# SCIENCE CENTRE NEWS LETTER

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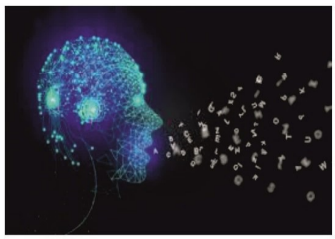
## WHAT'S NEW IN SCIENCE?

### AI language models could help diagnose Schizophrenia

Scientists at the University college of London (UCL) Institute of Neurology, have developed new tools, based on AI (Artificial Intelligence) language models, that can characterise subtle signatures in the speech of patients diagnosed with Schizophrenia.



The Research aims to understand how the automated analysis of language could help Doctors and Scientists diagnose and assess psychiatric conditions of people. Currently, psychiatric diagnosis is based almost entirely on talking with patients and those close to them with only minimal role for tests such as blood tests and brain scans. However, this lack of precision prevents a richer understanding of the cause of mental-illness and the monitoring of treatment.

The Researchers asked 26 participants with Schizophrenia and 26 control participants to complete two verbal fluency tasks, where they were asked to name as many words as they could either belonging to the category "animals" or starting with the letter "P", in five minutes.

To analyse the answers given by participants, the Researchers used an AI language model that had been trained on vast amounts of internet text to represent the meaning of words in a similar way to humans. They tested whether the words people spontaneously recalled could be predicted by the AI model and whether this predictability was reduced in patients with Schizophrenia. They found that the answers given by control participants were indeed more predictable by the AI model than those generated by people with Schizophrenia and that this difference was largest in patients with more severe symptoms.

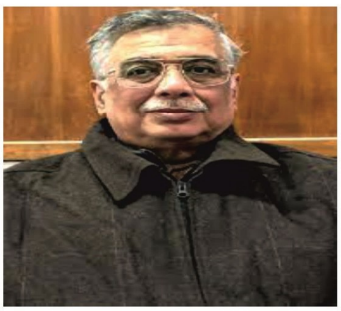
The Researchers think that this difference might have to do with the way the brain learns relationship between memories and ideas and stores this information in so called 'cognitive maps'. Lead Author Dr. Matthew Nour (UCL Queen Square Institute of Neurology and University of Oxford) said, "Until very recently, the automatic analysis of language has been out of reach of Doctors and Scientists. However, with the advent of Artificial Intelligence (AI) language models such as ChatGPT, this situation is changing."

Courtesy - Shree Kanchanlal Mamawala Primary School No.-88

## SCIENTIST OF THE MONTH

### Dr. Subrat Kumar Panda

Dr. Subrat Kumar Panda was born on 18th November, 1954 at Odisha, India. He was graduated in Medicine from SCB(Srirama Chandra Bhanja) Medical College, Cuttack, Odisha in 1977 and M.D (Doctor of Medicine) from AIIMS (All India Institute of Medical Sciences), Delhi in 1981. Subsequently, he moved to U.K (United Kingdom) where he did Post-Doctoral studies at the laboratory of Arie Zuckerman of London School of Tropical Medicine in 1987. Returning to India in 1987, he joined AIIMS, Delhi as a member of faculty at the Department of Pathology and serves as the Professor and Head of the Department.



Dr. S. K. Panda's researches covered the fields of Molecular Virology and Liver Pathology, is known to have contributed the wider understanding of viral Hepatitis (is liver inflammation due to a viral infection). He carried out extensive researches on various types of Hepatitis virus such as B [is a partially double-stranded (consists two polynucleotide chains whose Nitrogenous bases are connected by Hydrogen bonds) DNA virus], C [is a small (55-65nm in size), enveloped (outer most layer of many types of viruses), positive-sense (it signifies that a particular viral RNA sequence may be directly translated into viral proteins) single-stranded (it consists of only a single strand contrary to the typical two strands of nucleotides in helical form) RNA virus], E (the causative agent of Hepatitis E) and elucidated the replication and transcription processes of Hepatitis E virus. These studies based on Rhesus Monkeys [a species of Old World Monkey (common English name for a family of primate (diverse order of mammals) known taxonomically as the Cercopithecidae)], demonstrated the relationship of virus with Liver diseases and protracted Viremia (a medical condition where viruses enter the blood stram and hence have access to the rest of the body). The Council of Scientific and Industrial Research awarded him Shanti Swarup Bhatnagar Prize in 1995.

Courtesy - Shree Kanchanlal Mamawala Primary School No.-88

## SCIENCE FACTS NOVEMBER 2023

| | |
|---|---|
| 3 November 1893 | American Biochemist Adward Adelbert Doisy (Co- winner of the 1943 Nobel Prize in Physiology or Medicine for their discovery of vitamin K) was born. |
| 5 November 1854 | French Chemist Paul Sabatier (Co- winner of the 1912 Nobel Prize in Chemistry for his work improving the hydrogenation of organic species in the presence of metals) was born. |
| 7 November1867 | Polish Chemist and Physicist Maria Sklodowska- Curie ( was the first woman to win a Nobel Prize, the first person to win a Nobel Prize twice, and the only person to win a Nobel Prize in two scientific fields.) was born. |
| 8 November1895 | While experimenting with the electricity, Wilhelm Rontgen discovers the X-ray. |
| 9 November1897 | British Chemist Ronald George Wreyford Norrish (Co-winner of the 1967 Nobel Prize in Chemistry for their study of extremely fast chemical reactions) was born. |
| 9 November 1921 | Albert Einstein is awarded the Nobel Prize in Physics for his work with the photoelectric effect. |
| 10 November 1918 | German Chemist Ernst Otto Fischer (Co-winner of the 1973 Nobel Prize in Chemistry for his work on organometallic compounds) was born. |
| 12 November 1842 | English Physicist John Strutt, 3rd Baron Rayleigh (Winner of the 1904 Nobel Prize in Physics for his investigations of the densities of the most important gases and for his discovery of argon in connection with these studies) was born. |
| 14 November 1863 | Flemish- American Chemist Leo Hendrik Beakeland (Inventor of the first synthetic plastic, Bakelite) was born. |
| 17 November 1902 | Hungarian Physicist Eugene Wigner (Winner of the 1963 Nobel Prize in Physics for his contributions to the theory of the atomic nucleus and the elementary particles, particularly through the discovery and application of fundamental symmetry principles) was born. |
| 17 November 1922 | American Biochemist Stanley Cohen (Co-winner of the 1986 Nobel Prize in Physiology or Medicine for the isolation of nerve growth factor and the discovery of epidermal growth factor.) was born. |
| 18 November 1897 | British Physicist Patrick Blackett (Winner of the 1948 Nobel Prize in Physics for is investigation of cosmic rays using his invention of the counter- controlled cloud chamber) was born. |
| 18 November 1906 | American Scientist George Wald (Co-winner of the 1967 Nobel Prize in Physiology or Medicine for his discoveries in vision) was born. |
| 19 November 1936 | Taiwanese born Chemist Yuan T. Lee (Co-winner of the 1986 Nobel Prize in Chemistry for their contributions to the dynamics of chemical elementary processes) was born. |
| 19 November 1998 | The first module of the International Space Station , Zarya, is launched. |
| 20 November1886 | Austrian Zoologist Karl von Frisch (Co-winner of the 1973 Nobel Prize in Physiology or Medicine for his achievements in comparing behavioral physiology and pioneering work in communication between insects.) was born. |
| 22 November 1904 | French Physicist Louis Neel (Co-winner of the 1970 Nobel Prize in Physics for his pioneering studies of the magnetic properties of solids) was born. |
| 23 November 1837 | Dutch Physicist Johannes Diderk van der Waals (Winner of the 1910 Nobel Prize in Physics for his work on thc equation of statc for gascs and liquids) was born. |
| 28 November 1950 | American Physicist Russell Alan Hulse (Co-winner of the 1993 Nobel Prize in Physics for the discovery of a new type of pulsar, a discovery that has opened up new possibilities for the study of gravitation.) was born. |

U. N. : United Nations
WHO -World Health Organization
UNESCO - United Nations Educational Scientific & Cultural Organization

Answers: 1) a, 2) b, 3) b, 4) a, 5) c, 6) d, 7) d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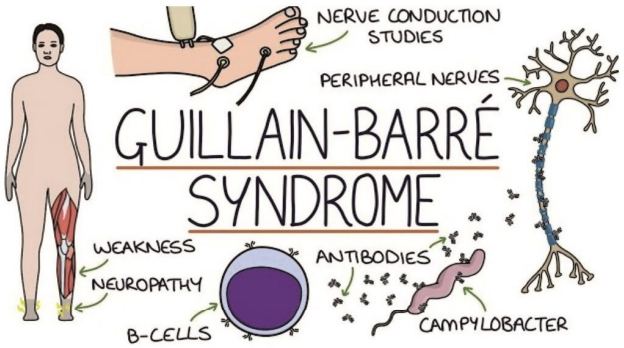
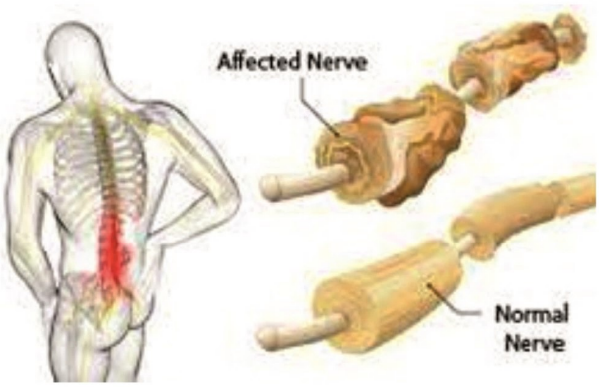
बहुजनहिताय बहुजनसुखाय

## SCIENTIFIC QUESTION

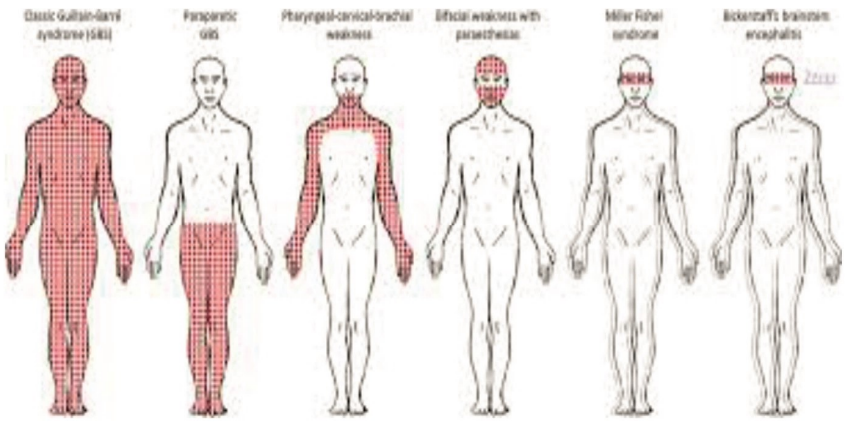
# What is Guillain Barre Syndrome (GBS)?

Guillain Barre Syndrome is a rapid-onset muscle weakness caused by immune system damaging the peripheral nervous system which is one of two components that make up the nervous system (highly complex part in an animal and human that coordinates its actions and sensory information by transmitting signals to and from different parts of the body) of bilateral animals and humans. Typically, both sides of the body are involved and the initial symptoms are changes in sensation or pain often in the back along with muscle weakness, beginning in the feet and hands, often spreading to the arms and upper body. The symptoms may develop over hours to a few weeks. During the acute phase, the disorder can be life-threatening, with about 15% of people developing weakness of the breathing muscles and therefore, requiring mechanical ventilation for breathing.




Although the cause is unknown, the underlying mechanism of the body involves an autoimmune disorder in which the body's immune system mistakenly attacks the peripheral nerves and damages their myelin insulation (it insulates axons).



**Sign and Symptoms**: the first symptoms of Guillain Barre Syndrome are numbness, tingling and pain, alone or in combination in body. This is followed by weakness of legs and arms that affects both sides equally and worsens over time.

**Cause**: Two-thirds of people with Guillain Barre Syndrome have experienced an infection before the on-set of the condition. Most commonly, these are episodes of gastroenteritis (also known as infectious diarrhea or simply gastro, is an inflammation of the gastrointestinal tract including stomach and intestine) or a respiratory tract infection . Approximately 30% of cases are provoked by Campylobacter jejuni bacteria.

**Diagnosis**: The diagnosis of Guillain Barre Syndrome depends on findings such as rapid development of muscle paralysis, absent reflexes (an involuntary or automatic, action that body does in response to something), absence of fever and absence of probable cause. Cerebrospinal fluid analysis and nerve conduction studies are supportive investigations commonly performed in the diagnosis of GBS.

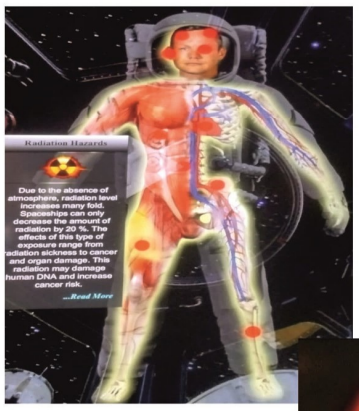
**Treatment**: Plasmapheresis (is a process of removal, treatment and return or exchange of blood plasma to the blood circulation or its components) and intravenous immune-globulins (is the use of mixture of antibodies to treat several health conditions) are the two main immunotherapy treatments for GBS.

Courtesy - Shree Kanchanlal Mamawala Primary School No.-88

# KNOW THE EXHIBIT

## Health in Space- Radiation Hazards

An extremely unusual and long absence of solar activity is causing dangerous radiation levels in Space. “While these conditions are not necessarily a big concern for long-duration missions to the Moon, an Asteroid, or even Mars, galactic cosmic radiation in particular remains a significant and worsening factor that limits mission durations”, Explained Nathan Schwadron of the UNH(University of New Hampshire) Institute for the study of Earth, Oceans and Space, USA (United States of America).



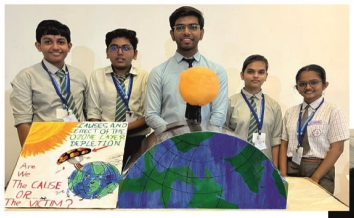

The effects of this type of exposure range from radiation sickness to Cancer and organ damage. These radiation levels will also reduce the number of allowable days behind the shielding of a Spacecraft by 20 percent.

One mission to Mars could expose an Astronaut to two-thirds of his or her safe lifetime limit of radiation. This radiation may damage human DNA and increase Cancer risk. “In terms of accumulated dose, it's like getting a whole-body CT scan once every five or six days”, said Scientist Cary Zeitlin, USA, which shows what happens on the health of an Astronaut when he/she comes back from Space.

This exhibit is situated at “Entering Space Gallery” between Fun Science Gallery and Power of Play Gallery at the first floor of Science Centre.

# SCIENCE PROJECT

Surat Municipal corporation had organized 'Science Fair-2023' at Art Gallery, Science Centre Surat on 18th and 19th August, 2023 for the students of std. 8 to 12. Harikrushn International School had participated with their project on 'Golbal Warming' under the sub theme of 'Climate Change and its Impact'.




The aim of the project was to create awareness among people about Global Warming and change in the environment. Climate change cause effects like Global Warming. Due to this, Ozone gas forms a gaps (depletion). Due to this gaps, serious diseases like skin disease, cataracts and cancer can occur in humans. Ozone gas damage due to climate change. Climate change causes problems like excess rain and drought.

# QUIZ

1. What is process of loosening of the soil is called _____.

a) Tilling b) Harvesting c) Spraying d) Weeding

2. The pressure which is exerted by Air around us is known as _____.

a) Fore b) Atmosheric pressure c) Muscular force d) Friction

3. One kilogram weight is equal to _____.

a) 98 Newton b) 9.8 Newton c) 0.98 Newton d) 0.098 Newton

4. How many types of Charges are gained by rubbing objects?

a) 2 b) 1 c) 3 d) 4

5. Which Gas helps in the process of combustion?

a) Cooking gas b) Nitrogen gas c) Oxygen gas d) Producer gas

6. Which cannot fix atmospheric Nitrogen in the soil?

a) Rhizobium b) Clostridium c) Azotobacter d) Pencilin

7. Which of the following is not used as food preservatives?

a) Salt b) Sugar c) Vinegar d) Methane