Study reveals optimism reduces stroke severity, inflammation

STROKE survivors with high levels of optimism had lower inflammation levels, reduced stroke severity and less physical disability after three months as compared to those who are less optimistic, says a recent study. The preliminary research was published in the journal of NIH/National Institute of Neurological Disorders and Stroke. In a small study of 49 stroke survivors, researchers examined the relationship between optimism, inflammation, stroke severity and physical disability for three months after a stroke. Researchers said that understanding how these elements relate to or impact one another may provide a scientific framework to develop new strategies for stroke recovery.

"Our results suggest that optimistic people have a better disease outcome, thus boosting morale may be an ideal way to improve mental health and recovery after a stroke," said Yun-Ju Lai, PhD, MS, RN, the study's first author and a postdoctoral fellow in the neurology department at The University of Texas Health Science Center at Houston.

Post-stroke inflammation is detrimental to the brain and impairs recovery. Optimism has been associated with lower inflammation levels and improved health outcomes among people with medical conditions, however, no prior studies assessed if this association exists among stroke patients. This pilot study is a secondary analysis of data collected from a repository of neurological diseases. Outcomes included optimism levels from the revised Life Orientation Test, a standard psychological tool for measuring optimism; stroke severity evaluation through the

National Institutes of Health Stroke Scale, and levels of inflammatory markers--interleukin-6 (IL-6), tumour necrosis factor-alpha (TNFa) and C-reactive protein (CRP).

As optimism levels increased, stroke severity and the inflammatory markers IL-6 and CRP decreased even after considering other possible variables. However, this was not true of TNFa.

"Patients and their families should know the importance of a positive environment that could benefit the patient," Lai said. "Mental health does affect recovery after a stroke." "Although immigrant men also face many of these settlement problems, they were not at elevated risk of distress compared to their Canadian-born peers," says co-author Karen Kobayashi, Professor in the Department of Sociology and a Research Affiliate at the Institute on Aging & Lifelong Health at the University of Victoria.

"One idea we hope to explore in future research is whether these gender differences could be due to the fact that the husbands initiated the immigration process and the wives may have had limited or no say in the decision to leave their homeland." The study team analySed data from the Canadian Longitudinal Study on Ageing which included 25,834 men and women aged 45-85 years. The article was published this month in the Journal of Affective Disorders.

"The team's findings suggest that policies and health care practices should aim to reduce nutrition risk, improve diet quality, address chronic pain and health problems and poverty among those experiencing poor mental health," adds Dr Davison. "Given that mental health conditions place a large burden of disability worldwide, such program & policy changes are becoming critically important."

Stressing too much can affect your thinking process

RESEARCHERS after a new study have found out that stress can impact aspects of the thinking process of humans including problem-solving. The study was conducted by the researchers of the University of Missouri School Of Medicine and the MU Thompson Center for Autism and Neuro developmental Disorders and has been published in the journal - NeuroImage. Researchers discovered a potential indicator of how stress affects the brain and alters its ability to solve the problem. These findings could ultimately help in understanding and optimizing the treatment for patients suffering from stress-related illnesses.

The results come from two companion studies involving 45 healthy college-age individuals who were genetically tested for the presence of at least one copy of a variation in the serotonin transporter gene (SERT), which is associated with greater susceptibility to stress. Participants for the study were given a series of tests while being monitored by magnetic resonance imaging (MRI). The first test involved verbal processing tasks where participants were asked in two sessions (stress and no-stress control) how many items from a category they could name in a minute. Researchers found that stress did not impact overall performance for either gender or gene group, but effects of stress on performance did relate to changes in the brain's overall functional connectivity in all participants, suggesting the brain could provide a biomarker for the effects of stress on cog-

nition. "This may begin to help us understand what is going on in the brain when stress is affecting cognition. If we can develop an intervention that affects the brain's networks, we may be able to mitigate the cognitively impairing effects of stress," said the lead researcher David Beversdorf. In an alternative study, the same participants completed problem-solving tasks in two sessions (stress and no-stress control) during MRI testing. Researchers discovered changes to the connections involving a section of the brain called the middle temporal gyrus related to changes in performance during stress in participants. This relationship depended on the presence or absence of the stress-related variant of the SERT gene, indicating a potential specific brain marker associated with susceptibility to stress during problem-solving.

"When you look at the relationship of the imaging changes in the brain and the performance changes resulting from stress, the left middle temporal gyrus appears to be a critical hub, and this relationship depends on an individual's genetic susceptibility to stress," said Beversdorf. "The next step is to look at this in specific patient populations. Is this effect greater in PTSD populations or test anxiety patients? And if we can understand how to mitigate those effects, it could be very helpful to these patients," he added.

Researchers suggest stronger behavioural monitoring for teens with ADHD background

ADOLESCENTS with a history of attention-deficit/hyperactivity disorder (ADHD) are prone to varied concerns, including adverse mental-health condition, sexually-transmitted infections (STIs), and car accidents. The team of researchers from Children's Hospital of Philadelphia (CHOP) found that most of the primary care doctors usually discussed depression, substance abuse, and suicide risk with patients who have a history of ADHD but hardly about safe driving or risky sexual behaviour. The finding which was published in the Journal of Developmental and Behavioral Pediatrics represents the first study to examine the clinical practices of primary care clinicians as children with ADHD advance through adolescence.

Those teens diagnosed before age 10 are at an increased risk for a variety of behavioural and medical concerns throughout adolescence. Yet of the 262 patients with a history of ADHD studied, the CHOP team found driving readiness was discussed in only two instances, and sexual health risks were discussed with only 47% of youth.

"These findings identify opportunities to improve the care of adolescents with a history of ADHD," said Thomas Power, PhD, ABPP, senior author and Director of the Center for Management of ADHD at CHOP. "Although doctors do a good job screening for many behavioural health risks, like suicide risk and depression, we need to be more aware of the dangers associated with driving and sexual health.

Citing a previous example from the study, Thomas Power, PhD, ABPP, senior author and Director of the Center for Management of ADHD at CHOP said: "teens with ADHD are more likely to be involved in a car accident particularly in the first month after receiving their driver's license, so this is definitely an issue that should be discussed with our patients."

Medication abuse, specifically the unlawful sharing of medication among youth, is another major area of concern for adolescent patients on medication for ADHD, yet the study found doctors rarely discussed this risk with these patients.

Scientists tweak cellular process to speed up ALS treatment

A new study has popped up in the field of medicine which attempts to explore the potential of a certain cellular process - known as endocytosis - to pave the way towards a revolutionary treatment approach that could counter the debilitating amyotrophic lateral sclerosis (ALS) disease. The unexpected findings have come to the horizons thanks to a study by researchers from the University of Arizona. ALS is the progressive degeneration of motor neurons that causes people to lose the ability to move and eventually speak, eat and breathe.

Within the neuronal cells of patients with ALS and other neurodegenerative diseases, two proteins TDP-43 and FUS are often found in bundles of molecular junk called aggregates, which can accumulate to deadly levels.

"It's not clear yet if TDP-43 aggregates themselves are truly toxic or a sign that things have gotten really bad in a cell, and this is its last Hail Mary trying to keep things in order," said Ross Buchan, assistant professor of molecular and cellular biology and a member of the BIO5 Institute.

Buchan and his team set out to investigate how healthy cells clear harmful aggregates from the cell.

What they found was that the aggregates were being removed via endocytosis, which was surprising for two reasons. First, the textbook definition of endocytosis is a process in which proteins, nutrients and chemical signals from outside the cell are

brought inside to be degraded and recycled by the lysosome.

But in this case, endocytosis was working on aggregates that were already inside the cell. And second, there's already a mechanism, called autophagy, in place for recycling junk that originated from within a cell, yet endocytosis was doing what autophagy should have been doing instead.

"Autophagy and also likely, although it's still uncertain, endocytosis often slows as we age, and there are genes that are mutated in that pathway that is associated with some neurodegenerative diseases. So people thought the reason aggregates form when we get old, or when you have these diseases, is because that pathway isn't working very well," said Buchan. Additionally, the accumulation of aggregates slows the endocytosis pathway further, creating a negative feedback loop within the cell.

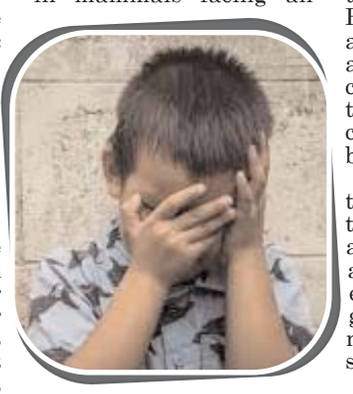
"If we genetically or chemically impede the pathway, then the TDP-43 protein accumulates and becomes super toxic. The cool thing, as far as a therapy for ALS is concerned, is that we can also do the reverse," Buchan said. "We can make the endocytosis pathway work better by over-expressing parts of it, like putting the gas pedal down so it goes really fast. When we do that, then the TDP-43 aggregates are cleared really efficiently and it's no longer toxic."

Many of the paper's experiments were performed in yeast cells, but the general findings are likely translatable to human cells based on initial findings.

"If I were to pull a textbook off the self, it would say endocytosis is for things that are outside the cell, not inside, so it's still pretty heretical," he said.

Stress in children separated from their parents may leave long-term genetic impacts

INCREASED levels of the stress hormone-cortisol, in young kids who are separated from their parents, especially their mothers, could have a long-term genetic impact on future generations. In a commentary published by the Journal of the Royal Society of Medicine, experts in the emotional needs of small children say that several studies show that small children cared for outside the home, especially in poor quality care and for 30 or more hours per week, have higher levels of cortisol than children at home. Professor Sir Denis Pereira Gray, Emeritus Professor of General Practice at the University of Exeter, and President of the children's charity What About the Children?, who wrote the paper with two colleagues, said: "Cortisol release is a normal response to stress in mammals facing an



emergency and is usually useful. However, sustained cortisol release over hours or days can be harmful." The authors say that raised cortisol levels are a sign of stress and that the time children spend with their parents is biologically more important than is often realised. Raised cortisol levels are associated with reduced antibody levels and changes in those parts of the brain which are associated with emotional stability.

"Environmental factors interact with genes so that genes can be altered, and once altered by adverse childhood experiences, can pass to future generations. Such epigenetic effects need urgent study", say the authors.

Sir Denis added: "Future research should explore the links between the care of small children in different settings, their cortisol levels, DNA, and behaviour."

Scientists target foot, mouth disease virus to tackle pancreatic cancer

A team of scientists are taking the help of the foot and mouth disease virus to tackle common cancer with the worst survival rate - pancreatic cancer. The research team from the Queen Mary University of London have identified a peptide, or protein fragment, taken from the foot-and-mouth-disease virus that targets another protein, called AvB6 (alpha-v-beta-6). This protein is found at high levels on the surface of the majority of pancreatic cancer cells. The study was published in Theranostics.

Working jointly with Spirogen and ADC Therapeutics, the team have used the peptide to carry a highly potent drug, called tesirine, to the pancreatic cancer cells. When mice with pancreatic cancer tumours were treated with the drug and peptide combination, the tumours were completely killed.

"Foot-and-mouth-disease virus uses AvB6 as a route to infect cattle, as the virus binds to this protein on a cow's tongue. By testing pieces of the protein in the virus that attaches to AvB6,

we've developed a route to deliver a drug specifically to pancreatic cancers," said John Marshall, lead researcher professor from the Cancer Research UK Barts Centre. The team performed tests of the peptide /tesirine combination in both cells in the laboratory and in mice. Mice that had AvB6-positive tumours were given a tiny dose of the peptide-drug combination three times a week, and this stopped the tumours growing completely. But when the dose was increased and given just twice a week, all tumours in mice that were AvB6 positive were completely killed. From the experiment, scientists were excited to offer a completely new way of treating pancreatic cancer.

Professor Marshall explained: "One advantage of targeting AvB6 is that it is very specific to cancer because most normal human tissues have little or none of this protein. So we're hopeful that, if we can develop this into an effective treatment for pancreatic cancer, it would have limited side effects."

The team now plan to further test the peptide and drug combination in more complex mice models, to determine if it can also impact on pancreatic cancer metastases, before moving to clinical trials.

Study focuses on research that reverses reproductive clock in mice

IN a breakthrough, researchers have lifted fertility rates in older female mice with small doses of a metabolic compound that reverses the ageing process in eggs, offering hope for some women struggling to conceive. The University of Queensland study found a non-invasive treatment could maintain or restore the quality and number of eggs and alleviate the biggest barrier to pregnancy for older women.

The study was published in the journal Cell Reports. A team led by UQ's Professor Hayden Homer found that the loss of egg quality through ageing was due to lower levels of a particular molecule in cells critical for generating energy.

"Quality eggs are essential for pregnancy success because they provide virtually all the building blocks required by an embryo," Prof Homer said.

"We investigated whether the reproductive ageing process could be reversed by an oral dose of a 'precursor' compound - used by cells to create the molecule."

The molecule in question is known as NAD (nicotinamide adenine dinucleotide) and the 'precursor' as NMN (nicotinamide mononucleotide). Prof Homer said fertility in mice starts to decline from around one year of age due to defects in egg quality similar to changes observed in human eggs from older women.

"We treated the mice with low doses of NMN in their drinking water over four weeks, and we were able to dramatically restore egg quality and increase live births during a breeding trial," Prof Homer said. Prof Homer said poor egg quality had become the single biggest challenge facing human fertility in developed countries.

"This is an increasing issue as more women are embarking on pregnancy later in life, and one in four Australian women who undergo IVF treatment are aged 40 or older," he said.

"IVF cannot improve egg quality, so the only alternative for older women at present is to use eggs donated by younger women."

"Our findings suggest there is an opportunity to restore egg quality and in turn female reproductive function using oral administration of NAD-boosting agents - which would be far less invasive than IVF. It is important to stress, however, that although promising, the potential benefits of these agents remains to be tested in clinical trials," added Prof Homer.

Study links genetics to cannabis dependence in adolescent females

A STUDY conducted on mice by a team of researchers have identified important implications for understanding the influence of genetics on cannabis dependence in adolescent females. The brain's endocannabinoid system regulates the activity of cannabinoids that are normally produced by the body to influence brain development and regulate mood, as well as those from external sources, such as the psychoactive ingredient THC, also known as D9-tetrahydrocannabinol, which is found in cannabis. An enzyme called fatty acid amide hydrolase (FAAH) breaks down a cannabinoid called anandamide that is naturally found in the brain and is most closely related to THC, helping to remove it from circulation.

In the study which was published in Science Advances, the researchers examined mice harbouring a human gene variant that causes FAAH to degrade more easily, increasing overall anandamide levels in the brain. From the preclinical research by Weill Cornell Medicine investigators, they discovered that the variant resulted in an overactive reward circuit in female--but not male adolescent mice--that resulted in a higher preference for THC in females.

Dr. Caitlin Burgdorf, recent doctoral graduate from the Weill Cornell Graduate School of Medical Sciences, and the lead author said: "Our study shows that a variant in the FAAH gene, which is found in about one-third of people, increases vulnerability to THC in females and has large-scale impact on brain regions and pathways responsible for processing reward."

"Our findings suggest that genetics can be a contributing factor for increased susceptibility to cannabis dependence in select populations," Caitlin added.

The result showcased that female mouse with the FAAH variant showed an increased preference for the environment in which they'd been exposed to THC over a neutral environment when they were exposed to the substance during adolescence, and the effect persisted into adulthood.

Emergency visits rise for opioid-related cases, data reveals

THE emergency departments at hospitals are being increasingly utilized by the patients for the treatment for opioid disorders, as per a new analysis. The new analysis in Annals of Emergency Medicine shows that the prevalence of patients who visited emergency departments at four Indiana hospital systems for repeat opioid-related emergencies jumped from 8.8 per cent of all opioid-related visits in 2012 to 34.1 per cent in 2017 - nearly a four-fold increase in just five years. Casey P. Balio, PhD candidate at IU Richard M. Fairbanks School of Public Health at IUPUI and lead study author said: "Emergency departments are vital partners in treatment for opioid disorders. Less frequently discussed is the value of emergency department data that can be applied to predict and prevent emergencies among at-risk patients."

"Because the ED is such an important site for care, we need to identify opportunities for treatment and support that help increase efficiency across systems of care and benefits patients," Casey added. Patients with greater numbers of previous opioid-related ED visits, previous unique number hospital systems for which they've had an ED encounter, heroin use being documented at the encounter, those insured by Medicaid or uninsured relative to privately insured were more likely to have a future emergency department encounter for opioid-related emergencies, according to the analysis. The data of 9,295 patients in four Indiana hospital systems was conducted from a statewide regional Health Information Exchange system that examined the prescription history, visit detail, and community characteristics.

"Consolidating patient information from multiple emergency departments can improve risk assessment and help identify more opportunities to provide patients with treatment, particularly those who have multiple ED visits for opioid-related health emergencies. More effective use of health information can enable more efficient care for these individuals," said Balio.

Study reveals differences in airway size develop during puberty

A breakthrough study has found that the differences in airway size between the sexes are developed because of hormonal changes around puberty. According to Paolo Dominelli, a professor in Waterloo's Department of Kinesiology, "Smaller airways can lead to the respiratory system limiting exercise performance in some people and can have implications for the development and progression of lung diseases like chronic obstructive pulmonary disease and asthma. Having a smaller airway would be analogous to breathing through a straw - it takes more effort and is not as efficient." The study used three-dimensional scans to assess the airways of 97 healthy females and 128 healthy males aged 1 to 17 years and found no differences in airway size between the sexes in children under 12 years old. However, males older than 14 years generally had larger airways than females, even when accounting for height. For example, the trachea was 25 per cent larger in males between the ages of 13 and 17. Dominelli said this is the first study that assesses sex differences in airway size in healthy children and accounted for differences in height.

Previously, other studies have used data from children with existing respiratory conditions. Another study had shown that in prepubescent children, females had faster swimming times, but at puberty, male swim times got faster than female times. However, to prove causation, the next step would be to directly link the size of airways and the results of strenuous exercise in the same group of people.

"That would be the last point of this story, so to speak," Dominelli said. "It is important to emphasize, though, that even though male airways were, on average, larger in the older age groups, there is still considerable overlap and many females have larger airways than males, especially if they are tall."