

# SCIENCE CENTRE NEWS LETTER

June 2020  
Issue 62



**Published by**  
Banchhanidhi Pani

I.A.S.  
Municipal  
Commissioner

**Editor**

R.J. Pandya  
Dy. Mu. Commissioner

**Sub Editor**

Bhamini Mahida  
Chief Curator

Divyesh Gameti  
Curator (Science)

**Co-ordinator**

Dr. Pruthul Desai  
Principal  
P. T. Science College



## SCIENCE CENTRE

Volume 6, Issue 2

### WHAT'S NEW IN SCIENCE?

#### Genetic discovery holds implications for better immunity, longer life

Wrinkles on the skin of a microscopic worm might provide the key to a longer, healthier life for humans. Working with *Caenorhabditis elegans* (*C.elegans*), a transparent nematode found in soil, researchers at Washington State University's Elson S. Floyd College of Medicine were the first to find that the nervous system controls the tiny worm's cuticle, a skin-like exterior barrier, in response to bacterial infections. Their study was published in *Science Advances* Journal. Often used in biologic research as a model organism, the *C. elegans* nematode has a relatively simple structure while still sharing several genetic similarities with more complex mammals including humans, so this discovery holds implications for human health as well. "Our study challenges the traditional



view that a physical barrier such as a worm's cuticle or a human's skin does not respond to infections but is part of the body's innate defense against a pathogen," said Assistant Professor Jingru Sun, the corresponding author on the paper. "We show that during infection the nematode can change its cuticle structure and that defense response is controlled by the nervous system." Jingru Sun and her colleagues used technologies such as gene silencing and CRISPR gene editing to show that a G-protein-coupled receptor tied to a gene called *npr-8* regulates collagens, proteins that are the key structural components of the nematode's cuticle.

Nematodes whose NPR-8 receptor was removed survived longer when exposed to the pathogens that cause pneumonia, salmonella and staph infections. The cuticle of the nematodes without the receptor also remained healthy compared to their wild peers whose cuticle wrinkled in response to the same pathogens. "For nematodes, it's important to maintain a healthy cuticle that acts as the first line of defense against external insults," said Durai Sellegounder, lead author on the paper and a postdoctoral researcher in Sun's Lab. "Many pathogens produce wicked proteins that try to destroy this barrier and establish infection. Our results show that the nervous system can detect these attacks and respond by remodeling or strengthening this protective structure."

Collagens are the most abundant proteins found in mammals, and declining collagen levels are associated with aging. For humans, collagen loss can create more problems than just unsightly wrinkles. While nematodes have only one "extracellular matrix," the cuticle, humans have an extracellular matrix on every organ and if that matrix is too stiff or too loose it can be harmful.

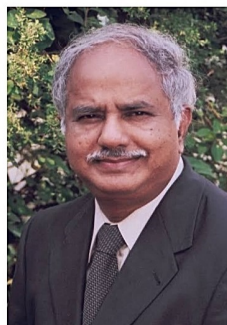
The WSU study results indicate that collagens play an important role in defense of pathogen infection, and the researchers speculate that the neural regulation of collagens might play a role in overall longevity as well.

### SCIENTIST OF THE MONTH

#### Dabbala Rajagopal (Raj) Reddy

Dabbala Rajagopal "Raj" Reddy was born on 13 June 1937 in Katur, Chittoor district, Madras Presidency, British India. He received bachelor's degree in Civil Engineering from College of Engineering, Guindy, then affiliated to the University of Madras (now to Anna University, Chennai), India in 1958 and M.Tech degree from the University of New South Wales, Australia in 1960. He received Ph.D degree in Computer Science from Stanford University, California, United States in 1966. Dr. Reddy is the University Professor of Computer Science and Robotics and Moza Bint Nasser Chair at the School of Computer Science at Carnegie Mellon University, Pittsburgh, Pennsylvania. From 1960, he worked for IBM (International Business Machines Corporation) in Australia. He is the Chairman of governing council of IIT Hyderabad. He was a co-chir of the President's Information Technology Advisory Committee (PITAC)

from 1999 to 2001. Dr. Reddy's early research was conducted at the AI labs at Stanford which concentrated on perceptual and motor aspect of intelligence such as speech, language, vision and robotics. Over the span of five decades, Dr. Reddy and his colleagues created several historic demonstrations of spoken language systems, e.g., Voice control of a robot, large vocabulary connected speech recognition and unrestricted vocabulary dictation. He has been awarded honorary doctorates from University of New South Wales, Anna University, IIT (Allahabad), Andhra University, IIT (Kharagpur). In 2001, Reddy was awarded Padma Bhushan. In 2005, Dr.Reddy received the Honda Prize for his pioneering role in robotics and computer science. In 2006, he received the Vannevar Bush Award, the highest award of National Science Foundation in United States, for his life-time contribution to science.





### Timings

Tuesday to Friday  
9.30 am to 4.30 pm

Saturday - Sunday  
& Public Holidays  
11.00 am to 6.30 pm

### Address

Science Centre  
City Light Road,  
Surat - 395 007

### Contact

0261 - 2255947  
+91 97277 40807

Fax No.  
91-261-2255946

E mail  
sciencecentre@suratmunicipal.org

Web Site  
www.suratmunicipal.gov.in



## SCIENCE FACTS JUNE 2020

1st June	"International Children's Day"
5th June	"World Environment Day"
5th June 1783	Discovery and first launching of primary Balloon
6th June 2012	The astronomical event "Transit of Venus" happened.
7th June 1811	Mr. James Young Simpson (who invented Chloroform) was born
7th June 1979	India Launched first low orbit Earth observation Satellite - "Bhaskar" into the Space
8th June	"World Brain Tumour day"
8th June	"World Ocean day"
8th June 1936	Indian state Broadcasting Service (ISBS) was renamed as "All India Radio" (AIR) on this day
10th June	"Ballpoint Pen Day"
11th June 1963	First Lady Astronomer "Valentina " came back from journey to Space
12th June	" World Day against child labour"
12th June 1872	Railway train started in Japan
14th June	"World Blood Donor Day (WHO)"
15th June 1752	Well-known Scientist Mr. Benjamin Franklin had done experiment of kite.
16th June 2019	The third Sunday of June is celebrated as " International father's Day"
19th June	World Sickle cell Anaemia Awareness Day
21st June	It is the longest day of the year in Northern Hemisphere and longest night of the year in Southern Hemisphere because Sun's rays strikes normally in Northern Hemisphere
22nd June 1973	Successful landing of the astronomer of Skylab in Pacific Ocean after revolving around the earth for 28 days
23rd June	United Nations Public Service Day (UN)
24th June 1961	Successful launching of first Indian "Super Sonic Fighter A"
30th June 1880	Longest total Solar Eclipse of millennium
U. N. : United Nations WHO : World Health Organization	

Answers: 1) c, 2) c, 3) b, 4) c, 5) c, 6) c, 7) b, 8) a



## SCIENTIFIC QUESTION

### Is time travel possible?

Time travel is the concept of movement between certain points in time, analogous to movement between different points in space by an object or a person, typically with the use of a hypothetical device known as a time machine. Time travel is a widely recognized concept in philosophy and fiction. The idea of a time machine was popularized by H.G. Wells' 1895 novel 'The time machine'.

It is uncertain if time travel to the past is physically possible. Forward time travel, outside the usual sense of the perception of time, is an extensively observed phenomenon and well-understood within the framework of special relativity and general relativity. However, making one body advance or delay more than a few milliseconds compared to another body is not feasible with current technology. As for backward time travel, it is possible to find solution in general relativity that allow for it, such as a rotating black hole. Travelling to an arbitrary point in space time has a very limited support in theoretical physics, and usually is



connected only with quantum mechanics or wormhole, also known as Einstein-Rosen bridges.

Some theories, most notably special and general relativity, suggest that suitable geometries of space time or specific types of motion in space might allow time travel into the past and future if these geometries or motions were possible. In technical research papers, physicists discuss the possibility of closed

time like curves, which are world lines that form closed loops in space time, allowing objects to return to their own past.

Many in the scientific community believe that backward time travel is highly unlikely. Any theory that would allow time travel would introduce potential

problems of causality. The classic example of a problem involving causality is the "grandfather paradox": What if one were to go back in time and kill one's own grandfather before one's father was conceived?

## KNOW THE EXHIBIT

### Turn Faster

This Exhibit is situated at " Park Exhibits" between Sardar Vallabhbhai Patel Museum and Art Gallery.

Sit on the chair. Push the weights away at your full arm length and hold them in position by your hands. Ask your friend to give you a gentle turn.

While you are spinning slowly drag both weights close to you- you will turn faster. Again push away the weights and you turn slower. Do this several times.

Angular momentum depends on mass distribution and angular velocity. If the more mass is accumulated close to the center by pulling the weights closer to you, the angular velocity increases.



## QUIZ

- Which of the following pairs represent two Scalar quantities ?  
a) Mass, Acceleration                      b) Temperature, Torque  
c) Distance, Speed                          d) Gravitational Intensity, Work.
- What is the density of air at room temperature?  
a) 1.41                      b) 1.75                      c) 1.29                      d) 1.9
- Which of these fluids has the highest viscosity?  
a) Water                      b) Honey                      c) Blood                      d) Air
- Fungi are plants that lack what?  
a) Oxygen                      b) Carbon dioxide                      c) chlorophyll                      d) None of these
- What is the pH value of pure water?  
a) 6.4                      b) 6.6                      c) 7                      d) 7.4
- Which of the following is called philosopher's wool ?  
a) Zinc bromide                      b) Zinc nitrate                      c) Zinc Oxide                      d) Zinc Chloride
- CNG and LPG are the example of what?  
a) Solid fuels                      b) Gaseous fuels                      c) Liquid fuels                      d) None
- Distilled water is what?  
a) Poor conductor                      b) Good conductor                      c) Both a and b                      d) None

## SCIENCE PROJECT

Surat Municipal Corporation had organized Science Fair at Art Gallery, Science Centre, Surat on 30th and 31st August 2019. Gopinath Malik Primary Kumar School No.-53 had presented their project on "Smart Road".

Aim: water conservation.

The procedure of this project is creates a layer of pebbles in one plastic tub and on this pebble layer there is a layer of topmix permeable. Topmix permeable is a layer which absorb 1000 litre of water in one minute. This layer is called permeable asphalt layer. When water falls on the road, through this surface water descends directly into the soil. This way water can be stored and consumed.

Advantages:

- It can be used by storing the rain water.
- Water level can be brought high in the soil.
- The road remains operational for a long time.
- Accidents during Moonsoon can be prevented.

