



2024

Baylor
College of
Medicine



DIRECT ANNUAL REPORT

DIRECT

THE BAYLOR COLLEGE OF MEDICINE STRATEGIC PLAN

DISCOVER

Applying biomedical discoveries to drive novel therapeutic approaches

INNOVATE

Developing a Learning Health System model through data analytics, collaboration and integration

REACH

Integrating care networks and innovative programs to support and improve the health of individuals and populations

EDUCATE

Preparing scientists and healthcare professionals to lead Learning Health Systems

CREATE

Developing a culture and climate of excellence and inclusion to recruit, retain and develop outstanding faculty, staff and learners

TREAT

Caring for individuals using an innovative patient-centered care model and a data-driven approach to prediction, diagnosis, prevention and cure of disease



Dear Baylor College of Medicine Friends and Colleagues,

The Annual Report is a great vehicle for showcasing the strengths of our programs and the commitment to our strategic plan. As you review these pages, you can see the progress we have made in the six areas of our strategic plan, but more importantly, the people we support and values we hold as an institution.

Many times you have heard me talk about the greatest strength of Baylor – the faculty who focus on achieving our vision of improving health. In this report you will see a snapshot of their work, from research discoveries to creating a Learning Health System, to developing collaborations that we foster both locally and across the world.

We are currently building for the future, with new research space in the Dynamic One building at the Texas Medical Center's Helix Park. The highly innovative labs in that space will greatly expand our commercialization efforts. And at the McNair Campus, construction is on schedule for the Lillie and Roy Cullen Tower at the Health Sciences Park, which will bring learners, researchers and educators together in collaborative space in 2026.

This report is meant to touch on some of the things we have celebrated in the past year. Here are a few:

DISCOVER – Our researchers developed a system to analyze public wastewater for viral outbreaks. It works as an early warning system to improve public health response.

INNOVATE – Baylor developed AI for diagnosing genetic disorders. The AI-MARRVEL is a machine learning system designed to diagnose rare Mendelian disorders, which are challenging to identify.

REACH – The Dan L Duncan Cancer Center and Rice University are working to better diagnose and treat cancer by bringing together cancer experts to identify molecular targets for treatment.

EDUCATE – BCM Academy at Ryan Middle School was recognized as a Nationally Certified Demonstration Magnet School, serving as a model for other schools. Initially at risk of closure, the school provides a rigorous, project-based curriculum in health sciences and STEM fields. We are adding schools throughout Texas and abroad.

CREATE – The Center for Space Medicine and the Translational Research Institute for Space Health continue to advance health in space and on earth through collaboration with private spaceflight companies and international partners, as well as NASA.

TREAT – Baylor 360 Executive Health and Baylor Medicine Concierge Healthcare provide comprehensive membership-based healthcare programs delivered with a personalized approach. These programs complement our care for veterans, children and the underserved.

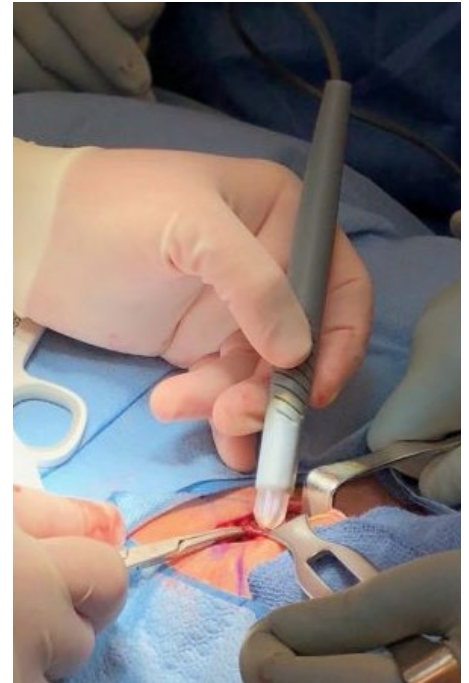
It has been a great year, thanks to the faculty, staff and trainees and through the support of our donor community. I hope you enjoy looking at this sample of our work.

Paul Klotman, M.D.



Baylor Wins STAT Madness

Baylor College of Medicine won the 2024 STAT Madness Science Competition with a project led by Drs. Anthony Maresso, Sara Javornik Cregeen, Michael Tisza and Joseph Petrosino, Department of Molecular Virology and Microbiology, that established the Texas Wastewater Environmental Biomonitoring (TexWEB) network. This project analyzes human virome by regularly examining public wastewater to search for viral outbreaks in the community with a goal to improve public health response and predict disease trends. Modeled after the NCAA March Madness tournament, STAT Madness includes 64 studies with the winner being elected by popular vote.



The MasSpec Pen

Researchers Dr. James Suliburk and Dr. Livia Eberlin, Michael E. DeBakey Department of Surgery, along with their teams, have developed the MasSpec Pen, a handheld probe for identifying thyroid, parathyroid and lymph node tissues during surgery. This technology offers a significant advantage over traditional methods, such as pathology analysis, by delivering results in about 20 seconds, thereby reducing surgical time and risk of complications. The MasSpec Pen, which is still in clinical trials, has the potential to revolutionize not only thyroid and parathyroid surgeries but also operations on other organs, improving overall surgical precision and patient outcomes.



Gene Therapy for Rett Patients

Researchers at Baylor College of Medicine and Texas Children's Hospital have pioneered the first gene therapy for Rett syndrome in pediatric patients, with two girls being the first worldwide to receive this treatment. This phase I/II trial involves a gene therapy, NGN-401 developed by Neurogene Inc., and aims to precisely regulate the MECP2 protein, the underlying cause of Rett syndrome. Early results from the trial indicate that NGN-401 is well-tolerated, with no serious side effects.

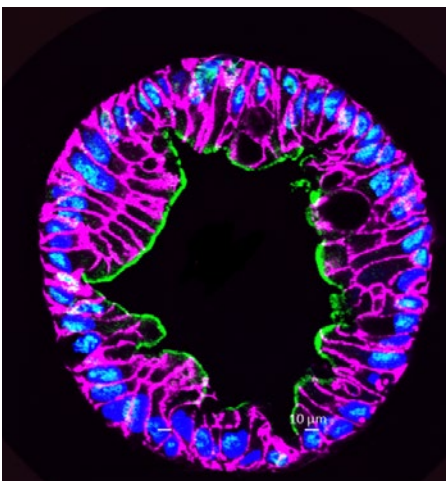


Gene Therapy for Advanced Heart Failure

A recent study led by Dr. Tamer M. A. Mohamed, Michael E. DeBakey Department of Surgery, demonstrates that advanced heart failure may be treatable, even in its chronic phase. Heart failure, the leading cause of mortality in the U.S., typically results in irreversible damage to the heart muscle, which is replaced by non-functional scar tissue. Using gene therapy to stimulate heart cell proliferation, researchers observed significant improvements in heart function and scar reduction and some recovery in liver and kidney functions in an animal model. This suggests the potential for developing new therapies to address advanced heart failure, which currently lacks effective treatments.

Birth Control for Men

Dr. Martin Matzuk, Stuart A. Wallace Chair, Robert L. Moody, Sr. Chair and Professor of pathology and immunology, and his team have identified a promising approach to developing a male contraceptive pill by targeting the STK33 protein, essential for sperm production. Using DNA-encoded chemistry technology, they discovered a potent STK33 inhibitor that reduces sperm motility and numbers in mice without causing toxicity or altering testis size. This compound showed reversible effects, meaning fertility returned after treatment ceased.



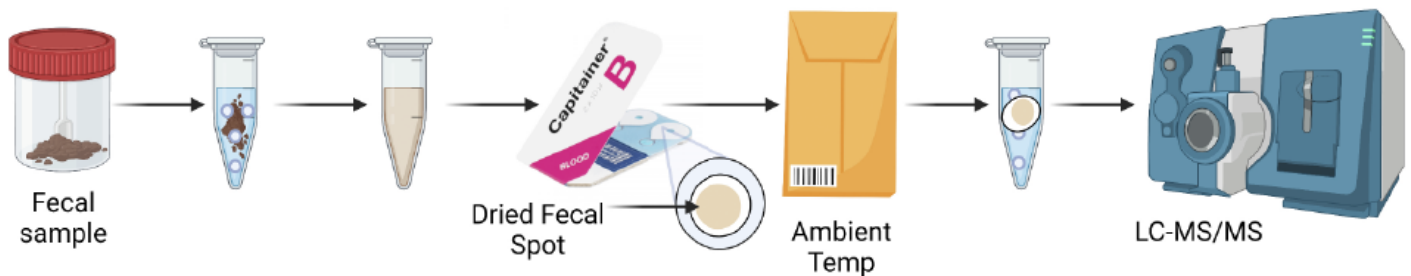
How Rotavirus Makes You Sick

Rotavirus, a key cause of severe gastroenteritis and associated with significant global mortality, induces diarrhea through a newly discovered mechanism. Dr. Sue Crawford, Department of Molecular Virology and Microbiology, and her colleagues found that rotavirus disrupts the enzyme DGAT1, which is crucial for lipid droplet formation in cells. By degrading DGAT1, rotavirus impairs nutrient absorption and enzyme production in the intestine, leading to diarrhea, similar to the condition observed in children with DGAT1 mutations. This discovery provides new insights into how rotavirus affects gastrointestinal function and suggests potential areas for intervention.

Credit Card-Sized Technology for Stool Test

Traditionally, doctors order stool sample tests to diagnose various gastrointestinal conditions. These tests require complex storage and shipping conditions, but researchers, led by Dr. Thomas Horvath of the Department of Pathology and Immunology, have developed a simpler method using dried fecal spots collected on a special paper the size of a credit card that can be transported at

room temperature. This method, inspired by dried blood spot technology, had more accurate results comparable to traditional frozen samples while being more practical and cost effective. The new system could revolutionize sample collection and analysis, especially in remote or resource-limited settings, and even allow patients to mail samples from home.

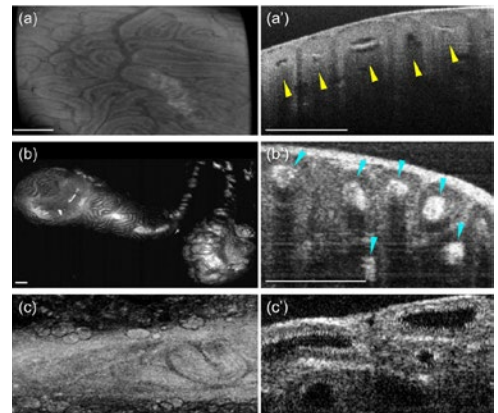


BCM, TCH Receive Grant to Develop Pediatric Devices

The Southwest National Pediatric Device Innovation Consortium (SWPDC), led by Baylor College of Medicine and Texas Children's Hospital, received a \$7.4 million grant from the FDA to develop pediatric medical devices. This funding will support the creation of devices specifically designed for children, addressing the current issue of using adult-sized devices for pediatric patients. Dr. Chester Koh, Scott Department of Urology, is SWPDC executive director and principal investigator.

Imaging Method Developed

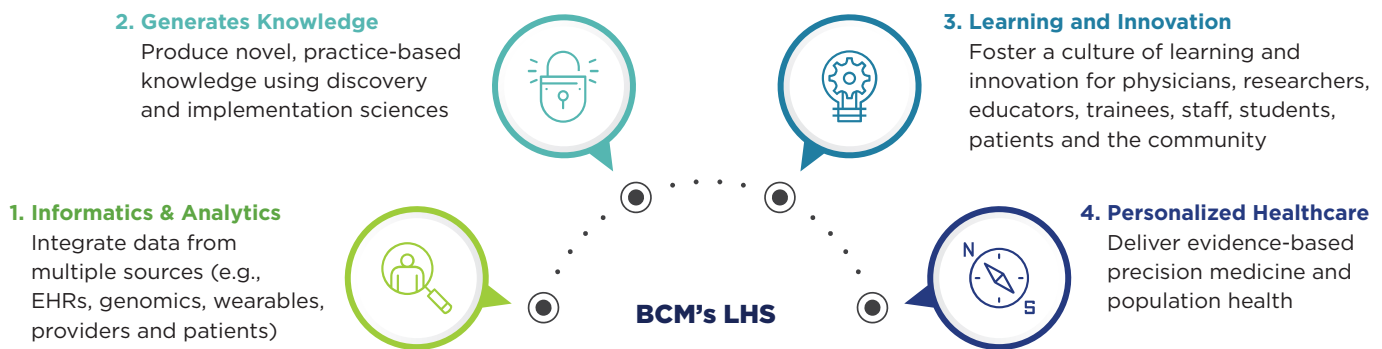
Researchers led by Dr. Irina V. Larina, Professor and Kyle and Josephine Morrow Endowed Chair, Department of Integrative Physiology, have developed a novel optical coherence tomography (OCT) method that allows direct imaging of motile cilia in their natural environment. This technique uses pixel intensity fluctuations to map cilia location, beat frequency, and coordination in living tissue, such as the fallopian tube of a mouse. The new method could reveal important details about cilia's role in reproductive physiology and ciliopathies, such as ectopic pregnancies. The approach might lead to advancements in both basic research and clinical practices, particularly in women's reproductive health.



AI for Diagnosing Genetic Disorders

Researchers at Baylor College of Medicine and the Jan and Dan Duncan Neurological Research Institute at Texas Children's Hospital, have developed AI-MARRVEL (AIM), a machine learning system designed to diagnose rare Mendelian disorders more accurately and efficiently. These disorders usually are challenging to identify, and diagnoses can take an average of six years. AIM is designed to prioritize potentially causative genetic variants, enhancing the diagnostic process. Trained using the extensive MARRVEL database, AIM has demonstrated superior performance in identifying correct gene candidates compared to existing algorithms. It also has shown promise in reanalyzing unsolved cases and predicting novel disease genes, potentially revolutionizing rare disease diagnostics.

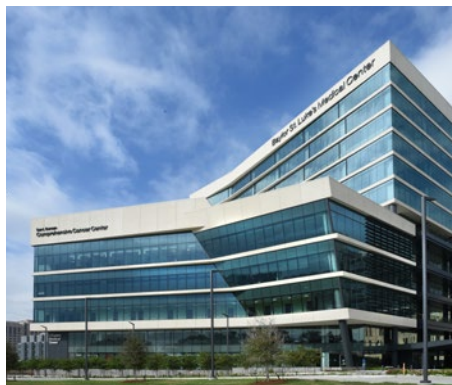
Learning Health System



Creates a virtuous cycle that iteratively uses data from clinical interactions, research discoveries and community feedback to generate novel information that promotes innovative personalized healthcare.

The College's Learning Health System was launched in February 2023. It is led by Dr. Hashem El-Serag, chair of the Margaret M. and Albert B. Department of Medicine and vice president of the Learning Health System Initiative. It is progressing as planned, moving from initial development to active implementation. The Phenotype Working Group recruited a multidisciplinary team, initiated proof-of-

concept phenotyping with 2022 patient data, and secured Umbrella IRB approval for data access. The IMAGINE program launched a GI clinic pilot, while developing a program for returning genetic results in clinics. The LHS Accelerator launched and is currently managing 15 projects. In addition, AI and Scholarly Time RFAs, funding 10 projects, were developed and the fourth BCM Datathon event was held.



DLDCCC and Rice University

The Dan L Duncan Comprehensive Cancer Center established a new joint research collaboration with Rice University. The new Synthesis X Center aims to find better materials for diagnosing and destroying cancer by bringing together people who are experts at treating cancer with those who are experts at creating precisely formulated molecules. SynthX focuses on prevention and early detection, artificial intelligence in speed drug recovery and improving patient reach. With the first seed grants awarded in April, this collaboration allows researchers to find benchside solutions to bedside problems.

NIH Funding for Gene Editing Technology

The National Institutes of Health awarded a \$3.9 million grant to Baylor College of Medicine and Rice University to establish the Baylor/Rice Genome Editing Testing Center (GETC). This new center will assist researchers nationwide with somatic cell genome editing, a promising treatment for severe diseases. The aim is to accelerate the clinical translation of new delivery technologies and gene editing systems to treat disease.



New Clinical Core for NIH Network

Baylor College of Medicine Global Programs and the Dan L Duncan Comprehensive Cancer Center will serve as the clinical core for the Center for Innovation and Translation of Point-of-Care Technologies for Equitable Cancer Care (CITEC), one of the National Institutes of Health's newest Point-of-Care Technologies Research Network (POCTRN) centers. The network focuses on the development and translation of point-of-care cancer screening and early detection technologies for global health.

The GRAB

The Grocery Resource at Baylor (The GRAB) is a free resource available to Baylor students who are experiencing food insecurity or who need assistance stocking their pantry. It opened in August 2022 and has assisted students in all schools, providing nearly 2,000 bags of food. Based on student feedback, the ordering process has been enhanced so that students are able to customize their weekly items.



Check-in on Clinics in Botswana and Malawi

Dr. Paul Klotman visited two areas of Africa early this summer to see the work of the Baylor Global Health team.

Dr. Klotman with Dr. Mokgwetsi Eric Keabetswe Masisi, President of Botswana.



Dr. Klotman with Khumbize Kandodo Chiponda, M.P., the Malawi Minister of Health.

His itinerary started in Botswana, the location of our first program in Africa, the Botswana-Baylor Children's Clinical Centre of Excellence. It opened in 2003 with the support of the Bristol Myers Squibb Foundation. This was the first pediatric HIV clinic on the African continent and since then more than 39,000 children and family members have benefited from HIV/AIDS care and treatment, contributing significantly to Botswana's near elimination of mother-to-child transmission of HIV. Today, our focus includes developing programs to prevent

and treat cancer and to expand STEM education programs.

The Baylor College of Medicine Children's Foundation in Malawi was the second stop. Baylor has worked in partnership with the Malawi government in the health sector since 2005. The original mission was focused on caring for HIV-infected children and families. The work in Malawi has now broadened to include pediatric cancer care and maternal health services in collaboration with Texas Children's Global Health.

FUNDRAISING FY24



\$169,435,476
FUNDS COMMITTED



6,815
GIFTS COMMITTED



3,652
UNIQUE DONORS



\$24,862
AVERAGE GIFT COMMITTED



1,505
NEW DONORS

EDUCATE

Match Day 2024

167

medical students
matched



65

of the students are beginning their residencies in the primary care fields of family medicine, pediatrics, internal medicine, medicine/pediatrics, obstetrics and gynecology or emergency medicine.



This represents 39% of the students participating in the match.



45

students matched with residency programs at Baylor College of Medicine

78

students matched with residency programs in Texas



BCM Academy at Ryan Designated Nationally Certified Demonstration Magnet School

Baylor College of Medicine and Houston Independent School District transformed James D. Ryan Middle School into a health and biomedical sciences magnet school more than a decade ago. Now named Baylor College of Medicine Academy at James D. Ryan, it has achieved Nationally Certified Demonstration Magnet School status. The school, initially at risk of closure, provides a rigorous, project-based curriculum in health sciences and STEM fields. Celebrated for its excellence in diversity, innovation and community involvement, it was featured on Good Morning America's Doctors of Tomorrow segment.

Graduation Ceremonies

In May, nearly 300 students graduated from the School of Medicine, Graduate School of Biomedical Sciences and Genetic Counseling Program.

Dr. William G. Kaelin, Jr., a Nobel Laureate and the Sidney Farber Professor of Medicine at Harvard Medical School and Dana-Farber Cancer Institute, was the commencement speaker.

Earlier in the day, two medical students were commissioned into the U.S. Army and another received the Excellence in Public Health Award from the U.S. Public Health Service Physicians Professional Advisory Committee.

In December 2023, 82 students graduated from three School of Health Professions programs at a commencement ceremony held at Rice University.



Nobel Laureate Dr. William G. Kaelin, Jr. received an honorary Doctors of Letters in Medicine degree and delivered the commencement address.

Graduates Per School

170	School of Medicine
99	Graduate School of Biomedical Sciences
32	School of Health Professions – Physician Assistant
27	School of Health Professions – Doctor of Nursing Practice
23	School of Health Professions – Orthotics and Prosthetics
9	School of Health Professions – Genetic Counseling

Dual Degree Program Graduates

7	M.D./Ph.D.
3	M.D./M.B.A.
3	M.D./M.P.H.

School of Medicine Educational Pathways

25	Care of the Underserved	1	Medical Ethics & Health Policy
5	Genetics & Genomics	9	Medical Ethics
1	Global Health	1	Medical Research
9	Health Policy	8	Space Medicine

McNair Scholars for FY2024

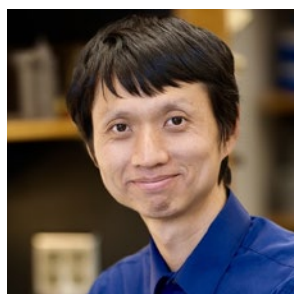


Dr. Michael Bround, assistant professor of integrative physiology

Bround studies the biology of mitochondria, an organelle responsible for generating the energy necessary to power cells. His research looks at how cells communicate with mitochondria to optimize energy production, regulate mitochondrial quality control and initiate pathological cell death processes, which can be a major driver of several significant human diseases, such as cardiac infarction, stroke, multiple sclerosis, Alzheimer's disease and muscular dystrophy.

Dr. Nicole Provenza, assistant professor of neurosurgery

Provenza's work uncovers the neurophysiology underlying cognition and emotion and the effects of neuromodulation on neural activity and behavior. Her lab will focus on understanding how the brain supports behavior in the real world throughout everyday life. The goal is to pioneer the development of personalized treatment strategies that more effectively guide brain activity and behavior toward healthy states.



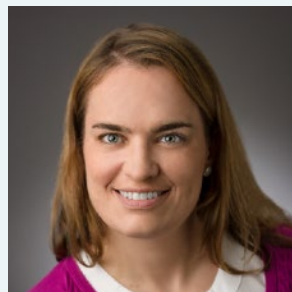
Dr. Yudong Gao, assistant professor of neuroscience

Gao's research focuses on the molecular mechanisms of brain conditions, particularly how protein interactions mediate critical biological processes in neurodevelopment. He has pioneered a new CRISPR-based protein engineering approach but also employs a range of other techniques to help understand how to identify and manipulate protein interactions and modulate neural functions with a goal of finding possible treatment options for certain brain conditions. CRISPR is a laboratory technique that lets scientists cut and insert small pieces of DNA at precise areas along a DNA strand.

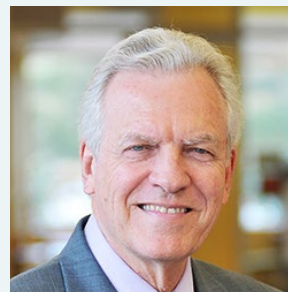
New Board of Trustees Members



J. Cary Gray
Chairman of the
Gray Reed law firm



Kelly Hackett
Managing director
at Tectonic Advisors



Dr. James Lomax
Professor of psychiatry
and behavioral sciences
Baylor College of Medicine

Dr. James Lomax serves as an ex officio member of the Board, representing the College's Alumni Association.

New Center Leadership

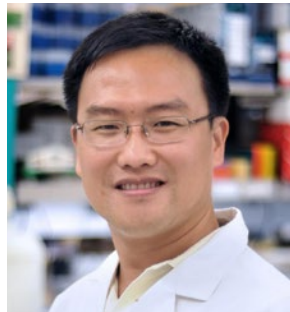


Lung Institute

Dr. Shanda Blackmon

was named the new director of the Lung Institute at Baylor College of Medicine. She specializes in minimally invasive lung segmentectomy and complex thoracic surgery.

She joins the faculty of the David J. Sugarbaker Division of Thoracic Surgery in the Michael E. DeBaakey Department of Surgery.



Lester and Sue Smith Breast Center

Dr. Xiang "Shawn" Zhang

was named director of the Lester and Sue Smith Breast Center at Baylor College of Medicine after serving as interim director since March 2022. Zhang

is a professor of molecular and cellular biology and a McNair Scholar at Baylor. He also holds a William T. Butler, M.D., Endowed Chair for Distinguished Faculty and is a member of the Dan L Duncan Comprehensive Cancer Center.

Baylor Programs Advance Health of Astronauts

The Center for Space Medicine and the Translational Research Institute for Space Health (TRISH) continued to advance health in space and on earth through collaboration with private spaceflight companies, private astronauts, and international partners established by the EXPAND (Enhancing eXploration Platforms and Analog Definition) Program.

The Institute collected biomedical data that determined short-duration spaceflights pose no significant health risks to private astronauts. The research lays the foundation for an open biomedical database for commercial astronauts' health data (EXPAND Database and Biorepository) and establishes best practices in collecting and processing this biomedical information.



Mosaic Project

The Mosaic Project reached a major milestone on Jan. 1 with the successful implementation of its new financial planning system. This is a step forward in the ongoing efforts to enhance the College's operational efficiency, connectivity and responsiveness.

The new system, SAP S/4 HANA, provides real-time data processing to significantly improve the accuracy, transparency and accessibility of information. This allows for better-informed decision-making and facilitates more precise financial planning. In addition, the Mosaic project continues to enhance existing technologies to streamline administration processes.

TREAT



New PT Clinic

Baylor Medicine Orthopedics and Sports Medicine opened a new physical and occupational therapy clinic at Kirby Glen. The location is more than 7,000 square feet and offers physical therapists and hand therapists the ability to accommodate orthopedic patients from all Baylor Medicine providers. Baylor Medicine Orthopedics and Sports Medicine is the clinical practice of the Joseph Barnhart Department of Orthopedic Surgery at Baylor College of Medicine.

Gene Therapy Clinical Trial Program Opens

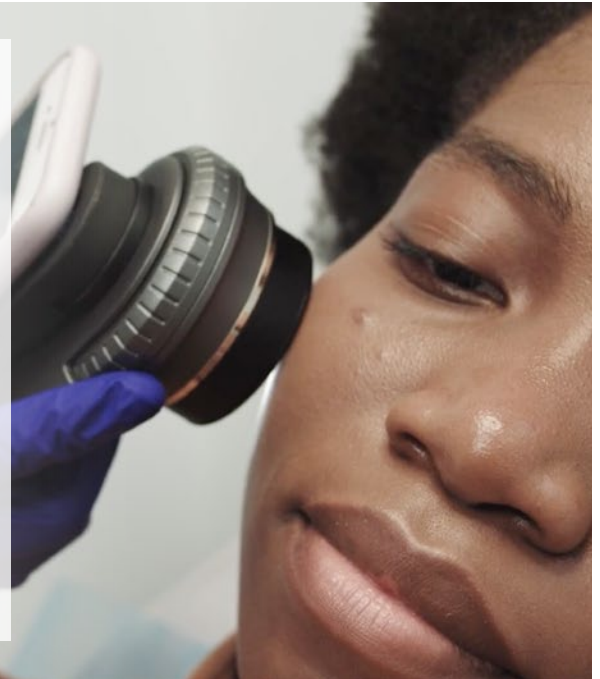
Baylor College of Medicine's Dan L Duncan Comprehensive Cancer Center launched a pilot program to offer cell therapy clinical trials at Harris Health's Ben Taub Hospital and Harris Health Smith Clinic, aiming to improve access to these advanced treatments for socioeconomically disadvantaged populations. The program will initially focus on phase I and II trials, including one for multiple myeloma, leveraging Baylor's existing cell therapy resources and facilities. Alongside clinical trials, the initiative will address systemic barriers by providing resources like transportation and childcare and engaging with communities to build trust and understanding. The program will serve as a model for expanding equitable access to cell therapies in other safety-net hospitals nationwide.





Skin of Color Clinic Opens

Baylor Medicine Dermatology has launched the Skin of Color Clinic at the Jamail Specialty Care Center to offer tailored, culturally sensitive dermatological care for patients with diverse ethnic backgrounds, skin tones and hair textures. Led by Dr. Oyetewa Oyerinde, the clinic addresses skin conditions prevalent in darker skin tones, such as hyperpigmentation, scarring and hair loss and provides cosmetic treatments as well.



Baylor Offers Personalized Healthcare Programs

Baylor Medicine offers two comprehensive membership-based healthcare programs delivered with a personalized approach — Baylor 360 Executive Health and Baylor Medicine Concierge Healthcare. Patients can be confident that they are getting high-quality, accessible care that fits their lifestyle and focuses on the whole person.

Baylor 360 Executive Health offers clinical evaluation, lifestyle assessment and genetic analysis in a private clinic with access to a dedicated nurse navigator, expert physicians, same-day results and facilitated referrals.

Baylor Medicine Concierge Healthcare is an advanced primary care clinic that provides accessible, comprehensive and highly personalized care, including priority scheduling, round-the-clock physician access, convenient diagnostics and coordination of care, with a proactive approach to overall wellness.

Primary Care Options

Baylor Medicine opened primary care clinical services at a new location, Baylor Medicine at San Felipe. The new clinic serves patient populations in the Houston Memorial area and west of Houston. The location is already home to a Baylor Orthopedics and Sports Medicine specialty team. They are now joined by four primary care physicians to meet patients' healthcare needs.



CONSTRUCTION

Health Sciences Park Project Overview



BCM Vision

Build the Learning Health System of the future by creating an unparalleled learning and research environment.

BCM Space



138,000 SF
of SOM/SHP
Education Space



81,000 SF
of Dry Lab
Research Space

BCM Occupancy



2026

Cullen Tower/Dynamic One at Helix Park

Baylor College of Medicine will have a major presence in the Texas Medical Center's Helix Park as well as significant growth on the McNair Campus.

For FY24, the College's space in Dynamic One, photo at right, is being completed, ready for occupancy later this year. Baylor will serve as the anchor tenant of the building, with highly innovative labs focused on novel start-up companies. The key will be on commercialization efforts.

The Lillie and Roy Cullen Tower at the Health Sciences Park on the McNair Campus is coming into view, with construction on the parking garage expected to be completed next spring and building occupancy in 2026. This 11-story building will support the Learning Health System of the future by creating an unparalleled learning and research environment. Photo below.



BY THE NUMBERS



NIH FUNDING:
\$319,460,291



20th nationally



1st in Texas



TOTAL
**RESEARCH
FUNDING:**
\$691.9M

— **First** in Texas —



British Medical Journal:
Health Policy Cited
Research Metrics

First in Texas Medical Schools

- Cited Articles Count: **14,101**
- Cited in Countries: **94**
- Cited in Sources: **969**



**WORLD
UNIVERSITY
RANKINGS**

#44 in the world and **#1** in Texas
in **Medicine category**

#72 in the world and **#1** in Texas
in **Biological Sciences**



BCM #245 of 14,131 universities in the world
• **#1 in Texas medical schools**

BCM #102 of 2,496 best universities in the United States
• **#1 in Texas medical schools**

BCM #6 of 119 universities in Texas
• **#1 in Texas medical schools**



U.S. News & World Report Best Graduate Schools - 2024

BCM is one of 16 Tier One Research Intensive medical schools nationally

BCM ranked **#2** nationally – PA schools
• **#1 in Texas**

BCM ranked **#26** nationally – Ph.D. biological sciences
• **#1 in Texas**

MISSION

Baylor College of Medicine is a health sciences university that creates knowledge and applies science and discoveries to further education, healthcare and community service locally and globally.

VISION

Improving health through science, scholarship and innovation.

VALUES

RESPECT

Integrity

INNOVATION

Teamwork

Excellence



Baylor College of Medicine

