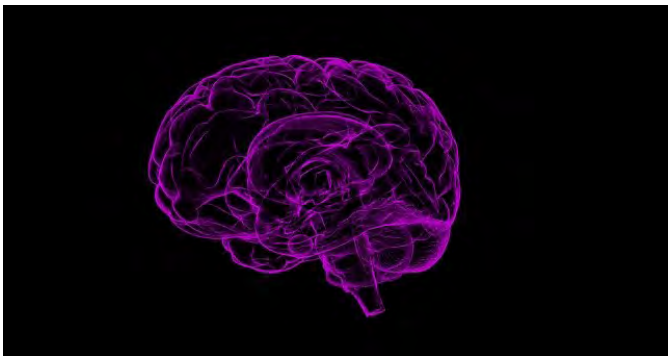
A new approach to treat Glioblastoma Multiforme, a form of brain cancer

Findings from a seven-year research project suggests that there could be a new approach to treating one of the most common and devasting forms of brain cancer in adults — Glioblastoma Multiforme (GBM).

In a peer-reviewed study published by *BMC Cancer*, scientists from the University of Surrey show that a short chain of amino acids (the HTL-001 peptide) is effective at targeting and inhibiting the function of a family of genes responsible for the growth of GBM — Hox genes. The study was conducted in cell and animal models.



"People who suffer from Glioblastoma Multiforme have a five per cent survival rate over a five-year period — a figure that has not improved in decades. While we are still early in the process, our seven-year project offers a glimmer of hope for finding a solution to Hox gene dysregulation, which is associated with the growth of GBM and other cancers, and which has proven to be elusive as a target for so many years."

Ironically, Hox genes are responsible for the healthy growth of brain tissue but are ordinarily silenced at birth after vigorous activity in the growing embryo. However, if they are inappropriately 'switched on' again, their activity can lead to the progression of cancer. Hox gene dysregulation has long been recognized in GBM.

Professor Susan Short, co-author of the study from the University of Leeds, said, "We desperately need new treatment avenues for these aggressive brain tumours. Targeting developmental genes like the HOX genes that are abnormally switched on in the tumour cells could be a novel and effective way to stop glioblastomas growing and becoming life-threatening."

The project was carried out in collaboration with the universities of Surrey, Leeds and Texas, and HOX Therapeutics, a University of Surrey start-up company based on the University's Surrey Research Park.

A new way of measuring sperm age could predict pregnancy success

A novel technique to measure the age of male sperm has the potential to predict the success and time it takes to become pregnant, according to a newly published study by researchers at the Wayne State University School of Medicine.

"Sperm epigenetic clock associates with pregnancy outcomes in the general population," published in the journal Human Reproduction, found that sperm epigenetic aging clocks may act as a novel biomarker to predict couples' time to pregnancy. The findings also underscore the importance of the male partner in reproductive success.

"Semen quality outcomes utilizing World Health Organization

guidelines have been used to assess male infertility for decades, but they remain poor predictors of reproductive outcomes. Thus, the ability to capture the biological age of sperm may provide a novel platform to better assess the male contribution to reproductive success, especially among infertile couples," said J. Richard Pilsner, lead author of the study.

Sperm epigenetic aging is the biological, rather than the chronological, aging of sperm. The study found a 17% lower cumulative probability of pregnancy after 12 months for couples with male partners in older compared to younger sperm epigenetic aging categories. The study involved 379 male partners of couples who discontinued the use of contraception for the purpose of becoming pregnant. The study also found a higher epigenetic aging of sperm in men who smoked.

The results, Dr. Pilsner said, indicate that higher sperm epigenetic aging is associated with a longer time to become pregnant in couples not assisted by fertility treatment, and among couples that achieved pregnancy, with shorter gestation.

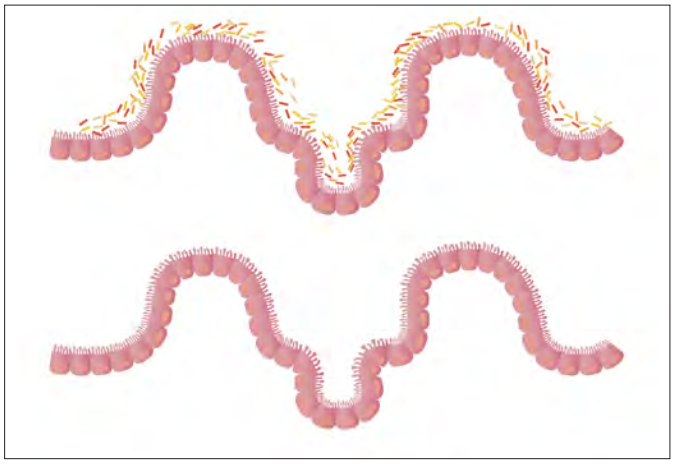
The strong association between sperm epigenetic aging and pregnancy probability and its slowing or reversal through lifestyle choices and/or pharmacological interventions warrants further investigation. In addition, because older fathers have an increased risk of children with adverse neurological outcomes, it is important to understand the potential relation of sperm epigenetic aging on children's health and development.

Dr. Pilsner said, "While chronological age of both partners remains a significant predictor of reproductive success, our clocks likely recapitulate both external and internal factors that drive the biological aging of sperm. Such a summary measure of sperm biological age is of clinical importance, as it allows couples in the general population to realize their probability of achieving pregnancy during natural intercourse, thereby informing and expediting potential infertility treatment decisions."

Fecal microbiota transplants reverse indications of aging

In a study, published in the journal *Microbiome*, scientists at the Quadram Institute have provided evidence, from research in mice, that transplanting fecal microbiota from young into old mice can reverse hallmarks of aging in the gut, eyes, and brain.

Ageing leads to loss of integrity of the lining of the gut, allowing bacterial products to cross into the circulation. This triggers the immune system and inflammation in the brain and eyes. The findings from the study show that gut microbes play a role in regulating some detrimental effects of aging and open up the possibility of gut microbe-based therapies.



The microbiota of young mice, and old mice who received young microbiota transplants were enriched in beneficial bacteria that have previously been associated with good health in both mice and humans. The researchers have also analysed the products which these bacteria produce by breaking down elements of our diet. This has uncovered significant shifts in particular lipids (fats) and vitamin metabolism, which may be linked to the changes seen in inflammatory cells in the eye and brain.

Similar pathways exist in humans, and the human gut microbiota also changes significantly later in life, but the researchers caution about extrapolating their results directly to humans until similar studies in elderly humans can be performed. A new facility for Microbiota Replacement Therapy (MRT), also known as Faecal Microbiota Transplantation (FMT) is being built in the Quadram Institute that will facilitate such trials, as well as other trials for microbiota-related conditions.

A combination of drugs may prove effective in patients with glioblastoma

Results of a preclinical study published in *NeuroOncology* suggest that a drug combination of MLN4924, also known as Pevonedistat, when given in combination with a second drug called Etoposide, could help glioblastoma patients whose cancer cells have lost PTEN. Genomic sequencing of patient-derived tissue samples showed those samples with a loss of PTEN also showed a spike in the

expression of a gene called TOP2A, which research suggests resists the effectiveness of MLN4924. By using Etoposide to block TOP2A, researchers believe glioma cells will be weakened enough for MLN4924 to kill the cancer.

Based on the findings of a new study led by the Translational Genomics Research Institute (TGen), a clinical trial has been planned. Using precision medicine to select only participants with a specific genomic "signature of vulnerability," researchers expect the new treatment could help up to a

third of all glioblastoma patients.

The drug combination, along with at least three others, will be tested in the Glioblastoma Umbrella Signature Trial (GUST). An abstract of the project was presented at the annual meeting of the American Association for Cancer Research (AACR) in New Orleans.

Associate Professor Patrick Pirrotte, Director of TGen's Collaborative Center for Translational Mass Spectrometry, and one of the study's authors said, "This study leveraged state-of-the-art genomic technologies—transcriptomics (RNA) and proteomics—to identify how the loss of the tumor suppressor PTEN affects glioblastoma cells treated with MLN4924." "Proteomics was key to discovering the increase in the protein expressed by TOP2A, which led to the recommended use of Etoposide in conjunction with MLN4924."

Women carrying mutation in PALB2 gene more likely to be diagnosed with breast cancer

A recent study in the *New England Journal of Medicine* showed women who carry a mutation in the PALB2 gene were 35% more likely to be diagnosed with breast cancer by age 70, compared with women who don't carry the mutation.

"PALB2 is a gene that encodes a protein that interacts with BRCA2. The BRCA2-PALB2 connection is required for appropriate DNA damage repair in human cells. "When this protein is not working properly, DNA damage is not repaired, and cells become aberrant, leading to cancer," said Mariya Rozenblit, MD, Instructor of Medicine (Medical Oncology) at Yale Cancer Center.

According to Rozenblit, patients are becoming increasingly aware of the value of genetic testing in evaluating their breast cancer risk. Genetic testing for hereditary breast cancer risk now frequently includes a panel of genes such as BRCA1, BRCA2, PALB2, and others.

"Results of genetic testing typically take two to three weeks and the genetic counselor will review the results of the genetic testing and their implications with the patient," said Claire Healy, Co-Manager and Genetic Counselor for the Smilow Cancer Genetics and Prevention Program. "If a mutation is identified the

genetic counselor can also help connect the patient to providers for high-risk cancer screening and medical management, if needed."

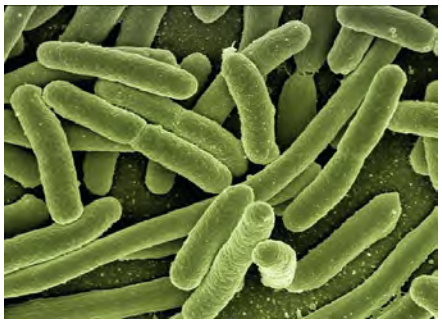
Healy also stated that clinical testing for PALB2 has not been available for as long as genetic testing for the BRCA1 and BRCA2 genes, so patients who completed testing before 2013 may not have gotten an analysis that included the PALB2 gene and should consult with their clinician.

If a mutation is discovered, the genetic counselor can assist the patient in connecting with physicians for high-risk cancer screening and medical care, if necessary.

Respiratory infections: CRL 1505 a probiotic that can help

Respiratory Tract Infections (RTIs) affect one's sinuses, throat, airways, and/or lungs. RTIs are a persistent and costly public health problem that even before COVID-19 pandemic were among the primary causes of death worldwide.

Since 2020, COVID-19 has been



the main RTI of concern, however, COVID-19 is not the only relevant RTI. A virus called Respiratory Syncytial Virus (RSV) is responsible for the largest number of viral bronchiolitis in infants worldwide. A hidden threat of RTIs is the heavy use of antibiotics associated with these diseases.

Some virologists believe that the lockdowns meant that newborns and expecting moms were not exposed to RSV that year, and hence did not develop immunity. Children were immunologically unprepared to resist the virus since lockdown restrictions were relaxed, resulting in a larger incidence of hospitalizations than previously. In this context, strengthening the immune system with probiotics to avoid RTIs appears to be an interesting way to reduce the risk of RSV infections, which is exactly what CRL 1505 is thought to achieve. Preclinical data has shown CRL 1505 to protect against viral RTIs, and in particular RSV and influenza.

Probiotics may affect the immune response of individuals with viral infections, but the interplay between bacteria, viruses, and host physiology is complicated. Because of their propensity to induce innate immune responses both locally and systemically, several probiotic strains have been demonstrated to enhance lung mucosal defences, for example, even when given orally. As a result, when a bacterial or viral infection develops, the host is prepared to fight it off and keep the illness at bay.

Lacticaseibacillus rhamnosus CRL 1505 is a probiotic strain isolated from goat milk that has been extensively researched for its ability to stimulate the immune system, allowing it to clear infections more quickly. CRL 1505 has been shown in pre-clinical investigations to elicit an early immune response to viral challenges with Influenza Virus or RSV, as well as to minimize lung damage. CRL 1505's methods of action include higher baseline levels, important immune system activators, and the anti-inflammatory cytokine interleukin 10 (IL-10). These changes prepare the immune system to deal with RTIs when they come into touch with the virus.

One of the main factors discovered in the interaction of CRL 1505 with the host is its heat-stable peptidoglycan (PG05), which has been shown to exhibit strain-specific immunomodulatory function. PG05 considerably boosts the production of particular antibodies as well as the number of alveolar macrophages. During viral and bacterial infections, these cells play an important role in the positive control of the respiratory innate immune response.

Cross reaction of Heart artery plaque cells and vascular proteins – a potential cause of heart attack

Researchers at the Stanford Cardiovascular Institute have discovered how viruses like influenza and SARS-CoV-2 and its accompanying vaccinations have been linked to an increased risk of heart attack and other cardiovascular problems. The findings were published in the journal *Circulation Research* recently.

"Flu has long been linked to heart attacks and inflammation of the heart." The latest COVID-19 pandemic has exposed the link between viruses and cardiovascular problems even more. "The reasons why respiratory viral infections raise cardiovascular risk remain unknown," stated Patricia Nguyen, an institute member and Assistant Professor in Stanford University's Division of Cardiovascular Medicine (Department of Medicine).

According to research, plaque accumulation in the heart arteries is made up of immune cells. The T cell population is a significant immune cell subgroup observed in plaques. Using novel methods that allowed the researchers to examine plaque cells at the single cell level, they discovered that memory T cells account for a considerable part of the plaque's cell components. Memory T lymphocytes in coronary artery plaque were influenza and SARS-CoV-2 specific.

The researchers demonstrated that T cells can be activated and expanded, that they can mediate an assault on self that causes atherosclerosis growth and progression, and that they can exert pro- and anti-inflammatory effects.

"These findings suggest that a subset of patients may be vulnerable to auto-immune clotting complications induced by previous viral infections. Development of diagnostic assays to identify these vulnerable patients is critical so that we may develop appropriate prevention and immune-based treatment strategies for these patients," concluded Dr. Nguyen.

New way to detect placenta accreta spectrum disorder during pregnancy

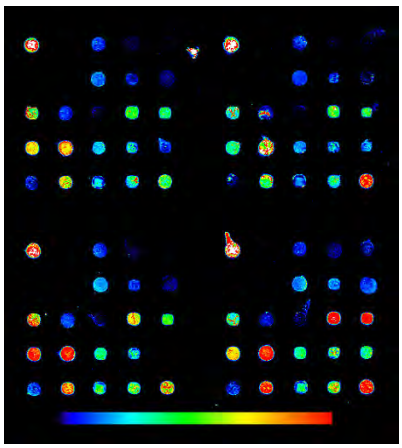
UCLA and Cedars-Sinai researchers have devised a novel method for detecting a potentially fatal disease that can arise during pregnancy. *Nature Communications* released a report describing the novel procedure.

Currently, ultrasonography along with a review of a mother's pregnancy history is used to identify placenta accreta spectrum condition. The new blood test can be performed as early as the first trimester of pregnancy, allowing for early referrals to high-risk pregnancy specialists. The blood test was 79 percent accurate in establishing the existence of placenta accreta and 93 percent accurate in ruling it out with a negative result in testing with over 100 women.

The researchers modified the device for the current study so that it could identify placenta cells in the mother's blood that are connected to placenta accreta spectrum disease. These cells, known as trophoblasts, emerge during the first few days of pregnancy. Trophoblasts adhere to the chip and may be identified under a microscope when a blood sample is examined using the chip. A trophoblast count or trophoblast cluster in the blood implies an increased risk of placenta accreta problem.

Imaging biomarkers can help transform stroke prevention

A large global study in stroke patients has shown how MRI biomarkers to estimate relative brain age can enhance surveillance and improve predictions on poststroke recovery, compared with simply using chronological brain age. The research shows how radiomics-derived brain age can predict functional outcome after acute ischemic stroke.



The authors scrutinized the texture of brain T2 fluid-attenuated inversion recovery (FLAIR) images from ischemic stroke patients to predict brain age. Clinicians usually assess the brain health of patients by looking at their brain parenchyma on T2-FLAIR MRI, then visually and subjectively quantifying the extent of atrophy and the cerebral burden of disease.

We wanted to translate this process in a quantified framework, by analyzing T2-FLAIR MRI of stroke survivors with textural analysis, i.e., radiomics, and artificial intelligence," explained Bretzner, who is also an interventional neuroradiologist at Lille University Hospital, France. "One of our goals was also to provide a method that used clinical imaging and not research-grade imaging, the latter being used in most published research, which might fail to be applicable to MRI acquired during routine care."

A biomarker to measure the relative age of a patient's brain could help predict how well they will recover from a stroke, say researchers at the University of Bath and Mecklenburg-Reichs University in the north-west of England (UBOA).

Stroke patients with radiomics-derived brain age biomarkers are shown to be more resilient to cognitive impairment and dementia, a study published in the journal RecoverY suggests. The authors point to how future studies could assess the relationship between radiomics brain age and cognitive reserve in stroke patients.

A magnetic marker liquid may help detect breast cancer spread

A magnetic marker liquid will now be able to help doctors determine if metastasis has occurred in women with invasive breast cancer, according to a recommendation by National Institute for Health and Care Excellence (Nice), which advises the government and the NHS, UK on cost-effective treatments.

The material, known as Magtrace, has been found to detect the existence of sentinel lymph nodes, which indicate whether the cancer has spread beyond the breast.

Magtrace is a non-radioactive brown liquid that serves as a magnetic marker as well as a visual dye.

It is injected into the breast tissue around a malignant tumour. Particles are absorbed into the lymphatic system and travel along the path that cancer cells are most likely to adopt when spreading from the initial location of the illness, eventually being lodged in sentinel lymph nodes, reports The Guardian.

The Sentimag probe is used to track the patient's progress once inside. When it goes over the Magtrace, it makes noises of varying pitches, similar to how a metal detector locates metal items in the ground.

After locating the sentinel lymph node, surgeons remove it and perform a biopsy, during which a pathologist looks for symptoms of malignancy. If this is the case, they may do further surgery to remove more lymph nodes.

However, Nice cautioned that Magtrace might cause side effects and hazardous outcomes. These include skin staining and a patient's ability to undergo an MRI scan in the future, and "therefore use of Magtrace should be carefully evaluated for those who are likely to need follow-up MRI tests."

Kidney Cells Don't Filter Blood, They Pump it

Epithelial cells transport blood through the kidneys and circulate it back into the body. How these immobile cells generate the mechanical force needed to do their job is not fully understood. A researcher from Johns Hopkins University has created a device that measures mechanical forces generated by both healthy and diseased kidney cells.

Sean Sun, a professor in the Whiting School of Engineering's Department of Mechanical Engineering and his team recreated the kidney microenvironment using their micro-fluidic kidney pump, or MFKP. The device has two microchannels separated by kidney epithelial cells. As the cells pass fluid between the channels, it records the fluid pressure generated by the cells in real time. The researchers noticed that kidney epithelial cells behave like mechanical fluid pumps and actively generate a fluid pressure gradient. The fluid pumping behavior is characterized by a pump performance curve, which is very much like a water pump in a house. Most people believe that kidneys behave like a conventional filter, which needs external pressure to move fluid. However, Sun and his team showed that cells can actually generate the needed pressure themselves—an insight with important implications for understanding kidney physiological function.

"Everyone hears that kidneys filter blood, but conceptually that is incorrect. What we showed is that kidney cells are pumps, not filters, and they are generating forces," Sun said in a news release.

Collaborating with the Baltimore PKD Research and Clinical Core Center at the University of Maryland, Sun's team also used the device to examine mechanical behaviors of kidney epithelial cells from patients with autosomal dominant polycystic kidney disease, or ADPKD. ADPKD is a common inherited and aggressive disorder in which the kidney develops fluid-filled cysts, resulting in an enlarged kidney. The team's device showed that ADPKD cells pump fluid in the opposite direction of healthy epithelial cells. This altered pumping behavior changes the kidney tube's pressure pro-

file, resulting in change to their shape and morphology.

Their findings were published recently in *Nature Communications*. The team's next steps include modifying the device to scale up their measurements and for use in other epithelial transport processes, such as those that occur in other organs. They want to showcase that mechanical forces are important in biological systems and organs, which can ultimately improve our approach to drug screening and disease modeling.

3D-printed acoustic holograms against Alzheimer's or Parkinson's

The holograms designed by the team of researchers from Universitat Politècnica de València (UPV)and CSIC allow the opening of the blood brain barrier selectively, efficiently and in a highly focused manner, facilitating the administration of therapeutic drugs to treat pathologies that affect the central nervous system.

As explained by Francisco Camarena, researcher at the Institute of Instrumentation for Molecular Imaging, a joint center between the UPV and CSIC, focused ultrasounds have great potential to treat neurological diseases thanks to their capacity to generate therapeutic effects in a precise and non-invasive manner. "However, applying them to the structures of the central nervous system is complicated, due to two obstacles: the effects of aberration and attenuation of the skull and the complex and extensive spatial distribution of the deep structures of the brain," Camarena pointed out.

The acoustic holograms designed by the UPV and CSIC researchers allow for a more controlled opening of the blood brain barrier than which is achieved by exclusively making use of ultrasound. Most importantly, they can correct the aberrations introduced by the skull. At the same time, they can generate an ultrasonic multi-focal beam in particularly important brain structures.

It is the first time that the blood brain barrier has been opened simultaneously in the two hemispheres. In addition, the UPV-CSIC-Columbia University team has achieved this with a resolution that is far superior than the standard. This allows better locating the area to treat, minimizing the healthy brain tissue volume that is targeted by ultrasound while simultaneously reducing the cost and operating time.

The hologram is printed, and customized for each case, with a 3D printer. "For example, let's say the doctor needs to do an ultrasound of the patient's amygdala. For that, they'd provide us with a CAT scan and an MRI of the patient's head, on which they would identify and segment the treatment area. Based on this information, we design the hologram we need to get the ultrasound of the region of interest," explained Sergio Jiménez, doctor at UPV and currently on staff at the group from Columbia University, who also noted the low cost of the holograms, whose cost would range between 40 and 300 euros, depending on the medical application.

The study is published in *IEEE Transactions on Biomedical Engineering*. Currently, the team of researchers from UPV, CSIC and Columbia University are working on verifying this new technology for opening the blood brain barrier in non-human primates. The team is designing the first protocols for experimentation in humans to treat brain tumors and perform brain neurostimulation studies.

Study finds 'super gene' shows promise for preventing obesity

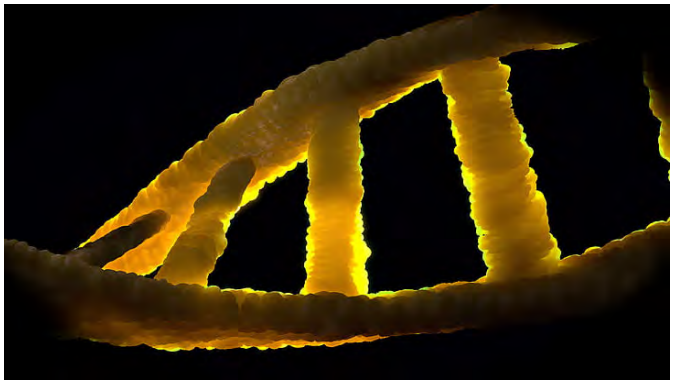
Nearly three decades after first discovering the tumor-suppressing Par-4 "super gene" that has been shown to kill cancer cells, a team of researchers at the University of Kentucky Markey Cancer Center is now learning about its role in preventing obesity—a disease that affects more than 1.9 billion people worldwide.

Vivek Rangnekar, associate director of the UK Markey Cancer Center first discovered Par-4 and its role in cell death in prostate tissue in 1993. Since then, subsequent studies revealed that Par-4 is a tumor sup-

pressor and that increased expression of Par-4 prevents tumor growth.

In addition to Par-4's role in cancer suppression, recent research published by Rangnekar's team in Frontiers in Oncology has uncovered a new role for Par-4 as a predictor of future obesity in men and women. The study shows that lack of Par-4 in mice led to increased fat absorption and fat accumulation in fat-storing cells (adipocytes), which resulted in the development of obesity. These mice also had secondary health issues, including fatty liver and insulin resistance, which are commonly associated with obesity. However, genetically restoring the missing Par-4 gene reversed the obesity, making the mice lean again.

Interestingly, mice with the same diet and physical activity as normal mice, but that lacked Par-4, still became obese. Additionally, the study shows that Par-4 loss may serve as a predictor for individuals who could be at-risk for developing obesity later in life. In collaboration with the UK Center for Clinical and Translational Science (CCTS) and Lund University in Sweden, these researchers also found that lower expression of Par-4 was associated with obesity in men and women.



"The risk of developing obesity is significantly greater in individuals who have low Par-4 levels compared to those who have high Par-4 levels," Rangnekar said. Future research is looking into treatment strategies that may be useful to overcome obesity and inhibit obesity-associated cancer, including an ongoing clinical trial at the UK Markey Cancer Center using a drug to elevate Par-4 in cancer patients.

Drug combination reduces the risk of asthma attacks

A global study of asthma patients by Rutgers and an international team of researchers found that a combination of two drugs dramatically reduces the chances of suffering an asthma attack.

Results from the MANDALA clinical trial published in *The New England Journal of Medicine*, show that a combination of albuterol, which provides relief from an asthma attack by relaxing the smooth muscles and is used for immediate asthma relief, and the corticosteroid budesonide, taken via an inhaler, lower the number of sudden episodes of shortness of breath, wheezing and coughing in patients. Such incidents, referred to medically as "exacerbations" but commonly known as asthma attacks, can often lead to an emergency room visit, hospitalization, or, in some cases, death.

The Phase 3 clinical study, which included more than 3,000 asthma patients from 295 sites throughout the U.S., Europe, and South America, was designed to evaluate the safety and efficacy of a combination of albuterol and budesonide, as a treatment for patients with modest to severe asthma. The patients, the study concluded, not only improved their lung function; they suffered fewer attacks.

Scientists found that albuterol with the higher dose of budesonide reduced the risk of an asthma attack by 27 percent in the short term and reduced asthma attacks by 24 percent annually. This combination also reduced use of corticosteroids, which can have adverse side effects, by 33 percent.

"With this new inhaler that delivers more inhaled steroids every time patients take the rescue therapy, they're getting more at a time when they're having a flare-up and when they need it," said Panettieri, director of the Rutgers Institute for Translational Medicine and Science. "We showed that, beyond decreasing their exacerbations, it decreased their need for oral steroids after a flare-up."

A blood test to help doctors diagnose tuberculosis and monitor treatment outcomes

Researchers at Tulane University School of Medicine have developed a new highly sensitive blood test for tuberculosis (TB) that screens for DNA fragments of the Mycobacterium tuberculosis bacteria that causes the deadly disease.

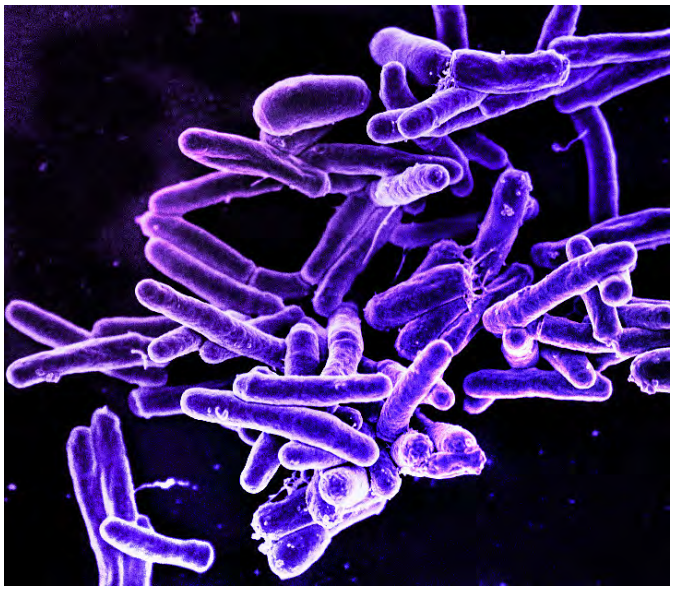
The test could give doctors a new tool to both quickly identify TB and then gauge whether drug treatments are effective by monitoring levels of DNA from the pathogen circulating through the bloodstream, according to a new study published in the journal The Lancet Microbe.

Tuberculosis is now the second most deadly infectious disease in the world, behind only COVID-19. In 2020, an estimated 10 million people contracted TB and 1.5 million people died from it, according to the World Health Organization.

"This assay may be a game-changer for TB diagnoses that not only provides accurate diagnosis results but also has the potential to predict disease progression and monitor treatment," Hu said. "This will help doctors rapidly intervene in treatment and reduce the risk of death, especially for children living with HIV," said lead study author Tony Hu from Tulane University.

The study evaluated a CRISPR-based assay that screened for cell-free DNA from live Mycobacterium tuberculosis bacilli. The screening target is released into the bloodstream and cleared quite rapidly, providing a real-time snapshot of active infection. Researchers tested preserved blood samples from 73 adults and children with presumptive TB and their asymptomatic household contacts in Eswatini, Africa.

Researchers also tested 153 blood samples from a cohort of hospitalized children in Kenya. These were HIV-positive patients who were at high risk for TB and presented with at least one symptom of the disease. The new test picked up all 13 confirmed TB cases and almost 85% of unconfirmed cases, which were cases



that were diagnosed due to clinical symptoms and not existing gold standard testing methods.The CRISPR-based test uses a small blood sample and can deliver results within two hours.

"We are particularly excited that the level of Mycobacterium tuberculosis cell-free DNA in HIV-infected children began to decline within a month of treatment, and most of the children's blood was cleared of the bacteria DNA fragments after treatment, which means that CRISPR-TB has the potential to monitor treatment and will give physicians the ability to better treat worldwide TB infections," Hu said.

The researchers have since adapted the assay to a rapid test platform that can deliver results in 30 minutes without any special equipment. Results would be viewable on a paper strip like a rapid COVID-19 test. "A highly accurate, rapid blood test that could be used anywhere would benefit millions of people living in resource-limited areas with a high TB burden," Hu said.