

SCIENCE CENTRE NEWS LETTER

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SCIENCE CENTRE

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WHAT'S NEW IN SCIENCE

Predicting Life "As we Don't Know it"

The only references we have for "life" are the forms we know on Earth. Astrobiologists suspect that the search for alien life, and even for the origins of life on Earth, may require a broader scope. A NASA-funded team of researchers is developing tools to predict the features of life as we don't know it. In a new study published in the Proceedings of the National Academy of Sciences, the team identifies universal patterns in the chemistry of life that do not appear to depend on specific molecules.

"We want to have new tools for identifying and even predicting features of life as we don't know it," says Santa Fe Institute External Professor Sara Imari Walker (Arizona State University), a co-author on the paper. "To do so, we are aiming to identify the universal laws that should apply to any biochemical system. This includes developing quantitative theory for the origins of life, and using theory and statistics to guide our search for life on other planets."

On Earth, life emerges from the interplay of hundreds of chemical compounds and reactions. Some of these compounds and reactions are found universally across Earth's organisms. Using the Integrated

Microbial Genomes and Microbiomes database, the team investigated the enzymes - the functional drivers of biochemistry - found in bacteria, archaea, and eukarya to reveal a new kind of biochemical universality.

Enzymes can be categorized into taxonomy of broad functional classes - groups designated by what they do, from using water molecules to break chemical bonds (hydrolases) to rearranging molecular structures (isomerases) to joining large molecules together (ligases). The team compared how the abundance of enzymes in each of these functional categories changed in relation to the overall abundance of enzymes in an organism. They discovered various scaling laws - almost algorithmic relationships - between the number of enzymes in different enzyme classes and the size of an organism's genome. They also found that these laws don't depend on the particular enzymes in those classes.





Timings

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9.30 am to 4.30 pm

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SCIENCE FACTS MAY 2022

1st May	International Worker's Day.
3rd May	World Press Freedom Day. (By U.N.)
3rd May	International Energy Day.
5th May 1961	"Freedom 7" the first piloted Mercury space craft launched by America.
8th May	World Redcross Day.
11th May	National Technological Day.
11th May 1998	India conducted nuclear tests at the Pokhran range in Rajasthan Desert.
12th May	International Nurses Day
13th May 1857	Sir Ronald Ross (Inventor of medicine for Malaria) was born.
14th May 1686	Daniel Gabriel Fahrenheit (inventor of Thermometer) was born.
14th May 1796	Dr. Edward Jenner tested his hypothesis first time on a eight years old boy.
16th May 1831	David Edward Hughes (inventor of carbon microphone & teleprinter) was born.
17th May 1749	Sir Edward Anthony Jenner (Inventor of smallpox vaccine) was born.
18th May	World AIDS Vaccine Day.
18th May	International Museum Day.
19th May 1910	Halley's Comet brushes the Earth with its tail.
19th May 1971	Soviet Union had sent "Mars-2" for journey to Planet Mars which was crashed land of the Mars.
24th May 1844	First telegraphic message was sent by well-known Scientist Samuel Morse.
30h May 1971	America launched space craft "Mariner -9" to Planet Mars.
31t May	World No Tobacco Day (by U.N.).
U. N. : United Nations	

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

SCIENTIFIC QUESTION

Vitiligo

Vitiligo also called leucoderma, is a long-term skin condition characterized by patches of the skin losing their pigment. The patches of skin affected become white. The hair from the skin may also become white. The exact cause of vitiligo is unknown. It is believed to be due to genetic susceptibility that is triggered by an environmental factor such that an autoimmune disease occurs. This results in the destruction of skin pigment cells. Risk factors include a family history of the condition or other autoimmune diseases, such as hyperthyroidism, alopecia areata (condition in which hair is lost from some or all areas of the body), and pernicious anemia. It is not contagious.

Signs and symptoms: The only sign of vitiligo is the presence of pale patchy areas of depigmented skin which tend to occur on the extremities. Some people may experience itching before a new patch occurs. The patches are initially small, but often grow and change shape.

Causes: Studies strongly imply that changes in the immune system are responsible for the condition. Vitiligo has been proposed to be a multifactorial disease with genetic susceptibility and environmental factors both thought to play a role.

Diagnosis: Vitiligo is classified into two main types:



segmental and non-segmental. Most cases are non-segmental, meaning they affect both sides; and in these cases, the affected area of the skin typically expands with time. About 10% of cases are segmental, meaning they mostly involve one side of the body; and in these cases, the affected area of the skin typically does not expand with time.

Treatment: There is no cure for vitiligo but several treatment options are available. The best evidence is for applied steroids and the combination of ultraviolet light in combination with creams. Topical preparations of immune suppressing medications including glucocorticoids (such as 0.05% clobetasol or 0.10% betamethasone)

and calcineurin inhibitors (such as tacrolimus or pimecrolimus) are considered to be first-line vitiligo treatments. Phototherapy is considered a second-line treatment for vitiligo. In mild cases, vitiligo patches can be hidden with makeup or other cosmetic camouflage solutions. In cases of extensive vitiligo the option to depigment the unaffected skin with topical drugs like monobenzone, mequinol, or hydroquinone may be considered to render the skin an even colour.

SCIENTIST OF THE MONTH

Charusita Chakravarty

Charusita Chakravarty was born in Cambridge, Massachusetts, U.S. on 5th May 1964. She was raised in Delhi, India and chose to give up her American citizenship in her twenties. She did her BSc Chemistry program from St. Stephen's College, University of Delhi. Having graduated from Delhi University with a gold medal, she went on to do the Natural Science Tripos from Cambridge University, UK. Following this, she joined the Doctorate of Philosophy program at Cambridge under the guidance of David Clary.

In 1994 Chakravarty returned to India. The IIT hesitated to give her a teaching position as she did not have a master's degree, even though she had a PhD from Cambridge. She did get an offer from IIT Kanpur, and then went on to accept a position in IIT



Delhi's Department of Chemistry, where she continued to teach till she passed away. Over the course of her career, she became famous for her specialised application of path integral Monte Carlo simulation to unravel quantum mechanical effects in the properties of atomic and molecular clusters. She got Medal for Young Scientists from the Indian National Science Academy in 1996, Anil Kumar Bose Memorial Award of Indian National Science Academy in 1999, and Shanti Swarup Bhatnagar Prize for Science and Technology in 2009. On 29 March 2016, Chakravarty passed away

having breast cancer at the age of 51 at New Delhi.

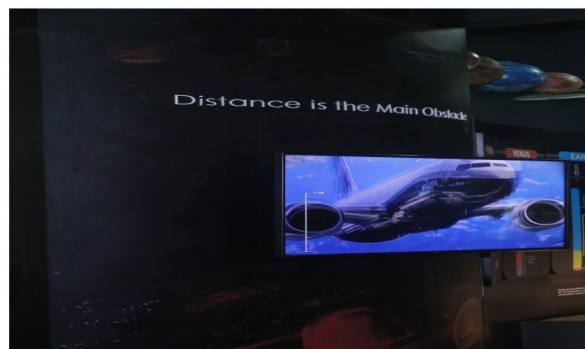
KNOW THE ENTERING INTO SPACE GALLERY EXHIBIT

Distance is the Main Obstacle

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

This exhibit shows the distance from ground level to uniform universe on television. From this exhibit we can say that there is vast universe which is yet to be explored. The distances are shown as follows:

1. Ground level
2. Taj Mahal-73m
3. Burj Kalifa-828m
4. Mount Everest-8850m
5. Passenger Plane-12km
6. Military Jet-37km
7. Karman Line-100km
8. International Space Station-400km
9. Earth and Moon-384400km
10. Solar System-10 billion km
11. Oort Cloud-1 light year
12. Local Interstellar Cloud-100 light years
13. Local Bubble-1000 light years
14. Spiral Arm- 10 thousand light years
15. Milky Way- 100 thousand light years
16. Galaxy neighbourhood- 10 lakh light years
17. Local Galaxy Group-1 crore light years
18. Local Super Cluster-10 crore light years
19. Cosmic Web-1 billion light years
20. Uniform Universe- 10 billion light years



SCIENCE QUIZ

1. Which part of the human body stores Glycogen?
a) liver b) intestine c) pancreas d) skin
2. “Gnathology” is the study of which among the following?
a) teeth b) jaws c) masticatory system d) tongue
3. Which of the following tests helps in diagnosis of Cancer?
a) X-ray b) Urine test c) Blood test d) Biopsy
4. Which of the following disease is non-communicable in nature?
a) Tuberculosis b) Chicken-pox c) cholera d) Cancer
5. Which among following is also known as white gold?
a) Nickel b) Rhodium c) Platinum d) Palladium
6. What amount of carbon dioxide is present in Earth's atmosphere?
a) 12% b) 1% c) 0.04% d) 3.8%
7. Which element has the narrowest liquid range?
a) helium b) fluorine c) argon d) neon