

## Scientists develop human gene therapy

In a significant medical feat, Indian scientists have developed the first-in-human gene therapy using lentiviral vectors for severe haemophilia A. The innovative therapy, developed by the Centre for Stem Cell Research (CSCR) at Christian Medical College (CMC), Vellore -- a translational unit of BRIC-inStem, and supported by the Department of Biotechnology, has demonstrated transfor-

mational results. Early this year, scientists at the CMC-Vellore successfully conducted the country's first human clinical trial of gene therapy for haemophilia A (FVIII deficiency). The single-centre study, which enrolled five participants aged between 22 and 41 years, showed transformational results. "The therapy successfully produced zero annualised bleeding rates in all five enrolled participants while

enabling prolonged production of Factor VIII, eliminating the need for repeated infusions," said the scientists, in the paper published in the peer-reviewed New England Journal of Medicine. This effect was observed "over a cumulative follow-up of 81 months, correlating Factor VIII activity with vector copy numbers in the peripheral blood," the team said. Haemophilia A is a severe bleeding disorder

caused by the deficiency of clotting Factor VIII. It significantly affects patients' quality of life, leading to spontaneous bleeding episodes. Although rare, India bears the world's second-largest burden of haemophilia, with approximately 136,000 cases. Current treatments require frequent Factor VIII replacement therapy, which faces challenges such as high costs, venous access in

children, and low patient acceptance. The new gene therapy approach involves the use of a lentiviral vector to introduce a normal copy of the Factor VIII gene into autologous haematopoietic stem cells (HSCs). These modified HSCs generate blood cells capable of producing functional Factor VIII over extended periods. "Participants were monitored for six months following the gene therapy. Results showed a strong correlation between Factor VIII activity levels and the vector copy number in

peripheral blood," the researchers said. "This achievement underscores the long-term efficacy and safety of the therapy, offering renewed hope for patients with severe Haemophilia A," they added. This pioneering study marks a transformative leap in accessible and effective treatments for resource-limited settings, unlocking new possibilities for managing previously incurable diseases. The therapy is expected to soon undergo a second phase human trial.

## Factors distorting BP readings

More often than not, patients and even nurses and doctors are skipping steps that help paint an accurate portrait of someone's blood pressure -- how someone sits and positions their arm, whether they just had a cup of joe or chitchat with their practitioner during the measurement, and other factors can produce readings that are higher or lower than normal blood

pressure. "To really make a dent at improving people's cardiovascular health, we need to screen and treat people for hypertension, but we need to do it correctly," Tammy Brady, a pediatric nephrologist at the Johns Hopkins Children's Center in Baltimore who studies blood-pressure measurement and cardiovascular health in children and adults, told The Wall

Street Journal. "Getting the right reading is important for preventing heart attacks, strokes and other potentially fatal conditions," noted the newspaper, Xinhua news agency reported. What does it take to get the reading right? The patient should sit with both feet on the ground, legs uncrossed, back straight and your arm supported on a table or other

surface, according to guidelines from the American Heart Association and other organisations. "A cuff should be positioned over your bare arm at the level of your heart. You shouldn't talk or scroll on your phone while it is being measured, and your bladder should be empty. And you should take your blood pressure at least a couple of times in a sit-

ting," added the report. Meanwhile, last month, a research published by experts from an international academic collaboration led by the University of Sydney and University College London, had suggested that doing five minutes of physical activity, such as walking uphill or stair climbing every day may help to lower blood pressure. According to the study by the Prospective Physical Activity, Sitting and Sleep (ProPASS) Consortium,

replacing sedentary behavior with 20-27 minutes of exercise per day can result in a clinically meaningful reduction in blood pressure. "High blood pressure is one of the biggest health issues globally, but unlike some major causes of cardiovascular mortality there may be relatively accessible ways to tackle the problem in addition to medication," Emmanuel Stamatakis, joint senior author and Director of the ProPASS Consortium from the University of Sydney, said.

## Coffee addict? Well, you may live longer



Chicago: Go ahead and have that cup of coffee, maybe even several more. New research shows it may boost chances for a longer life, even for those who down at least eight cups daily. In a study of nearly half-a-million British adults, coffee drinkers had a slightly lower risk of death over 10 years than abstainers. The apparent longevity boost was seen with instant, ground and decaffeinated, results that echo US research. It's the first large study to suggest a benefit even in people with genetic glitches affecting how their bodies use caffeine. Overall, coffee drinkers were about 10 per cent to 15 per cent less likely to die than

abstainers during a decade of follow-up. Differences by the amount of coffee consumed and genetic variations were minimal. The results don't prove your coffee pot is a fountain of youth nor are they a reason for abstainers to start drinking coffee, said Alice Lichtenstein, a Tufts University nutrition expert who was not involved in the research. But she said the results reinforce previous research and add additional reassurance for coffee drinkers. "It's hard to believe that something we enjoy so much could be good for us. Or at least not be bad," Lichtenstein said. The study was published

Monday in the journal JAMA Internal Medicine. It's not clear exactly how drinking coffee might affect longevity. Lead author Erika Lofthoff, a researcher at the US National Cancer Institute, said coffee contains more than 1,000 chemical compounds including antioxidants, which help protect cells from damage. Other studies have suggested that substances in coffee may reduce inflammation and improve how the body uses insulin, which can reduce chances for developing diabetes. Lofthoff said efforts to explain the potential longevity benefit are continuing. Adam Taylor, fetching two iced coffees for friends

Monday in downtown Chicago, said the study results make sense. "Coffee makes you happy, it gives you something to look forward to in the morning," said Taylor, a sound engineer from Las Vegas. "I try to have just one cup daily," Taylor said. "Otherwise I get a little hyper." For the study, researchers invited 9 million British adults to take part; 498,134 women and men aged 40 to 69 agreed. The low participation rate means those involved may have been healthier than the general UK population, the researchers said. Participants filled out questionnaires about daily coffee consumption, exercise and other habits, and received physical exams including blood tests. Most were coffee drinkers; 154,000 or almost one-third drank two to three cups daily and 10,000 drank at least eight cups daily. During the next decade, 14,225 participants died, mostly of cancer or heart disease. Caffeine can cause short-term increases in blood pressure, and some smaller studies have suggested that it might be linked with high blood pressure, especially in people with a genetic variation that causes them to metabolise caffeine slowly.

## New potential breast cancer drug identified

Houston: Scientists, including an Indian-American researcher, have identified a molecule that can help treat breast cancer, giving hope to patients who have become resistant to traditional therapies. The first-in-class molecule shuts down oestrogen-sensitive breast cancer in a new way, researchers said. First-in-class drugs are those that work by a unique mechanism -- in this case a molecule that targets a protein on the oestrogen receptor of tumour cells. The potential drug offers hope

for patients whose breast cancer has become resistant to traditional therapies. "This is a fundamentally different, new class of agents for oestrogen-receptor-positive breast cancer," said Ganesh Raj, professor at the University of Texas Southwestern (UT Southwestern) Simmons Cancer Centre. "Its unique mechanism of action overcomes the limitations of current therapies," Raj said. All breast cancers are tested to determine if they require oestrogen to grow and about

80 per cent are found to be oestrogen-sensitive, researchers said. These cancers can often be effectively treated with hormone therapy, such as tamoxifen, but as many as a third of these cancers eventually become resistant, they said. The new compound is a potential highly effective, next-line treatment for these patients, said Raj. Traditional hormonal drugs, such as tamoxifen, work by attaching to a molecule called the oestrogen receptor in cancer cells, preventing oestrogen from binding to the receptor, a

necessary step for cancer cells to multiply. However, the oestrogen receptor can mutate and change its shape over time so that the treatment drug no longer fits neatly with the receptor. When this happens, the cancer cells start multiplying again. Blocking such "protein-protein interactions" has been a dream of cancer researchers for decades. The drug works by blocking other molecules - proteins called co-factors - that also must attach to the oestrogen receptor for cancer cells to multiply.

## Air Pollution: Here's Why And How To Detox Your Lungs

Infections and chronic lung conditions like asthma can all be caused by or made worse by poor air quality. The danger is higher for individuals who already have lung diseases. The current spike in poor air quality has further worsened our exposure to pollutants. You may notice a sudden appearance of symptoms if you are exposed to high pollution levels, such as on a busy road or during a high pollution episode like right now. These include coughing, feeling out of breath, and inflamed airways. You should see your doctor for a check up if you discover that these symptoms occur frequently.

There are various methods to enhance our lung health without having to use medications. Lungs are self-cleaning systems that will start to repair once they are not exposed to pollution anymore. Continue reading to understand effective ways through which you can cleanse your lungs and reduce further degradation due to air pollution.

Protective and corrective measures to detox your lungs

1. Exercise regularly Regular exercise can help people maintain healthy lungs in addition to improving their physical and emotional well-being and lowering their chance of developing a number of diseases. Exercise makes the muscles work harder, which speeds up breathing and increases the amount of oxygen delivered to the muscles. Morning and evening hours usually have the highest pollution levels due to temperature inversions. If possible, exercise at late morning or early afternoon when sunlight and slight winds help disperse pollutants.
2. Avoid catching infections Current air quality and weather changes can make one prone to infections. By getting vaccinated against the flu and pneumonia, washing your hands frequently, and avoiding contact with people who are congested or suffering from other illnesses, you can prevent further damage to your lungs.
3. Keep indoors clean It's critical to maintain clean indoor air quality. Invest in a high-quality vacuum and vacuum frequently. Avoid using aerosol sprays and go for fragrance-free, natural cleaning supplies. Make sure to sweep and dust your home regularly.
4. Try steaming Inhaling water vapour is known as steam inhalation, which helps to open the airways and may also assist to release mucus. The airways' mucous membranes might become dry in polluted and cold environments, which can also reduce blood flow. On the other hand, steam warms and moistens the air, which may help with breathing and help to break up mucus in the lungs and airways.
5. Improve your diet Changing your food can also aid your lung health, particularly if you have a chronic illness. Your mind and body will stay healthy if you include foods high in antioxidants in your diet, along with a variety of vitamins and nutrients.

**Air Pollution: Here's Why And How To Detox Your Lungs**  
Air Pollution: Wear a mask to restrict exposure to pollutants. Infections and chronic lung conditions like asthma can all be caused by or made worse by poor air quality. The danger is higher for individuals who already have lung diseases. The current spike in poor air quality has further worsened our exposure to pollutants. You may notice a sudden appearance of symptoms if you are exposed to high pollution levels, such as on a busy road or during a high pollution episode like right now. These include coughing, feeling out of breath, and inflamed airways. You should see your doctor for a check up if you discover that these symptoms occur frequently.

1. Children Nearly half of the cases are of children under 15 suffering from Mpox in Democratic Republic of Congo.  
2. Females Women now represent 54% of Mpox cases.  
3. Malnourished populations Malnutrition exacerbates viral disease severity.  
4. Healthcare workers Exposure to infected patients increases risk of Mpox.  
5. People in endemic regions Areas with poor sanitation and healthcare infrastructure are most affected with Mpox.  
6. Traveller's to high-risk areas Lack of vaccination can heighten vulnerability to Mpox.  
7. Individuals with compromised immune systems Such as those suffering with HIV or chronic illnesses. Takeaways from Africa CDC's continental Mpox response intra action review. The Africa Centres for Disease Control and Prevention recently conducted a continental review to evaluate Mpox response strategies.

## Mpox Outbreak In Africa: Is The Mysterious Disease In DRC Caused By Malaria?

The Democratic Republic of Congo (DRC) is grappling with a severe outbreak of Mpox, a viral disease previously known as monkeypox. With 2,632 new cases reported in the DRC over the past week and a concerning case fatality rate of 6.2%, health authorities are on high alert. The outbreak, which has spread steadily across Africa, is compounded by overlapping health crises, including severe malaria and malnutrition. Dr. Ngashi Ngongo, Mpox lead for the Africa Centres for Disease Control and Prevention (Africa CDC), noted that the situation presents two working hypotheses: severe malaria against a backdrop of viral infection and malnutrition or a viral infection in the context of malaria and malnutrition. Amid this complex situation, vaccines are

being rolled out slowly, with only 56,000 people vaccinated despite over a million doses being available. Is Mpox caused by malaria, viral infections, or hemorrhagic fever syndrome? Africa CDC officials have been investigating the root causes of the Mpox outbreak. According to Dr. Ngongo, malaria has been confirmed via PCR in 86% of patients tested, leaning the diagnosis towards malaria as a primary cause. However, the elevated case fatality rate and reports of hemorrhagic fever syndrome raise concerns about viral co-infections. The DRC has reported cases of hemorrhagic fever syndrome, where viral diseases cause severe bleeding and organ damage. Samples from affected patients are

being analysed in Kinshasa for laboratory confirmation. Dr. Ngongo emphasised the difficulty of accurate diagnosis due to challenges like transporting samples to laboratories and the interplay of multiple conditions in affected patients. Signs of malaria Recognising the symptoms is crucial in endemic regions like the Democratic Republic of Congo.  
1. High fever and chills.  
2. Headache and muscle aches.  
3. Fatigue and general malaise.  
4. Nausea, vomiting, and diarrhoea.  
5. Profuse sweating, especially at night.  
6. Rapid heartbeat or difficulty breathing in severe cases.  
7. Jaundice, dark urine, and organ failure in advanced stages. Signs of viral infections

Viral infections, including Mpox, can manifest with symptoms such as these below.

1. Fever and body aches.
2. Skin rashes or pustules.
3. Swollen lymph nodes.
4. Severe fatigue or weakness.
5. Respiratory symptoms like a sore throat or cough.
6. Gastrointestinal distress, including diarrhoea.
7. Neurological issues in severe cases. Signs of hemorrhagic fever syndrome This group of viral diseases, including Ebola and certain forms of Mpox, is characterised by the following.  
1. Sudden onset of fever.  
2. Bleeding from the nose, gums, or other orifices.  
3. Abdominal pain and vomiting blood.  
4. Severe fatigue and confusion.  
5. Low blood pressure and shock.  
6. Organ dysfunction, including kidney and liver failure.  
7. Rash and redness in the eyes. Who is at risk of Mpox The Mpox outbreak disproportionately affects vulnerable popula-

## EDUCATION PLUS

### NEET UG -2025 likely to be held in online mode: Experts share pros and cons

As the National Testing Agency (NTA) deliberates on transitioning the NEET UG (National Eligibility cum Entrance Test - Undergraduate) from the traditional pen-and-paper format to an online mode, the decision holds significant implications for medical aspirants across India.

With over 20 lakh students appearing annually, NEET UG is one of the most competitive entrance exams in the country, serving as the gateway to undergraduate medical and dental courses. As a medical counsellor, it's crucial to analyse the potential impacts of such a decision on students, the examination process, and the education system as a whole.

**THE CURRENT SYSTEM: PEN-AND-PAPER MODE**

NEET UG has traditionally been conducted in the pen-and-paper format. This offline mode ensures accessibility to students from diverse socio-economic backgrounds and geographical locations, including rural areas where access to digital infrastructure remains limited. The format has been viewed as more comfortable for students accustomed to writing exams on paper, a system they have followed throughout their academic journey.

However, the current system also comes with challenges, such as logistical issues in distributing and collecting exam papers, risks of paper leaks, and errors in manual evaluation. Over the years, there has been a growing demand to modernise the examination process, prompting discussions about transitioning to an online format.

**WHY CONSIDER ONLINE MODE?**

The primary motivation for moving NEET UG to an online mode is to enhance efficiency, security, and transparency in the examination process. Online exams have already been successfully implemented for other national-level entrance exams like JEE (Joint Entrance Examination) for engineering aspirants. Proponents of the online mode argue that it could reduce instances of malpractice, minimise human error in evaluation, and provide instant processing of results.

Moreover, the COVID-19 pandemic has accelerated the adoption of digital technologies in education, with many schools and coaching institutes offering online classes and mock tests. A shift to an online mode would align with this digital transformation, preparing students for a future where technology plays a more significant role in learning and assessment.

**CHALLENGES IN IMPLEMENTING THE ONLINE MODE**

Despite the potential benefits, transitioning NEET UG to an online format is not without challenges. India's digital divide is a major concern. While urban areas may have the infrastructure required for conducting online exams, rural regions often lack reliable internet connectivity, access to computers, and electricity. This disparity could disadvantage students from rural and economically weaker sections, contradicting the principles of equity and fairness that NEET aims to uphold.

Additionally, many NEET aspirants are more comfortable with the traditional pen-and-paper format and may find the transition to online exams intimidating. Navigating the online interface, managing time on digital platforms, and dealing with technical glitches could increase stress levels among students.

**STUDENTS' PERSPECTIVES**

The decision to shift to an online format has sparked mixed reactions among students. While some believe that online exams could make the process more streamlined and modern, others feel that it might create unnecessary hurdles.

For instance, a student from a rural background may express concerns about the availability of a nearby online test centre, while an urban student might worry about the reliability of the computer systems and the internet during the exam. Coaching institutes, which play a significant role in NEET preparation, are also divided in their opinions. Many are already offering digital resources, but others emphasise that a significant portion of their students still prefer offline study materials and tests.

**THE WAY FORWARD**

As the NTA prepares to make a final decision, it is essential to strike a balance between modernisation and inclusivity. If NEET UG is to be conducted online, the authorities must address the following concerns:

1. Infrastructure Development: Establishing well-equipped test centres in rural and remote areas to ensure equitable access for all students.
2. Training and Awareness: Organising mock tests and training sessions to familiarise students with the online format and reduce anxiety.
3. Technical Support: Providing robust technical support during the examination to handle any glitches promptly.
4. Hybrid Models: Exploring the possibility of a hybrid approach, allowing students to choose between online and offline modes based on their comfort and accessibility.

The decision to shift NEET UG to an online mode is a significant one, with far-reaching consequences for lakh of medical aspirants. While modernisation of the examination process is inevitable, it is crucial to ensure that the transition is smooth, inclusive, and student-friendly. As a medical counsellor, I advise students to stay adaptable, embrace technological advancements, and focus on thorough preparation, regardless of the mode of examination. Change, after all, is the only constant, and those who adapt will always find a way to succeed.

The final decision from the NTA is eagerly awaited, and it is hoped that it will prioritise students' interests while fostering a fair and efficient examination system.

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