes going forward," said Dr. Susan Hedayati, Associate Vice Chair of Research and Faculty Development at UTSW. "I think this will open a lot of doors for collaborative data science and population health research between the different hospitals in our community. This is going to be our gateway toward that objective."

Dr. Hedayati co-chaired an 11-person workgroup charged with leading the data collection efforts along with Dr. Christoph Lehmann, Professor of Pediatrics, Bioinformatics, and Population and Data Sciences at UTSW and a leading expert in clinical informatics.

With the information available in hospital records, Dr. Lehmann said the registry will include thousands of data points on patients, such as vital signs, off-label drug use, ventilator use, race, ethnicity, and patient ZIP codes. The registry will allow researchers to study

medical and social questions. New insights will be gained about treatment and how the virus is affecting different demographic groups.

Dr. Hedayati said there has been intense interest among researchers in the data.

"We've already received a lot of questions from nearly every department at UT Southwestern through the COVID registry email," Dr. Hedayati said. "We're getting requests from every kind of subspecialty."

Dr. Hedayati holds the Yin Quan-Yuen Distinguished Professorship in Nephrology.

More online: Read the full story on *Center Times Plus* at utsouthwestern.edu/ctplus.

FOCUS: COVID-19 CRISIS

C is for Coronavirus: Medical student writes children's book about the pandemic

By Lori Sundeen Soderbergh

“Are all my friends going to die?” Startling questions like this can be stressful for parents who are doing their best to reassure, educate, and entertain young children during the COVID-19 pandemic.

Dani Mathisen, a third-year UT Southwestern medical student, resolved to find a simple way to talk with kids about the pandemic after hearing this question from a young relative. One night when she couldn't sleep, she came up with the idea to create an alphabet book to explain the disease and the safety precautions it requires.

“I wrote *C is for Coronavirus* for families like mine with young siblings. It's for all the families that are going through this pandemic. Even older kids enjoy it because it puts tough things into words,” said Mrs. Mathisen. “We're not wearing masks because we are playing superheroes, but we are helping people just the same.”

Each page of the book is dedicated to a letter of the alphabet and a word that relates to the pandemic. *C is for Coronavirus* is available through Amazon and Barnes & Noble, where it was self-published.

She gained her knowledge of COVID-19 through a research project she completed with guidance from Dr. William Gary Reed, Associate Dean for Quality, Safety, and Outcomes Education and Professor of Internal Medicine, and Dr. Carol Croft, Professor of Internal Medicine. The book also follows the COVID-19 safety guidelines from the Centers for Disease Control and Prevention.

One of her mentors, Dr. Kehinde Odedosu, Assistant Professor of Internal Medicine, said she wasn't surprised by Mrs. Mathisen's initiative. Dr. Odedosu has two young daughters, ages 5

and 6, and shared some of their questions and frustrations with her.

“Using the alphabet makes it very catchy,” said Dr. Odedosu. “My kids love the ‘W is for Washing’ page, because it reminds kids to sing the ‘Happy Birthday’ song when they wash their hands.”

The book also talks about harder parts of life during a pandemic, like loneliness.

“The letter Q is for quarantine. It is scary and it's not fun. No one enjoys being alone,” Mrs. Mathisen said. “E is for emotions. It's OK to have emotions. Talk to a parent or teacher about how you feel.”

Through it all, she found support from her husband, Matthew. The couple live in Dallas and have been married one year. They are frustrated with how some young adults are behaving during the crisis.

“People are going to bars and parties without a mask. They aren't doing the right thing. A friend of mine just gave birth wearing a mask. If she can do that, you can wear one to go grocery shopping,” said Mrs. Mathisen.

Is there advice in the book for getting through the tough times?

“In my book, J is for Joy – find joy in the little things like doing chalk art. Fly a kite. Find joy in being at home.”

It's sound advice for children – and for adults.

Dr. Croft holds the Baldrige Family Professorship in Internal Medicine and Preventive Care.

Dr. Reed holds the S.T. Harris Family Distinguished Chair in Internal Medicine, in Honor of Gary Reed, M.D.; and the Eva A. Rosenthal Professorship in Internal Medicine, in Honor of Gary Reed, M.D.



WRITTEN BY DANI MATHISEN ILLUSTRATED BY PEYTON POGUE



Medical student Dani Mathisen wrote a book to explain the COVID-19 pandemic to children. At right, Mrs. Mathisen reads the book to her niece, Payton Warren.

“We're not wearing masks because we're playing superheroes, but we are helping people just the same.”

– Dani Mathisen



Mrs. Mathisen (left) reads her book along with mentor Dr. Kehinde Odedosu and the Assistant Professor's two daughters, Fatima and Mariam.

More online: Read the full story on *Center Times Plus* at utsouthwestern.edu/ctplus.

Robotics team makes, donates PPE for COVID-19 caregivers and responders



Jasper High School sophomore Derek He assembles 3D-printed face shields made by his robotics team, TechnicBots.

By Courtney Borchert

For the first hour of their day, Jasper High School sophomores Audrey and Derek He work at home assembling face shields. The dining room serves as a workstation for the twins, with materials like elastic bands, clear plastic sheets, and 3D-printed face shield frames spread out on the table. Sounds of hole punchers and plastic snapping into place fill the room until a batch is complete.

Their work is part of a larger collaborative project run by a local robotics team known as TechnicBots – FIRST (For Inspiration and Recognition of Science and Technology) Tech Challenge Team No. 8565. The team includes 14 middle school and high school students across North Texas, said Dr. Fang Wang, their coach who has been involved with the program since 2009.

With robotics competitions canceled because of the pandemic, the students had time to take their commitment to community outreach to a new level. In late March, TechnicBots set its sights on assisting clinics and hospitals, including UT Southwestern, with personal protective equipment (PPE). Without hesitation, the team dedicated thousands of hours to produce donated face shields and ear guards for health care workers using 3D printing technology.

“They need PPE in order to help take care

of people and save lives,” Audrey He said. “The least we can do to help – even if it is just within our own community – is to lend our skills and resources.”

TechnicBots continued producing PPE this summer when Texas became a national hot spot due to rising COVID-19 cases. By the end of July, the group had produced more than 1,900 face shields and 3,800 ear guards for more than 45 local clinics and hospitals with the assistance of five other FIRST teams. More than 20 percent of the 3D-printed PPE has gone directly to UT Southwestern.

It all began with a handful of students, including Coppell High School junior Ellen Sun, contacting health care providers to gauge interest and need for PPE donations. The operation uses 16 3D printers with a production capability of 40 to 50 face shields and 100 ear guards per day. UTSW Senior Research Nurse Donglan Xia, Ellen Sun's mother, volunteered her photography services as an additional mode of fundraising to ensure her daughter's robotics team had enough supplies, such as spools of filament for the desktop printers, to produce the PPE.

Mary Strauch, a nurse and UTSW Care Coordinator at Zale Lipshy Pavilion – William P. Clements Jr. University Hospital, is among those grateful for the robotic team's philanthropy.



Twins Derek and Audrey He work together to assemble a batch of 3D-printed face shields for local clinics and hospitals.



TechnicBots team member Ellen Sun (right) stands with UT Southwestern Records Coordinator Cindy Levy at the UTSW receiving dock, where she delivered hundreds of 3D-printed face shields and ear guards for health care workers.

“This little object plays a big role to those who are wearing it,” Ms. Strauch said of the ear guard. “The 3D-printed ones work best for me and help me more comfortably and properly wear PPE. Some of the masks in production have elastic bands that vary in length, but the ear guards allow you to make adjustments so your mask fits perfectly. I can't go a shift without one.”

More online: Read the full story on *Center Times Plus* at utsouthwestern.edu/ctplus.

Awards Continued from page 1

foundation of my central teaching philosophy: Set the bar high and show them the map,” said Dr. Abraham, who has been selected by graduating students as a faculty marshal for four Medical School commencements. “Encouraging learners to reach a little higher to achieve their mission and embrace the journey along the way is my ultimate teaching goal.”

Dr. Julie Champine

Dr. Champine leads the Medical School's Radiologic Anatomy course and serves on numerous educational groups, including the Radiology Residency Curriculum Committee, the Future of Radiology Medical Education Committee, and the Curriculum Reform Committee. Her affiliation with UTSW began in 1989 with her diagnostic radiology internship, followed by her residency, as well as a fellowship, in advanced MRI training.

She has been recognized with Outstanding Teacher Awards from the Medical School Classes of 2009, 2011, 2014, 2015, 2019, and 2020, and received the UTSW Radiology Resident Teaching Award in 1998 and 2019. As testament to her dedication and accomplishments, in 2017 she was inducted into SWAT.

A member of Radiology's Abdominal Imaging Division, her clinical interests include genitourinary radiology, contrast media, and information technology. Dr. Champine's investigations on abdominal imaging, Doppler ultrasound, genitourinary imaging, and percutaneous abdominal interventional procedures have led to multiple publications and contributions to textbooks.

“My teaching philosophy is rooted in progressive experiential learning, collaboration, and adaptability of educational methodologies to evolving environments,” Dr. Champine said. “Flexibility is something we have all had to especially embrace in the past few months. I'm excited to integrate new technology and new methods into instruction, resulting in the collective shared enthusiasm for learning by both the student and the teacher.”

Dr. Podolsky holds the Philip O'Bryan Montgomery, Jr., M.D. Distinguished Presidential Chair in Academic Administration, and the Doris and Bryan Wildenthal Distinguished Chair in Medical Science.

The link between anesthetics, 'benzos,' and brain receptors

Study that reveals the molecular-level actions of certain drugs could lead to more targeted therapies with fewer side effects

By Sarah Williams

As you drift into unconsciousness before a surgery, general anesthetic drugs flowing through your blood are putting you to sleep by binding mainly to a protein in the brain called the γ -aminobutyric acid type A (GABA_A) receptor. Now UT Southwestern scientists have shown exactly how anesthetics attach to this receptor and alter its three-dimensional structure, and how the brain can tell the difference between anesthetics and the psychoactive drugs known as benzodiazepines – which also bind to the GABA_A receptor. The findings were published online last month in *Nature*.

"Anesthetics remain one of the most clinically important, yet mysterious, classes of drugs," said Dr. Ryan Hibbs, Associate Professor of Neuroscience and Biophysics at UTSW and senior author of the study. "We went into this study driven by curiosity about how general anesthesia works – and now we're one big step closer to answering that question."

General anesthetics, which can be inhaled or administered intravenously, put people into a sleep-like, immo-

bilized state. Although intravenous anesthetics have been used since the 1930s, it wasn't until around the turn of the 21st century that researchers discovered that the drugs act on the GABA_A receptor in the brain.

The GABA_A receptor is an ion channel; when it's in an open conformation, it allows chloride ions to flow through. This movement of ions decreases the signaling of brain cells, calming brain activity. So stimulating the GABA_A receptor – as anesthetics, benzodiazepines, alcohol, anti-seizure, and some sleep medications all do – quiets the brain in a variety of ways.

In 2018, the Hibbs lab detailed the first atomic structure of the GABA_A receptor. In the new study, the researchers looked again at the structure of the receptor in an environment more closely mimicking the cell, and this time while it was being bound by one of three different anesthetics – phenobarbital, etomidate, and propofol – as well as the benzodiazepine drug diazepam, or Valium, which is used to treat anxiety disorders, and the drug flumazenil, which can treat benzodiazepine overdoses.

"What we found is that the GABA_A receptor is particularly sensitive to



Drs. Ryan Hibbs and Jeong Joo Kim prepare samples for their cryo-electron microscopy experiments.

its surrounding environment," said Dr. Jeong Joo Kim, a postdoctoral research fellow and first author of the study. "It has the ability to change conformation in different ways based on the binding of many different drugs."

The team discovered that both general anesthetics and diazepam could bind to multiple places on the

GABA_A molecule. One site – dubbed the "benzo site" in earlier research – was unique to the diazepam. But another site overlapped between the two drug types. When diazepam was present at high enough doses, it bound to this site that was more often used by the anesthetics. This observation could explain why high doses of benzodiazepines like diazepam can

have anesthetic-like effects. The researchers also found differences among the general anesthetics; phenobarbital, for instance, bound to a place on GABA_A that neither etomidate nor propofol attached, and seemed to be less choosy about where it bound.

The nuances between how and where each drug binds to the GABA_A receptor raise the possibility of engineering new drugs that could be more selective for certain effects on the brain or have fewer side effects.

"The fact that there are differences in the binding sites gives us some hope that we might be able to create more specific molecules that bind to only one site on the GABA_A receptor," Dr. Hibbs said. "This is now a launching point for the discovery of improved, more selective anesthetics."

Dr. Hibbs is an Effie Marie Cain Scholar in Medical Research.

More online: Read the full story on *Center Times Plus* at utsouthwestern.edu/ctplus.

Simulation Center event becomes industry model for virtual conferences

By Lori Sundeen Soderbergh

UT Southwestern is known for its scientific discoveries and health care advancement. Now, the Business Affairs side of the University is demonstrating innovation by creatively employing virtual conferencing technology and showing other institutions how to do the same.

The third annual Simulation-Based Quality Improvement and Research Forum on May 13 became the first UT Southwestern conference to be held virtually using the Microsoft Teams platform. More than 430 people from over 70 institutions took part in the conference, including representatives from UT Dallas, UT Arlington, Baylor Scott & White, Penn State University, University of Chicago, and Northwestern University. One attendee even signed on from Lisbon, Portugal.

By going virtual, the event broadened exposure for UT Southwestern's Simulation Center, which opened in 2018 and quickly gained a reputation for excellence. The Center fulfills three primary functions: high-fidelity team training that replicates the clinical environment; training in specific procedures and tasks such as laparoscopic surgery and suturing; and clinical training using hired actors who replicate patients, according to Dr. Daniel Scott, Director of the Simulation Center. Learners receive feedback and coaching, with a focus on teamwork and communication.

Hosting virtual conferences is one way to leverage Microsoft Teams – a videoconferencing, collabora-

tion, and communications platform that has become invaluable for UT Southwestern, and many institutions, as employers embrace remote work in the age of COVID-19.

"A key ingredient to change is the desire, the reason why. COVID-19 made people willing to try a new approach because there was no other option," said Billy Stevenson, Senior Change Management Analyst in Academic and Administrative Information Resources (AAIR), who has worked to update and evolve UTSW technology systems since last year.

The goal was to make the experience as similar as possible to attending a live conference, without any travel logistics or expenses. Participants just had to register online and then log on for the event. A post-conference survey showed that, given the opportunity, 90 percent of conference registrants would happily attend this type of conference again.

"Information Resources is driven to provide innovative technical solutions that partner with our faculty and students to help share their work nationally and internationally," said Dr. Thomas B. Spencer, Assistant Vice President for IR Operations and Compliance.

"Our group used the Microsoft Teams space as if it were a virtual building. The channels and links were like doors to various rooms," said Mr. Stevenson. He explained that the difference between this conference and online webinars was that it needed to be open and collaborative, a place for attendees to explore, discuss together, and receive immediate responses to



UT Southwestern's Simulation Center, pictured here, hosted the University's first virtual conference in May that drew 430 participants. The conference on simulation-based quality improvement and research was so successful it is serving as an industry model for future virtual events.

their questions.

The half-day conference started as most such events do: with a greeting, an agenda, and a brochure. All of these were accessed online, where Dr. Scott and Krystle Campbell, Director of Operations at the Simulation Center, welcomed attendees. Next, participants could virtually "walk through" the poster sessions and ask questions of the presenters. In total, there were interactive presentations involving 13 speakers and 26 posters on a range of simulation-related topics. Presenters were tagged so that when attendees asked questions, responses could be given in real time. Both questions and answers were recorded and made available afterward, and CME credit was available.

According to Dr. Scott, the collaborative team spirit of the Simulation Center and AAIR employees helped transition the conference to a virtual platform in less than six weeks.

"Our colleagues brought their incredible skill sets to the table. Their expertise allayed our concerns, and led to a smooth and successful conference experience," said Dr. Scott, who is also Assistant Dean of Simulation & Student Integration, Graduate Medical Education.

In the background, pulling strings to make the magic happen, the AAIR team managed 20 rooms of presentations simultaneously, much like a crew would manage a

television broadcast. "We made sure each camera angle was correct and that there was seamless switching between presenters. Every PowerPoint needed to function correctly, and all the sound levels needed to be set just right," said Mr. Stevenson.

The sessions proved so popular that they were kept available online for two days after the conference concluded. Mr. Stevenson was invited by Microsoft to share his knowledge of using the Teams platform with their executives, and to participate in Microsoft's innovation in education program. This one-year national program includes education professionals from elementary level to higher education, and requires collaboration with others in the cohort to exchange ideas.

"UTSW needs to be virtually accessible even when there isn't a pandemic," said Mr. Stevenson. "We like to say that when innovation occurs, technology is indistinguishable from magic."

Dr. Scott holds the Frank H. Kidd, Jr., M.D. Distinguished Professorship in Surgery.

More online: Read the full story on *Center Times Plus* at utsouthwestern.edu/ctplus.



Dr. Thomas Spencer



Dr. Daniel J. Scott



Billy Stevenson

Lymph

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they have an opportunity to grow at a distant site.

"After further analysis, we discovered that the oxidative stress in the blood causes the cancer cells to undergo a specific form of cell death called ferroptosis," said Dr. Jessalyn Ubellacker, lead author of the study and a postdoctoral researcher in the Morrison lab. "In contrast, cancer cells in lymph experience lower levels of oxidative stress and are protected from ferroptosis."

To better understand why melanoma cells undergo ferroptosis in the blood but not the lymph, researchers looked for metabolic differences between cancer cells in the blood versus the lymph. They discovered cancer cells from the lymph had higher levels of a monounsaturated fatty acid known as oleic acid, which is the main component of olive oil. They also found this monounsaturated fatty acid was incorporated into the membranes of cancer cells in the lymph. This diluted polyunsaturated fatty acids in the membranes of these cells, inhibiting the chemical reactions that lead to ferroptosis and protecting the cells.

This protective coating of oleic acid from the lymph allowed the cancer cells to safely enter the blood, travel to other locations, and form metastatic tumors. This explains why cancer cells often form tumors first in lymph nodes before metastasizing to distant sites through the blood: They are able to load up on antioxidants in the lymph that protect the cells when they subsequently enter the blood.

"Now that we understand more about why cancer cells are most likely to metastasize initially through lymph, it raises the possibility of treating patients with drugs that target those protective mechanisms in the lymph to inhibit the early stages of metastasis," said Dr. Morrison, a Cancer Prevention and Research Institute of Texas (CPRIT) Scholar in Cancer Research and a member of the National Academies of Sciences and Medicine.

Dr. Morrison holds the Kathrynne and Gene Bishop Distinguished Chair in Pediatric Research at Children's Research Institute at UT Southwestern and the Mary McDermott Cook Chair in Pediatric Genetics.

HHMI grant to advance neuroscience student's brain research



Ana Ortiz plans to use Gilliam Fellowship funding to support brain and autism spectrum disorder research.

By Rachel Stowe Master

The brain has always fascinated Ana Ortiz, a neuroscience graduate student in the lab of Dr. Genevieve Konopka. As one of 45 recipients of a Gilliam Fellowship for Advanced Study, Ms. Ortiz will use the grant from the Howard Hughes Medical Institute (HHMI) to support her research into brain development and how disorders such as autism spectrum disorder (ASD) may arise.

"I am thrilled to join a community of fellows outside of UTSW who want to advance diversity and equity in science," Ms. Ortiz said. "Further, this award supports me as a researcher and my goals to become an independent investigator."

The grant provides \$50,000 annually for up to three years. The goal of

the Gilliam Fellowships program is to increase diversity among scientists interested in leadership roles, particularly college and university faculty. Pairs of students and their dissertation advisers are selected for the awards based on their scientific leadership and commitment to advance diversity and inclusion in the sciences. This year, 227 applications were evaluated on the scientific and leadership promise of the students and the quality and commitment of the institution's mentoring environment.

Ms. Ortiz studies a gene called *FOXP1* in the cortex, the outer part of the brain. "Since *FOXP1* is able to help turn certain other genes on or off, I investigate at the molecular level how its loss can lead to an increase in susceptibility to ASD. By understanding the role of *FOXP1*, we can identify therapeutic targets to improve

the lives of people with ASD," she said.

This research explores how the brain develops at a molecular level, how changes in early brain development affect cognitive development, and why some people are more likely to develop a neurodevelopmental disorder.

"A better understanding of how specific genes functionally regulate cortical development will improve opportunities for therapeutic interventions," Ms. Ortiz said. "I hope to better understand how the brain develops, what makes human cognition particularly unique, and to develop therapies to relieve symptoms of neurodevelopmental disorders. I also hope to help make science more equitable and accessible."

"Ana is a stellar graduate student.

Her research is making critical insights into cell-type specific molecular mechanisms in early brain development at risk in autism," said Dr. Konopka, Associate Professor of Neuroscience. "Ana is also a leader at UTSW and in the community, where she is working toward de-stigmatizing mental illness, especially among minority communities."

Ms. Ortiz earned a bachelor's degree in neuroscience from Wellesley College. The openness, collaboration, and quality of research drew her to UTSW. "The best science is collaborative," she said, "and I wanted to train at a place where I would receive strong mentorship."

Dr. Konopka is a Jon Heighen Scholar in Autism Research.

Quads

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Director at Clements University Hospital's NICU and Associate Professor of Pediatrics at UTSW. "Premature babies can have prolonged pauses in their breathing that will improve with time, and learning to feed from a bottle for a baby is like running a marathon. So they have to build up their stamina and they have to practice that skill."

Mrs. Sturm, who is a medical-surgical nurse at another hospital, and her husband, Chris, praised the skill and compassion of the UT Southwestern medical teams led by Dr. Santiago-Muñoz, Dr. Ennis, and Dr. Toral Patel, a brain tumor specialist in the Peter O'Donnell Jr. Brain Institute and Assistant Professor of Neurological Surgery, Neurology, and Radiation Oncology.

"I don't know what other way to describe it but to say it was something special – it was amazing," Mrs. Sturm said about seeing all four boys for the first time. "The word that comes to mind about care at UT Southwestern is impressive. The care and the doctors have been great."

Tumor diagnosis threatens rare pregnancy

The Sturms first learned they were pregnant with quadruplets in January – a completely spontaneous occurrence. Then, on Feb. 19, Mrs. Sturm suffered a seizure while sitting at a desk at work. She blacked out for about 15 minutes and woke up in an emergency room where she learned the seizure was caused by a brain tumor. She was just a little more than three months pregnant.

The couple said the shocking diagnosis overshadowed the rare pregnancy.

"Learning of the tumor was tough and hit really hard because of the idea that the tumor could cause potentially serious or fatal damage to Katie or that it could affect the pregnancy and we could go from being a pending family of seven to it just being me and our older son," Mr. Sturm said.

The next day, Mrs. Sturm was transferred to UT Southwestern where she met with Dr. Patel. The neurosurgeon diagnosed Mrs. Sturm with a large glioma – a rare brain tumor. The initial plan was to remove the tumor after Mrs. Sturm gave birth.

The thought of surgery was worrisome for



At their home in Haslet, big brother Ryan, 3, watches over his siblings.



Chris and Katie Sturm hold Hudson, one of their four new baby boys.

Mrs. Sturm, who was concerned for her older son, Ryan, who turned 3 years old in June.

"I didn't want to leave my son without a mom. And at the point when we were planning to do the surgery after I gave birth, I told my husband I didn't want to leave him with four newborn babies," she said.

Then Mrs. Sturm suffered a second seizure while at home – approximately two weeks after her first seizure. Upon further discussion with Dr. Patel, the decision was made to remove the tumor while she was pregnant.

"Once the tumor is removed, the risk of seizures decreases substantially – which improves the overall health of both the mother and the babies," Dr. Patel said.

Dr. Patel removed Mrs. Sturm's tumor at Clements University Hospital's Zale Lipshy Pavilion during Mrs. Sturm's second trimester – the safest point in the pregnancy for the babies. Gliomas can occur in different parts of the brain and they affect function based on their location.

Different types of treatment may be required, including surgery, chemotherapy, and radiation, based on the particular grade and type of tumor.

"Gliomas are intrinsic brain tumors that have a tendency to recur. However, early intervention has been proven to improve both quantity and quality of life," Dr. Patel said. "Of the various types of gliomas, Mrs. Sturm has a favorable subtype and I remain optimistic about her future treatment options." Routine MRIs will be required to monitor her condition moving forward.

'Resilient warriors'

With the surgery behind them, the Sturms were finally able to turn more attention to birth preparations. As she anxiously awaited their births, Mrs. Sturm recalled thinking: "I am just so pregnant! I just want to feel normal again."

Dr. Santiago-Muñoz planned to deliver the babies via a scheduled cesarean section once Mrs. Sturm made it to 32 weeks of pregnancy.

"We don't mess around with high-order multiples," Dr. Santiago-Muñoz said. "Every baby you add increases the risk of every complication of pregnancy – especially hypertension, preeclampsia, and preterm birth."

During her career, Dr. Santiago-Muñoz has participated in four high-order multiple births, including the 2012 delivery of quintuplets at the former St. Paul University Hospital. In May, when Mrs. Sturm was at 23 weeks, the medical team in the NICU began preparations. Logistics



Katie Sturm, who underwent surgery to remove a brain tumor in March, later gave birth to four healthy baby boys. Here she visits with one of the babies in the Clements Neonatal Intensive Care Unit.

included organizing teams of physicians and nurse practitioners to be available around the clock in case Mrs. Sturm went into labor early and planning ahead for any complications related to premature infants. The lead neonatologist, Dr. Ennis, said the biggest concern was early delivery since preterm birth increases risks to the babies, including lung issues and bleeding in the brain.

When Mrs. Sturm reached 28 weeks, the babies were preadmitted as patients, which allowed the NICU to track their status in the hospital system, Epic, and enabled physicians and pharmacists to have medications ready. Also, a NICU team was assigned to each baby for the day of delivery.

A few days before Mrs. Sturm's scheduled C-section, she was admitted to the hospital as an "extreme precaution" due to slightly elevated blood pressure. Four days later, Mrs. Sturm underwent her C-section as planned without any unforeseen complications to her or the quadruplets.

"In spite of everything that has gone on – from the seizures, and brain surgery, and a pandemic – every time that we have done a checkup on the kids, they have been peachy keen hunky-dory," Mr. Sturm said. "They are little resilient warriors. They endured a lot and even before seeing the outside world."

"This is a big life adjustment," said Mrs. Sturm. "But family told me God won't give you more than you can handle – which I believe."

More online: Read the full story on *Center Times Plus* at utsouthwestern.edu/ctplus.

HPREP, STARS receive STEM awards from INSIGHT Into Diversity

By Rachel Stowe Master

Recognized for their efforts to inspire and encourage a new generation of young people to consider careers in STEM, UT Southwestern's Health Professions Recruitment and Exposure Program (HPREP) and Science Teacher Access to Resources at Southwestern (STARS) were both selected to receive a 2020 Inspiring Programs in STEM Award from *INSIGHT Into Diversity* magazine. The award honors colleges and universities that encourage students from underrepresented groups to enter the fields of science, technology, engineering, and mathematics.

"STEM programs are rarely recognized for their dedication to underrepresented students. Through this award, we honor colleges and universities that have created opportunities for everyone to pursue a career in a STEM field," said Lenore Pearlstein,

owner and publisher of *INSIGHT Into Diversity* magazine, the largest and oldest diversity and inclusion publication in higher education.

"I am excited to receive this prestigious award recognizing the efforts of our incredible STARS and HPREP teams," said Dr. Shawna Nesbitt, Associate Dean, Student Diversity and Inclusion. "We are committed to increase the pipeline of diverse candidates entering into science and health careers."

Launched more than 35 years ago, HPREP exposes DFW-area high school students to medicine and science through workshops, a college fair, and mentoring with students from the UT Southwestern Medical School, School of Health Professions, and Graduate School of Biomedical Sciences.

"It is a great example of building the pipeline into STEM fields, community engagement, and education, with the added benefit of facili-

tating the development of strong leadership skills for our current students," said Dr. Nesbitt, also Professor of Internal Medicine.

Since 1991, STARS has focused on improving science education in North Texas – with a special emphasis on urban school districts. It serves more than 20,000 teachers and close to 90,000 students in 4,000 schools in DFW with numerous no-cost programs and resources.

Quickly adjusting to the coronavirus pandemic, STARS went virtual with its recent summer programs and increased participation in the process. Its three longtime camps – biology, chemistry, and physics – along with its new middle school camp, provided students and teachers with equipment and supplies to perform experiments at home. STARS also hosted a remote Summer Seminar Series, with almost 200 registrations for each of the six seminars offered.

"We are particularly excited that the registration for these events was greater than last year when the seminars were offered on campus. Plus the seminars were recorded and viewed by thousands afterward as professional development for teachers and a student STEM engagement resource," said Dr. Joel Goodman, STARS Director and Professor of Pharmacology.

Dr. Goodman holds the Jan and Bob Bullock Distinguished Chair for Science Education.

More online: Read the full story on *Center Times Plus* at utsouthwestern.edu/ctplus.



STARS participants listen in on a lecture as part of a Basic Science Symposium on Neuroscience held in October 2019.

Space-age science

Chasing discoveries as close as the heart, as far away as the moon

By Carol Marie Cropper

Dr. Benjamin Levine's career reads like an adventure novel. Known around the world among sports cardiologists – consultant to the NCAA, the NFL, and the U.S. Olympic Committee & Paralympic Committee – he also works with NASA to solve medical problems related to spaceflight.

His first research paper, on the success of a drug to treat altitude sickness in mountain climbers, made it into the *New England Journal of Medicine* while he was still a cardiology fellow. In 2018, Dr. Levine's research created a media frenzy when he conducted a study showing strenuous exercise can reverse the heart stiffening and shrinkage associated with aging.

But Dr. Levine's career in medicine almost didn't happen. The UT Southwestern Professor of Internal Medicine started as a music major at Brown University, thinking he would play classical saxophone. Just in time, the doctor's son from Long Island realized orchestras don't need many mediocre saxophonists, so he switched to human biology: "It was probably the simplest way for me to graduate on time," he said.

That decision led him to Harvard Medical School. "I said, 'I'm not going to be a musician. What else do I really like to do?'" Dr. Levine recalled. He had always been athletic, playing on Brown's tennis team, serving as captain of its wrestling team, even doing a little mountain climbing.

"I loved sports and athletic competition and the limits of human performance," he said. "I said, 'Well, maybe I can be a sports medicine doctor.'"

Training under giants

After medical school, Dr. Levine headed to California for an internal medicine internship and residency at Stanford University, where he found himself training under some of the country's foremost experts in alpine medicine. In the emergency room, there was Dr. Gil Roberts, a member of the first successful American expedition to Mount Everest in 1963. Another was Dr. Herb Hultgren, former Chief of Cardiology at Stanford University Medical Center and an avid climber and researcher who later wrote the book *High Altitude Medicine*. Then while eating in the Stanford cafeteria one day, he met Dr. David Shlim, who worked with Dr. Peter Hackett, the Stanford emergency room physician who helped found and became Medical Director of the Himalayan Rescue Association in Nepal.

Under such influences, Dr. Levine stepped up his mountain climbing. He has summited Denali (formerly Mount McKinley) in Alaska as well as Mount Loboche in Nepal, and climbed on Mount Everest. In 1985, as he approached the end of his residency, Stanford offered him the job of Chief Resident, but he declined: "I said I'd rather go to Nepal."

A yearlong scholarship from the Henry Luce Foundation took him as far as Japan, where he studied altitude sickness in the Japanese Alps. From there, he headed to Dr. Hackett's Himalayan Rescue Association, where he treated patients with acute altitude sickness. The *New England Journal of Medicine* paper on the drug dexamethasone as a treatment followed in 1989, with Dr. Levine as first author.

By then, he knew he wanted to be a researcher as well as a cardiologist. "Where could I go in the United States to get great clinical training in cardiology and great research training in cardiovascular/exercise physiology?" he had asked his Stanford mentor, Dr.

William Haskell, an American College of Sports Medicine President.

"I would give my right arm to work with Jere Mitchell and Gunnar Blomqvist," came Dr. Haskell's response. Both respected UT Southwestern cardiologists, Dr. Blomqvist (now deceased) and Dr. Mitchell, Professor of Internal Medicine and Physiology, were researchers on the 1966 Dallas Bed Rest and Training Study, a landmark report published in *Circulation* two years later that showed 20 days of bed rest dramatically reduced the fitness of young men.

Launching space/health research

Upon joining UT Southwestern in 1987, Dr. Levine began the research for which he is well known: the connection between exercise and heart health, and the effects of space travel on the human body.

Dr. Levine was 13 years old in 1969 when Neil Armstrong stepped onto the moon. Two decades later, as a cardiology fellow at UT Southwestern at the time, he implanted the first catheter to monitor heart pressure in an astronaut in space. The test participant was Dr. Drew Gaffney, a UT Southwestern cardiologist who had trained to become a NASA astronaut.

In 1989, as UT Southwestern prepared to conduct its space experiment with Dr. Gaffney, Dr. Levine applied to NASA to become an astronaut himself. "They ended up disqualifying me because of my color vision – actually, the lack thereof," he said.

Instead of flying, Dr. Levine has led NASA-funded research into such questions as why astronauts develop vision problems and why they are prone to fainting after they return to Earth. The answers: In the first case, persistent, mildly elevated pressure inside the skull during spaceflight changes the shape of the eyeball. In the second, cardiovascular deconditioning combines with circulatory system changes in the low-gravity environment to affect blood flow.



Dr. Levine at Shinshu University in Japan, in front of the chamber where he did his first research studies.

Last year, Dr. Levine successfully demonstrated a strategy to reduce fainting by having astronauts exercise regularly while in space to prevent deconditioning, combined with a treatment plan of saline infusions upon their return to Earth to boost blood pressure. Dr. Levine's space findings help the Earth-bound patients he treats who faint due to a condition called postural orthostatic tachycardia syndrome (POTS) in which too little blood is sent to the heart after a reclining patient stands up.

Dr. Levine has also continued to study the effects of deconditioning due to a lack of exercise on the ground. His collaborations with Drs. Blomqvist



Dr. Benjamin Levine and his team at the Institute for Exercise and Environmental Medicine test a volunteer in a lower body negative pressure chamber, which is used to reproduce the effect of gravity on the body's circulation.



Dr. Levine used NASA-honed technology to monitor the effects of endurance exercise on long-distance swimmer Ben Lecomte's heart.



Dr. Levine (center) flanked by fellow climber John Fischer and their Sherpa (right) on the summit of Mount Loboche in Nepal, 1986.

and Mitchell led to important findings as they followed up on the 1966 Bed Rest Study.

Bed rest study redux

In 1996, three decades after the original study, Dr. Levine and other researchers brought the five participants – now well into middle age – back to UT Southwestern. What they found astounded them. Thirty years of aging had done less to reduce the men's conditioning, or cardiovascular capacity, than had 20 days of bed rest when they were 20 years old. "We found that not a single person was in worse shape after 30 years of aging than after three weeks of bed rest," he said.

That study led Dr. Levine to a chain of research projects over the next two decades to see if exercise could prevent the effects of aging on the heart – and if it might even reverse them.

"In my career, one of the things that surprised me the most is that the heart stiffened and atrophied after bed rest," Dr. Levine said. "That was an 'aha moment.' That finding led me to question how much of what we assume to be an inevitable consequence of aging is really due to deconditioning."

In a 2004 study, Dr. Levine reported that Masters athletes in their 60s – people who exercise regularly and strenuously – had hearts indistinguishable from those of sedentary control participants in their 30s in terms of the stiffness and pumping ability of the left ventricle, the chamber that pumps blood throughout the body.

Next, the researchers investigated whether a year of vigorous exercise could turn back the clock in sedentary individuals. Examining sedentary test participants in their 70s, Dr. Levine found that while exercise had some

heart benefits, it wasn't enough to reverse heart stiffening.

In 2018, Dr. Levine and his researchers finally hit pay dirt. This time, they recruited test participants ages 45 to 64 for a two-year study involving regular exercise. In this group, the regimen managed to decrease heart stiffness and improve maximal oxygen intake, a measure of cardiovascular fitness, Dr. Levine's team reported in *Circulation*.

Dr. Levine said he's best known for a study on altitude training for competitive runners, known as "Living High-Training Low" and published in 1997 in the *Journal of Applied Physiology*.

Notable achievements

He regards the Institute for Exercise and Environmental Medicine, which he founded in 1992 and now directs, as "probably my greatest achievement." A joint project of Texas Health Presbyterian Hospital Dallas and UT Southwestern, the Institute has grown into the largest center for the study of human physiology in the United States, he said. "People come from all over the world to train and study."

This year, Dr. Levine received the American College of Cardiology's Distinguished Scientist Award (Translational Domain).

"It's really hard for me to pick just one achievement," he said. "And maybe that's part of the fun aspect of my career, right – that it's not just one thing."

His quick and curious mind has leapt from one challenge to the next – and he said UT Southwestern has let him do that. "I've been very fortunate. No regrets."

Well, maybe just one. In 1954, his father, a doctor then serving in the Army, was on his way to Fort Sam Houston in San Antonio with his wife when he got word to head to the Military Academy at West Point instead. Dr. Levine was born there two years later.

"I could have been a native Texan," the *New Yorker* said with a sly grin.

Dr. Levine holds the Distinguished Professorship in Exercise Sciences.

Dr. Mitchell holds the S. Roger and Carolyn P. Horchow Chair in Cardiac Research, in Honor of Jere H. Mitchell, M.D.

More online: Read the full story, "Space-age science," in the Summer 2020 edition of *In Pursuit* at utsouthwestern.edu/research/in-pursuit.