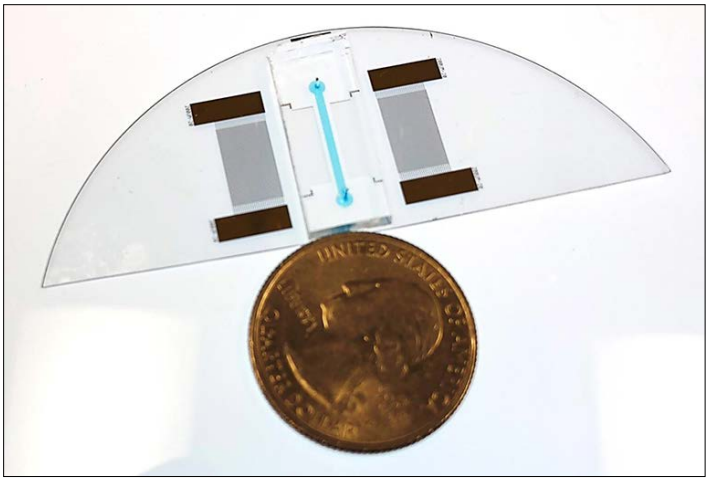
New Ultrasound Device Promptly Diagnosis Sickle Cell Disease

Researchers at the University of Colorado have developed a new rapid test for sickle cell disease. Their tiny device can provide result in one minute. The technology uses ultrasound to heat a protein sample and then measures how it dissolves over time to identify the protein responsible for sickle cell disease. It is relatively inexpensive and requires only a simple camera, a power source, and a microscope.



"Almost all life activities involve proteins," said Xiaoyun Ding, another researcher involved in the study. "We thought if we could measure the protein thermal stability change, we could detect diseases that affect protein stability." One way to analyze proteins in a sample disease is to heat a sample and measure protein solubility over time using a technique called a Thermal Shift Assay (TSA). However, the assay can take a whole day to run and requires expensive equipment. "The traditional methods for thermal profiling require specialized equipment such as calorimeters, polymerase chain reaction machines and plate readers that require at least some technical expertise to operate," said Kerri Ball, a researcher involved in the project.

Immunotherapy for Lung Cancer

A newly approved drug for lung cancer, improves patient survival, a new study confirms. The immunotherapy drug Tecentriq (atezolizumab) was approved by the USFDA to treat patients with newly diagnosed non-small cell lung cancers (NSCLC).

Tecentriq targets a protein known as PD-L1 that lies on the surface of tumor cells. Normally, this protein signals the body's immune system T cells not to attack. However, by targeting PD-L1, Tecentriq unleashes the body's natural T cells to target and destroy these cancer cells, researchers at Yale Cancer Center explained. Tecentriq "has already shown excellent activity in patients who progress on frontline chemotherapy, but this study confirmed that the drug is active in selected patients who have not yet received any treatment for lung cancer," said medical oncologist Dr. Nagashree Seetharamu, Northwell Health Cancer Institute in Lake Success, N.Y.

The results of a new study were published in the *New England Journal of Medicine*. The study included 554 patients with stage 4 metastatic NSCLC tumors. All patients had tumors lacking mutations in the EGFR or ALK genes. Among 205 patients whose tumors had a high cellular expression of PD-L1, the median overall survival was 20 months for those who received Tecentriq versus 13 months for those who received standard platinum-based chemotherapy. Median progression-free survival was eight months for patients who received Tecentriq versus five months for those on standard chemotherapy, the researchers found. "Among the patients with NSCLC, those with high tumor mutational burden who received [Tecentriq] showed improved progression-free survival of seven months versus four months for those given chemotherapy.

Sleep Apnea Aid Eases Heart Problems in People with Prediabetes

A new study has found that continuous positive airway pressure (CPAP) treatment at night can lower daytime resting heart rates in patients with prediabetes who have obstructive sleep apnea, reducing their risk of cardiovascular disease. The study, published in the *Journal of the American Heart Association*, was conducted by Esra Tasali, MD, Director of the Sleep Research Center at the University of Chicago Medicine, and Sushmita Pamidi, MD, a sleep physician-scientist at McGill University in Montreal.

This randomized controlled trial studied people with pre-diabetes. Those who used CPAP treatment for two weeks had a drop in their resting heart rate by four to five beats per minute, compared to those who received a placebo. With optimal CPAP treatment, their heart rates were not only lower at night, but also during the day. Tasali said that a drop of even one beat per minute in resting heart rate can lower the mortality rate and future risk of developing cardiovascular disease. "A four- to five-beat-per-minute drop in heart rate that we observed is comparable to what one would get from regular exercise," she added. "Our breakthrough finding is the carryover of the lowered resting heart rate into the daytime and the cardiovascular benefit of that." "Our recent findings urge people who have pre-diabetes, diabetes, or sleeping problems to be screened for sleep apnea," Pamidi said.

Catheter Ablation in AF Reduces Dementia Risk in Patients

Researchers have shown that a procedure to restore normal heart rhythm is more effective than medications in reducing de- mentia risk in people with atrial fibrillation (AF).

For this study, researchers analyzed data on patients in South Korea who were diagnosed with AF between 2005 and 2015, including more than 9,100 who had catheter ablation and nearly 18,000 who were treated with medications.

During a 12-year follow-up, catheter ablation reduced the incidence of dementia by 27% compared to medication, according to findings published in the *European Heart Journal*. "The proportion of people who developed dementia during the follow-up period was 6% in the ablation group and 9% in the medical therapy group," said study leader Dr. Boyoung Joung, a professor of car- diology and internal medicine at Yonsei University in Seoul. "This suggests that three people per 100 of the atrial fibrillation population avoid dementia if they undergo catheter ablation, and 34 patients would need to be treated to prevent one case of de- mentia during the follow-up period," he added. When researchers focused on specific types of dementia, they found that abla- tion was associated with a 23% lower incidence of Alzheimer's compared to medications and a 50% decrease in vascular dementia

New Artificial Intelligence Diagnostic can Predict COVID-19

A group of researchers have developed an artificial intelligence (AI) that accurately predicts COVID-19 infection from standard blood tests. The AI solution has the potential to increase testing capacity and spot potential outbreaks before they develop. The results of this study were published in the journal *In- ternational Immunopharmacology*.

A team of researchers from the universities of Brighton, Bristol, Glasgow, Lincoln, Sheffield, and

Oxford have developed diagnostic by the multi-institution research team Modeling and Prediction Pandemics (MaPP). The research could help to address the early prediction of outbreaks and the availability and speed of testing, which are two key challenges to combating a pandemic. The team made use of anonymized patient data from a hospital in Sao Paulo and found they were able to accurately predict who had the virus, due to decreased levels of platelets and types of white blood cells. Dr. Bart Vorselaars, Senior Lecturer and Program Leader in Maths and Computer Science in the School of Maths and Physics at the University of Lincoln, is one of the leading developers in the team said: "Using the AI prediction from standard blood test data provides several benefits including increased test capacity, lower costs and results that are both quicker and less susceptible to virus mutations than current RT-PCR tests. Because of this, it could help to spot outbreaks before they develop."

New Procedure May End Insulin for Type 2 Diabetes

A small study suggests that a new procedure that treats part of the intestine just beyond the stomach may allow people with type 2 diabetes to safely stop taking insulin. The procedure which resurfaces the duodenum was combined with GLP-1 receptor and counseling on lifestyle factors, such as nutrition and physical activity. Six months after treatments began; three-quarters of participants taking insulin no longer needed it. The amount of fat stored in their livers dropped from 8% to less than 5%.

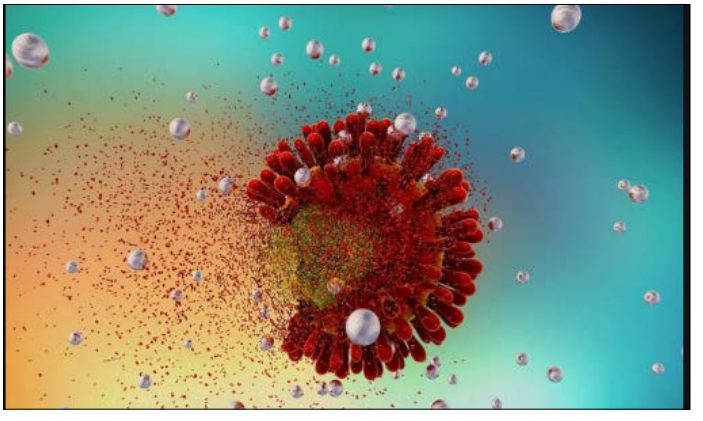
"The duodenum harbors a broad potential for the treatment of type 2 diabetes and this combination treatment could be a game-changing approach in the treatment of type 2 diabetes and the metabolic syndrome," said lead researcher Dr. Suzanne Meiring, of Amsterdam University Medical Center in the Netherlands. The preliminary study included 16 patients, all of whom underwent Duodenal Mucosal Resurfacing (DMR).

In DMR, the endoscope is guided to the duodenum, where doctors then resurface or ablate, it's lining. Meiring said it's not yet clear why the procedure works. "We think the effects result from a combination of changes that occur when the duodenal mucosa is ablated and rejuvenated," she said. "We think that changes in hormonal signaling, including GLP-1, bile acid compositions, and the microbiome play an important role." The 16 participants had type 2 diabetes for an average of 11 years. On average, they had been on insulin for just under three years. None had taken a GLP-1 receptor agonist before the study.

At the outset, their average A1C levels were under 8%. After 12 months, the average fell to 6.7%. After the DMR procedure, patients were given a specific diet for two weeks. After that, they began taking the GLP-1 receptor agonist medication. Meiring said researchers added the drug because it also targets the duodenum. In this study, 75% of those taking insulin were able to stop. Participants who weren't insulin-free after 12 months needed only about half the insulin they required before the procedure. Their average body mass index (BMI) dropped from just under 30 to a near-normal 25.5 after 12 months. The researchers said there were no serious procedure-related side effects.

New Blood Test Predicts Which COVID-19 Patients are at Severe Risk

Scientists have developed a score that can accurately predict which patients will develop a severe form of COVID-19. The study, led by researchers at RCSI University of Medicine and Health Sciences, has been published in *EBioMedicine.*



The measurement, called the Dublin-Boston score, is designed to enable clinicians to make more informed decisions when identifying patients who may benefit from therapies, such as steroids, and admission to intensive care units.

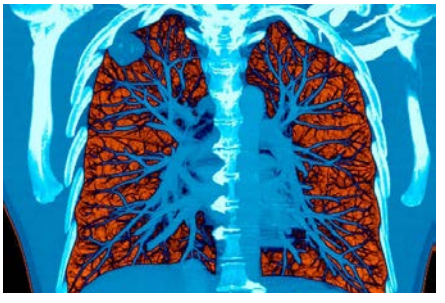
Until this study, no COVID-19 specific prognostic scores were available to guide clinical decision-

making. The Dublin-Boston score can now accurately predict how severe the infection will be on day seven after measuring the patient's blood for the first four days. The blood test works by measuring the levels of two molecules that send messages to the body's immune system and control inflammation. One of these molecules, interleukin (IL)-6, is pro-inflammatory, and IL-10, is anti-inflammatory. The levels of both are altered in severe COVID-19 patients. Based on the changes in the ratio of these two molecules over time, the researchers developed a point system where each 1-point increase was associated with 5.6 times increased odds for a more severe outcome.

"The Dublin-Boston score is easily calculated and can be applied to all hospitalized COVID-19 patients," said RCSI Professor of Medicine Gerry McElvaney, the study's senior author and a consultant in Beaumont Hospital. "More informed prognosis could help determine when to escalate or de-escalate care. The score may also have a role in evaluating whether new therapies designed to decrease inflammation in COVID-19 actually provide benefit." The Dublin-Boston score uses the ratio of IL-6 to IL-10 because it significantly outperformed measuring the change in IL-6 alone.

AI Analysis can Improve Lung Cancer Detection on Chest Radiographs

A new study has found that an artificial intelligence (AI) algorithm trained to detect pulmonary nodules can improve lung cancer detection on chest radiographs. Conducted by MGH and a South Korean medical AI company Lunit, the study evaluated 5,485 chest radiographs collected from participants in the National Lung Screening Trial (NLST) with an AI software called Lunit INSIGHT CXR that diagnoses chest X-rays. The AI solution is designed to deliver location information of detected lesions in the form of heatmaps and abnormality scores, indicating the probability that the detected lesion is abnormal. It also generates an AI 'case report', summarising the



analysis result by each finding. The study reported 94% sensitivity and 83% specificity for the AI algorithm in detecting malignant pulmonary nodules. MGH attending thoracic radiologist and the senior author of the study Subba Digumarthy said, "Low-dose CT is recommended for lung cancer screening because the detection of chest radiographs is challenging for radiologists due to its projectional nature of radiography. This study shows that AI can provide diagnostic value to more patients by supplementing the shortcomings and maintaining the advantages of X-ray diagnosis."

New Therapy Improves MS Treatment

Researchers at the Pritzker School of Molecular Engineering (PME) at the University of Chicago have designed a new therapy for multiple sclerosis (MS) by fusing a cytokine to a blood protein. In mice, this combination prevented destructive immune cells from infiltrating the central nervous system and decreased the number of cells that play a role in MS development, leading to fewer symptoms and even disease prevention. Their results have been published in the journal *Nature Biomedical Engineering*."The exciting result is that we can suppress MS symptoms

in a way that is more effective than current treatments," said Jeffrey Hubbell, Eugene Bell Professor in Tissue Engineering and co-author of the paper.

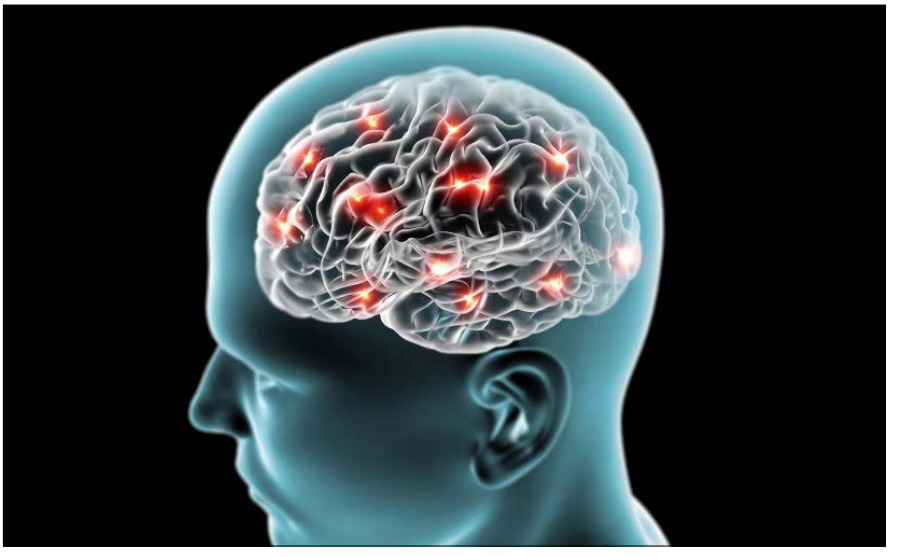
In patients with MS, autoreactive immune cells infiltrate the central nervous system and cause damage. Recent studies have shown that Th17 cells, immune cells that are activated in the body's secondary lymphoid organs, migrate to the brain and play a role in the severity of the disease. Several drugs to treat MS work by sequestering these cells in the lymph nodes and preventing them from targeting tissue, but these drugs can have adverse side effects.

Interleukin-4 (IL-4) suppresses the genes that cause MS and has been found to suppress the reactivation of Th17 cells. To use it as a potential therapy, researchers

needed to find a way to keep the IL-4 in the secondary lymphoid organs to ensure that Th17 cells were suppressed and did not migrate. To do this, they bound IL-4 to a blood protein and injected it into mice that had experimental autoimmune encephalomyelitis (the mouse model of MS) and found that it caused the IL-4 to stay within the secondary lymphoid organs. The result was reduced infiltration of Th17 cells into the spinal cord. That suppressed the disease and resulted in fewer symptoms.

Researchers also found that the therapy even prevented MS from developing in the majority of mice they treated with it. "This treatment could potentially be self-administered by MS patients at home with an injector pen," Hubbell said. "We think this is imminently translatable and could lead to a better quality of life, with fewer symptoms, for those with the disease."

New Device Detects Traumatic Brain Injury 'On the Spot'



A method for detecting traumatic brain injury at the point of care has been developed by scientists at the University of Birmingham. Using chemical biomarkers released by the brain immediately after a head injury occurs, researchers can pinpoint when patients need urgent medical attention. This saves time in delivering vital treatment and avoids patients undergoing unnecessary tests where no injury has occurred.

The technique was developed by a team of researchers in the group of Advanced Nanomaterials, Structures, and Applications (ANMSA) led by Dr. Goldberg Oppenheimer at the University of Birmingham. The method works using a spectroscopic technique called surface-enhanced Raman scattering, in which a beam of light is fired at the biomarker. The biomarker, taken from a pinprick blood sample, is prepared by being inserted into a special optofluidic chip, where the blood plasma is separated and flows over a highly specialized surface. The light causes the biomarker to vibrate or rotate and this movement can be measured, giving an accurate indication of the level of injury that has occurred. To produce the level of accuracy required, the test needs to be extremely sensitive, rapid, and specific and this is where the Biomedical Engineering expertise at the ANMSA group at the University of Birmingham comes to the fore. The key to sensitivity is in the way the biomarkers interact with the surface. The team developed a low-cost platform, made from polymer and covered with a thin film of gold. This structure is then subjected to a strong electric field, which redistributes the film into a distinctive pattern, optimized to resonate in exactly the right way with the light beam. Dr. Pola Goldberg Oppenheimer, the lead researcher on the study, explains, "This is a relatively straightforward and quick technique that offers a low-cost, but highly accurate way of assessing traumatic brain injury which up until now has not been possible."

Their research was published in *Nature Biomedical Engineering*. In the study, 48 patients were assessed using the engineered device, with 139 samples taken from patients with TBI and 82 from a control group. The study showed that in the TBI group, the levels of the biomarker were around five times higher than in samples taken from the control group. The team also found the levels tailed off rapidly around one hour after the injury occurred, further highlighting the need for rapid detection.

Rapid Screening and Early Diagnosis of Diabetic Retinopathy

Researchers led by Prof. XU Guowang from the Dalian Institute of Chemical Physics (DICP) of the Chinese Academy of Sciences and their collaborators found that 12-hydroxy arachidonic acid (12-HETE) and 2-piperidone are suitable for the diagnosis of diabetic retinopathy (DR), particularly for the early screening of DR. Their study was published in Advanced Science.

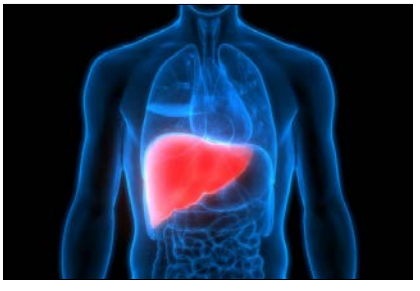
The scientists used multiplatform metabolomics methods to analyze the serum samples from 905 participants, to provide comprehensive insights into the abnormal metabolic characteristic and disordered metabolic pathways involved in the onset and development of DR. Through multivariate/univariate statistical analysis, a novel marker panel consisting of 12-HETE and 2-piperidone was discovered and validated by a two-step strategy. And the panel was able to perform rapid and accurate diagnosis of DR in vitro, showing high diagnostic performance with a sensitivity of 80.5—89.4%, specificity of 91.9—93.3%, and area under the receiver operating characteristic curve (AUC) of 0.928—0.946. Moreover, the marker panel also showed advantages in the early diagnosis of DR, with a sensitivity of 81.6—92.9%, specificity of 90.1—93.3%, and AUC of 0.925—0.958.

This study provides a reliable, efficient, and convenient new method for the detection of DR with a small amount of serum.

International Studies Identify Risk Factors Linked to Alcohol-Related Cirrhosis

Researchers from six countries, including Professor Sir Munir Pirmohamed and Dr. Andrew Thompson from the University of Liverpool, conducted two studies recruiting patients diagnosed with alcohol-related cirrhosis and compared to individuals with a similar drinking history but no evidence of liver damage.

The first study looked at risk factors such as drinking patterns, preferred type of alcoholic drink, and other non-alcohol lifestyle choices that are associated with cirrhosis. The findings showed that diabetes and increased BMI as a young adult were more common in patients with cirrhosis. There was also evidence that people without liver damage were more likely to have been wine drinkers, coffee drinkers, smokers, and cannabis users.



The second study used a genome-wide association study (GWAS) to pinpoint the genes responsible for increasing the risk of cirrhosis. This method searches a person's DNA (genome) for small variations, called single nucleotide polymorphisms (SNPs). Each person carries many millions of SNPs, but if a particular SNP occurs more frequently in people with a particular condition than in people without the condition, it can suggest the underlying reason for the difference. The findings from both studies were found to be consistent in a second cohort from the UK Biobank, helping to confirm the validity of the results.

Professor Sir Munir Pirmohamed, said, "These genetic and non-genetic risk factors provide new knowledge into why some people might be vulnerable to cirrhosis." Dr. Andrew Thompson, said, "Improving our understanding of the factors leading to alcohol-related liver cirrhosis presents new opportunities for risk stratification and developing treatment options."

Arm Squeezes with Blood Pressure Cuffs can Potentially Aid in Post – Stroke Recovery

After administering clot-busting drugs to treat a stroke, using blood pressure cuffs to squeeze each arm might aid recovery, a new, small Chinese study suggests. In the technique called remote ischemic post-conditioning, the flow of oxygen-rich blood is repeatedly interrupted and restored using blood pressure cuffs on the arms. The findings were published in the journal *Neurology*.

"The findings show a promising prospect of remote ischemic post-conditioning and have important clini-

cal implications," said researcher Dr. Guo-liang Li, of First Affiliated Hospital of Xi'an and Jiaotong University in Xi'an, China. The therapy is non-invasive, easy-to-use, cost-effective, and safe. Even though clot-busting drugs have saved many stroke patients, 32% do not have a favorable outcome. This is partly because blood flow is not completely restored and vessels can clot even after clot-busting drugs are given. Remote ischemic post-conditioning can be a complementary treatment that can improve the prognosis in stroke patients," he said.

Li's team randomly assigned 68 people (average age: 65) who suffered a stroke. All were treated within 4.5 hours with a medication that dissolves blood clots called tPA. Half also received ischemic post-conditioning therapy. Over an average of 11 days, post-conditioning participants wore blood pressure cuffs on both arms for 40 minutes, alternating cycles of inflation for five minutes and deflation for three minutes. Treatments were done twice a day. Seventy-two percent of those who wore the blood pressure cuff had a favorable recovery, compared with 50% of those who didn't, the researchers found. These findings remained significant even after taking into account age, stroke severity, and other factors.

Dr. Larry Goldstein, chairman of the Department of Neurology at the University of Kentucky, reviewed the findings and said the discomfort might be tolerated if it aids in stroke recovery.

Scientists Design a Novel Testing Platform for Breast Cancer Cells

A Purdue University team has developed a novel testing platform to evaluate how breast cancer cells respond to the recurrent stretching that occurs in the lungs during breathing. The technology is designed to better understand the effects that the local tissue has on metastatic breast cancer to study how metastases grow in new tissue.

"One of the key features of breast cancer is that most patients survive if the disease stays local, but there is a greater than 70% drop in survival if the cells have metastasized," said Luis Solorio, a Purdue assistant professor of engineering, who co-led the research team. The Purdue researchers created a magnetically moving cell culturing system where the cancer cells can be grown in 3-D on a suspended extracellular matrix protein that is abundant in early metastatic lung tissue to evaluate the impact of mechanical forces. They were able to incorporate the strain amplitude and rate of breathing in this tissue mimic. The researchers found that the cells quit dividing under these conditions. The research has been published in *Advanced Functional Materials.*

"Never before has the concept of motion been interrogated as a component of the tumor microenvironment," said Michael Wendt, a Purdue associate professor of medicinal chemistry and molecular pharmacology. "The development of this microactuator system will not only continue to yield increased biological understanding, of metastasis, but it will also serve as a platform for us to better evaluate pharmacological inhibitors of the most lethal aspect of cancer progression."

Hyowon "Hugh" Lee, an associate professor of engineering and a researcher at the Birck Nanotechnology Center, co-led the research team said, "This is the first attempt to engineer a cell culture system that can apply mechanical forces on a suspended tissue." "Our system better mimics the physiological environment without using artificial substrates. Using this platform, we show that certain cancer cells slow down their proliferation due to the cyclic stretching of breathing," he added.

Study Links People Having Rheumatoid Arthritis are at 23% Increased Risk of Developing Diabetes

A new study showed that rheumatoid arthritis (RA) is associated with a 23% increased risk of type 2 diabetes (T2D), and may indicate that both diseases are linked to the body's inflammatory response. The research was conducted by Zixing Tian and Dr. Adrian Heald, University of Manchester, UK, and colleagues.

Inflammation has emerged as a key factor in the onset and progression of T2D, and RA is an autoimmune and inflammatory disease. The team suggests that the systemic inflammation associated with RA might therefore contribute to the risk of individuals developing diabetes in the future.

The team conducted a comprehensive search of a range of medical and scientific databases up to 10 March 2020, for cohort studies comparing the incidence of T2D among people with RA to the diabetes risk within the general population.

Statistical analyses were performed to calculate the relative risks, as well as to test for possible publication bias. The eligible studies identified comprised a total of 1,629,854 participants. The authors found that having RA was associated with a 23% higher chance of developing T2D, compared to the diabetes risk within the general population. They concluded, "This finding supports the notion that inflammatory pathways are involved in the pathogenesis of diabetes."

Novel Dual CAR T Cell Immunotherapy Holds Promise for Targeting HIV

A recent study led by researchers James Riley, Ph.D., a professor of Microbiology at the Perelman School of Medicine at the University of Pennsylvania, and Todd Allen, Ph.D., a professor of Medicine at Harvard Medical School and Group Leader at the Ragon Institute of MGH, MIT, and Harvard, describes a new Dual CAR T cell immunotherapy that can help fight HIV infection. Their study has been published in *Nature Medicine.*

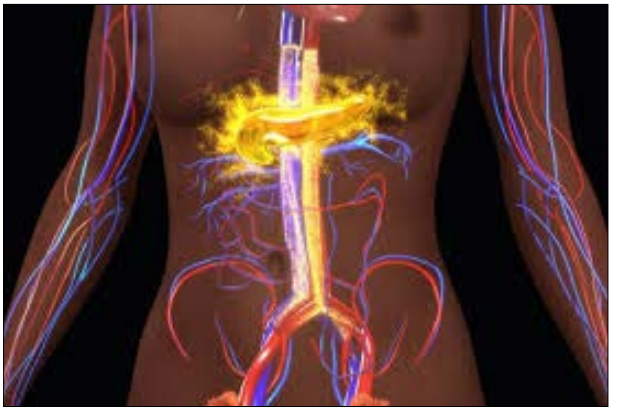
CAR T cells are currently used in cancer treatments. These CARs re-program the T cells to recognize and eliminate specific diseased or infected cells, such as cancer cells or, potentially, HIV-infected cells. Allen's and Riley's research groups worked together to design a new HIV-specific CAR T cell. They needed to design a CAR T cell that would be able to target and quickly eliminate HIV-infected cells, survive and reproduce once in the body, and resist infection by HIV itself since HIV's primary target is these very same T cells.

"By using a stepwise approach to solve each issue as it arose, we developed protected Dual CAR T cells, which provided a strong, long-lasting response against HIV-infection while being resistant to the virus itself," Allen said. This Dual CAR T cell, a new type of CAR T cell, was made by engineering two CARs into a single T cell. Each CAR had a CD4 protein that allowed it to target HIV-infected cells and a co-stimulatory domain, which signaled the CAR T cell to increase its immune functions. The first CAR contained the 4-1BB co-stimulatory domain, which stimulates cell proliferation and persistence, while the second has the CD28 co-stimulatory domain, which increases its ability to kill infected cells. Since HIV frequently infects T cells, they also added in a protein called C34-CXCR4, developed in the lab of James Hoxie, MD, a professor of Hematology-Oncology at Penn. C34-CXCR4 prevents HIV from attaching to and then infecting the cell. The final CAR T cell was long-lived, replicated in response to HIV infection, killed infected cells ef-

fectively, and was partially resistant to HIV infection. When the protected Dual CAR T cells were given to HIV-infected mice, the team saw slower HIV replication and fewer HIV infected cells than in untreated animals. They also saw reduced amounts of virus and preservation of CD4+ T cells, HIV's preferred target, in the blood of these animals. Also, when they combined Dual CAR T cells with ART in HIV-infected mice, the virus was suppressed faster, which led to a smaller viral reservoir than in mice who were only treated with ART. "The ability of these protected Dual CAR T cells to reduce the HIV burden in a variety of tissues and cell types, including long-lived memory CD4+ T cells, supports the approach of using CAR T cell therapy as a new tool to target the HIV reservoir towards a functional cure for HIV," said Allen.

Researchers Halt Type 1 Diabetes Onset by Denervating the Pancreas

A study, researchers at La Jolla Institute for Immunology (LJI) show that report that the nervous system may be driving beta-cell die-off. Their findings have been published in *Science Advances*. The findings in a mouse model suggest that blocking nerve signals to the pancreas could stop patients from ever developing type 1 diabetes. The Matthias von Herrath, MD, Study Senior Author and Professor, La Jolla Institute for Immunology Lab has been working to uncover the cause of type 1 diabetes. Although there are environmental and genetic risk factors for the disease, type 1 diabetes often seemingly strikes at random.



Over the years, researchers have sought an explanation for the observed patchy pattern of cell death. One theory has been that these patches have differences in blood flow or they have been damaged by a virus that might be sparking an immune attack. But recently, researchers are investigating about neuroimmunology. To test this theory, the researchers used a mouse model that can be experimentally induced to have beta-cell death. They "denervated" the mice to block most of the sympathetic nerve signals to the pancreas. The researchers then used imaging techniques to track the pattern of beta-cell death in living mice. The team found that blocking the nerve signals protected mice from beta-cell death, compared with no effect in mice given no treatment and mice given only beta-blockers. Without innervation, it was like the pancreas had gone dark and immune cells were unable to find their target. "We were pretty surprised to see that these nerve blockers led to pretty significant differences in the onset of diabetes," says study first author Gustaf Christoffersson, Ph.D., a former LJI postdoctoral researcher now at the University Uppsala, Sweden.

The discovery might explain much more than the patchiness seen in type 1 diabetes.