SCIENCE CENTRE NEWS LETTER

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SCIENCE CENTRE

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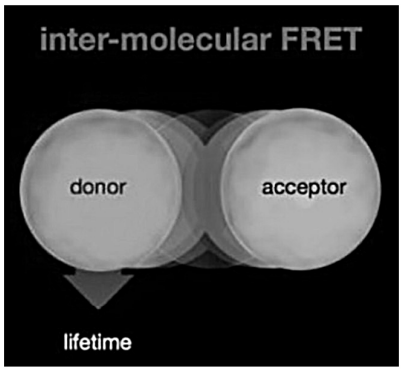
WHAT'S NEW IN SCIENCE

How the brain works with new live imaging

There are more than a trillion cells called neurons that form a labyrinth of connections in our brains. Each of these neurons contains millions of proteins that perform different functions. Exactly how individual proteins interact to form the complex networks of the brain still remains as a mystery that is just beginning to unravel. For the first time, a group of scientists has been able to observe intact interactions between proteins, directly in the brain of a live animal. The new live imaging approach was developed by a team of researchers at the University of Miami (UM). 'Our ultimate goal is to create the systematic survey of protein interactions in the brain,' says Akira Chiba, professor of Biology in the College of Arts and Sciences at UM lead investigator of the project. The new technique will allow scientists to visualise the interactions of proteins in the brain of an animal, along different points throughout its development, explained Chiba, who likens protein interactions to the way organisms associate with each other. The researchers chose embryos of the fruit fly (Drosophila melanogaster) as an ideal model for the study. Because of its compact and transparent body, it is possible to visualize processes inside the Drosophila cells using a fluorescence lifetime imaging microscope. The results of the observations are applicable to other animal brains, including the human brain. The Drosophila embryos in the study contained a pair of fluorescent labeled proteins: a developmentally essential and ubiquitously present protein called Rho GTPase Cdc42 (cell division control protein 42), labeled with green fluorescent tag and its alleged signaling partner, the regulatory protein WASp (Wiskot-Aldrich Syndrome protein), labeled with red fluorescent tag. Together, these specialized proteins are believed to help neurons grow during brain development. The proteins were selected because the same (homolog) proteins exist in the human brain as well. Previous methods required chemical or physical treatments that most likely disturb or even kill the cells. That made it impossible to study the protein interactions in their natural environment. The current study addresses these challenges by using the occurrence of a phenomenon called Förster resonance energy transfer, or FRET. It occurs when two small proteins come within a very small distance of each other (eight nano meters). The event is interpreted as the time and place where the particular protein interaction occurs within the living animal. The findings show that FRET between the two interacting protein partners occurs within neurons, during the time and space that coincides with the formation of new synapses in the brain of the baby insect. Synapses connect individual neurons in the brain.



Courtasy : Sati Loyan Prathamik School no. 322

SCIENTIST OF THE MONTH

Kamala Kant Pandey

Kamala Kant Pandey, a geneticist, was born on December 11, 1926 at Varanasi in Uttar Pradesh. He joined the John Innes Institute in London to do research on plant genetics. After completing his Ph.D. in 1954, he settled in New Zealand. Professor Pandey was the first Indian agriculture graduate to win the London Exhibition Scholarship. Professor K.K. Pandey is renowned for a revolutionary technique in plant breeding. He developed the technique by which selected genes of a flowering plant can be transferred to another plant. In order to break the genetic material of a plant and to separate desirable genes, Pandey used strong nuclear radiation. He is also credited with the identification of 'S-gene', of which governs the capability of a plant to self-pollinate or across-pollinate. He has been appointed as the Head in Genetic Unit, Department of Scientific and Industrial Research in New Zealand. He was also elected the Fellow of Linnean Society of London in 1966.

Courtasy : Sati Loyan Prathamik School no. 322

SCIENCE FACTS DECEMBER 2018

AIDS Awareness Month

1st Dec	World AIDS Day. (by U. N.)
2nd Dec 1984	Bhopal Gas Tragedy.
3rd Dec	International Day, disabilities. (by U. N.)
3rd Dec 1886	Swidish Physicist Karl M.G. Siegbahn (Inventor of Rontgen Spectroscope) was born.
7th Dec	International Civil Aviation Day. (by U. N.)
7th Dec 1972	American Space Craft "APOLLO 17" launched towards moon with Scientist.
9th Dec 1868	German Physicist and Chemist Fritz Haber (Who discovered Haber Process) was born.
14th Dec	National Energy Conservation Day.
15th Dec 1852	Antoine Henri Becquerel (Who discovered Radioactivity) was born.
15th Dec 1863	Arthur D. Little (Inventor of Rayon) was born.
17th Dec 1797	American Scientist Joseph Henry (Inventor and Pioneer of Electromagnetism) was born.
17th Dec 1903	Wright Brothers were the world's first successful persons who flew in an aeroplane.
17th Dec 1908	Willard Frank Libby (Inventor of The Carbon 14) was born.
18th Dec 1856	English Physicist Joseph John Thomson (Discoverer of electron) was born.
23rd Dec	Farmer's Day. (Chaudhary Charansingh's Birth Anniversary)
24th Dec 1818	Physicist James Prescott Joule (Who discovered the Principle of Conservation on energy) was born.
27th Dec 1571	German Astronomer Johann Kepler (Who discovered elliptical orbits) was born.
	U.N. (United Nation)

Timings

Tuesday to Friday
9.30 am to 4.30 pm

Saturday - Sunday & Public Holidays
11.00 am to 6.30 pm

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KNOW THE EXHIBIT AT FUN SCIENCE GALLERY

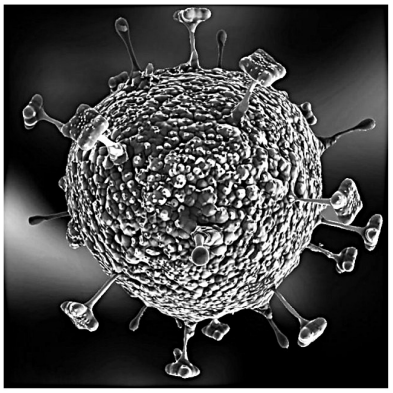
Musical Tube

Hit the freely hanging metallic pipes one by one by the small hammer and listen to the different musical notes emitted. As you hit a pipe, the air column inside it starts vibrating and sound of a particular pitch is given out. The frequency or pitch of this sound depends on the length of the air column. The shorter the length of air column, the higher is the pitch.

SCIENTIFIC QUESTION

What is Nipah virus?

Nipah virus (NiV) is a zoonotic virus (it is spread from animals to humans) and can also be spreaded through contaminated food or directly between people. In Infected people, it causes a range of illnesses from asymptomatic (subclinical) infection to acute respiratory illness and fatal encephalitis. The virus can also cause severe disease in animals such as pigs, resulting in significant economic losses for farmers.



☐ **Past Outbreaks**

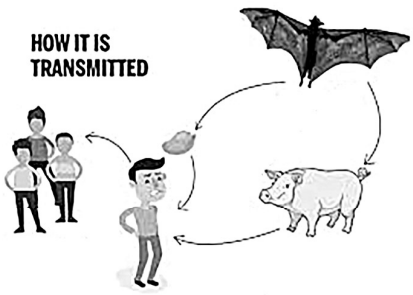
Nipah virus was first recognized in 1999 during an outbreak among pig farmers in Malaysia. No new outbreaks have been reported in Malaysia since 1999.

☐ **Transmission**

During the first recognized outbreak in Malaysia, which also affected Singapore, most human infections resulted from direct contact with sick pigs or their contaminated tissues. Transmission is thought to have occurred via unprotected exposure to secretions from the pigs, or unprotected contact with the tissue of a sick animal. In subsequent outbreaks in Bangladesh and India, consumption of fruits or fruit products (such as raw date palm juice) contaminated with urine or saliva from infected fruit bats was the most likely source of infection.

☐ **Signs and symptoms**

Human infections range from asymptomatic infection to acute respiratory infection (mild, severe), and fatal encephalitis. Infected people initially develop symptoms including fever, headaches, myalgia (muscle pain), vomiting and sore throat. This can be followed by dizziness, drowsiness, altered consciousness, and neurological signs that indicate acute encephalitis. Some people can also experience atypical pneumonia and severe respiratory problems, including acute respiratory distress. Encephalitis and seizures occur in severe cases, progressing to coma within 24 to 48 hours.



☐ **Diagnosis**

Initial signs and symptoms of Nipah virus infection are nonspecific, and the diagnosis is often not suspected at the time of presentation. This can hinder accurate diagnosis and creates challenges in outbreak detection, effective and timely infection control measures, and outbreak response activities. In addition, the quality, quantity, type, timing of clinical sample collection and the time needed to transfer samples to the laboratory can affect the accuracy of laboratory results. Nipah virus infection can be diagnosed with clinical history during the acute and convalescent phase of the disease. The main tests used are real time polymerase chain reaction (RT-PCR) from bodily fluids and antibody detection via enzyme-linked immunosorbent assay (ELISA). Other tests used include polymerase chain reaction (PCR) assay, and virus isolation by cell culture.

☐ **Treatment**

Currently, there are no known drugs or vaccines specific for Nipah virus. Although WHO has identified Nipah as a priority disease from the WHO Research and Development Blueprint. Intensive and supportive care is recommended to treat severe respiratory and neurologic complications.

Courtasy : Sati Loyan Prathamik School no. 322

Exhibitions of Science Centre

Rangoli Exhibition

To celebrate Diwali, Rangoli exhibition was organized at the Art Gallery of Science Centre by. making Rangoli in different mediums and subjects from 4/11/2018 to 18/11/2018. This exhibition was Inaugurated by Hon. Standing Committee Chairman. In this exhibition 62 rangoli artists from Surat made extremely beautiful 73 Rangolis in different mediums as Karothi, Glitter, Sand etc, in different subjects such as 3D, Portraits, Landscapes, Craft, Traditional themes etc.

Heritage Exhibition

Heritage Exhibition was organized on the ground floor of Art Gallery at Science Centre Surat on the occasion of 'World Heritage Week' from 21st to 25th November, 2018. In this exhibition the details of Historical places such as Fort, Mughalsarai, Gopi Talav, English Factory, Dutch Factory and European Cemetry, Social places such as Civil Hospital, Ashaktashram Hospital, Parsi Panchayat, Religious places such as Chintamani Derasar, Kantareshwar Mahadev Mandir, Kuvate Islam Mosque, Parsi Fire Temple and Educational places such as Sorabji Training College, I.P Mission School, Mahila Vidhyalaya etc. were displayed in different panels.

SCIENCE CENTRE

Science Centre forms the main part of the entire complex; it displays thematic galleries in the field of Science and Technology. The ground floor of Science Centre showcases 3D Theatre and Souvenir Shop. The first floor of Science Centre showcases Planetarium, Fun Science Gallery and Power of Play Gallery and second floor of Science Centre showcases Diamond Gallery, whereas Entering into Space, Textile Gallery, Cosmos Gallery and Polar Science Gallery are under development.

3d Show	Tuesday to Friday (Time)	Saturday, Sunday & Holidays (Time)
English	09:15, 11:20, 12:00, 02:40, 04:00	11:20, 12:00, 02:40, 04:00
Hindi	10:00, 10:40, 12:40, 01:20, 02:00, 03:20	12:40, 01:20, 02:00, 03:20, 04:40, 05:20, 06:00

Science Centre + Planetarium + Museum + Diamond Gallery	
Above 18 Years	Rs. 100
3 Years to 18 Years	Rs. 65
Science Centre + Museum + Diamond Gallery	
Above 18 Years	Rs. 60
3 Years to 18 Years	Rs. 40
Science Centre + Planetarium + Museum + Diamond Gallery + 3D Show	
Above 18 Years	Rs. 120
3 Years to 18 Years	Rs. 80
Planetarium	
Above 18 Years	Rs. 50
3 Years to 18 Years	Rs. 40
3D Show	
Above 18 Years	Rs. 60
3 Years to 18 Years	Rs. 40

Planetarium

Tuesday to Friday		Saturday, Sunday & Public Holidays	
09:30 to 10:20	English	11:30 to 12:20	Gujarati
10:30 to 11:20	Gujarati	12:30 to 01:20	English
11:30 to 12:20	Gujarati	01:30 to 02:20	Hindi
12:30 to 01:20	English	02:30 to 03:20	Hindi
01:30 to 02:20	Hindi	03:30 to 04:20	Gujarati
02:30 to 03:20	Hindi	04:30 to 05:20	English
03:30 to 04:20	Gujarati	05:30 to 06:20	Gujarati