

## NEWS ITEM

### SCIENTIFIC NEWS

#### **India was part of Antarctica billions years ago:**

Geologists have found evidence supporting the hypothesis that Indian subcontinent was part of Antarctica a billion years ago but were separated and re-united several times due to tectonic movement of plates before the evolution of mankind. A group of geologists from India and Switzerland researching on evolution of the Earth's crust studied ancient rocks of the continental crust in the Eastern Ghats area and found important clues to the formation of the continents. "It is for the first time that we have been able to prove the hypothesis that the continent of Antarctica and subcontinent India were once a single large continent that broke apart about 1.5 billion years ago," the group of geologists from IIT Kharagpur, who led the research. India and Antarctica then got separated by an ocean. "This ocean closed again with the movement of the landmasses and the two continents approached each other until they collided again around one billion years ago to form the Eastern Ghats mountain belt," they said.

**Indian American's start-up 'Moon Express':** In a first, the Federal Aviation Administration has given license to a private US company, co-founded by an Indian American, to launch a spacecraft and land on moon in 2017. This breakthrough US policy decision provides authorisation to Moon Express for a maiden flight of its robotic spacecraft onto the Moon's surface, the company said in a media release.

There have been no private space missions so far beyond Earth's orbit and only state agencies have performed outer space missions. "The sky is not the limit for Moon Express, it is the launchpad. Space travel is our only path forward to ensure our survival and create a limitless future for our children," The researchers said "In the immediate future, we envision bringing precious resources, metals, and moon rocks back to earth,"

The federal interagency's approval of the Moon Express 2017 lunar mission establishes an important precedent for the private sector to engage in peaceful space exploration, bringing with it monumental implications for the advancement of technology, science, research, and development, as well as commercial ventures that expand Earth's economic sphere, the company said.

**Zebra fish gives a new hope to fight the rare human disease:** Scientists from the Delhi-based

CSIR-Institute of Genomics and Integrative Biology are a step closer to bringing hope to children born with a rare disorder — CHARGE syndrome — if the results seen in zebrafish are reproducible in humans. The results of a study were published on July 13 in the Journal Human Molecular Genetics. About 1 in 20,000 people in the world, and an estimated 50,000 in India alone, are born with CHARGE syndrome — multiple life-threatening problems such as deafness and blindness, heart defects, genital problems and growth retardation and facial bone and nerve defects that cause breathing and swallowing difficulties. There is a high death rate in the very first year in children born with CHARGE. A mutation in the CHD7 gene is responsible for 60-70 per cent of all CHARGE defects. The expression of the gene peaks in the early stages of embryo development, starting from 2-4 cells. The team from IGIB studied the fertilised egg of a zebrafish to better understand the CHARGE syndrome. Following fertilization, zebrafish embryos are transparent. This allows scientists to observe the inside of the embryo and watch in real time how various organs develop. Since most organs begin forming in the first 24-36 hours and are fully formed within five days, it allows researchers to study the development of an organism from egg to maturity. An RNA injected into a one-cell embryo interferes with the making of the CHD7 protein, thus producing a zebra fish embryo with very similar problems as the human babies with CHARGE syndrome. The researchers found that the CHD7 protein causes CHARGE syndrome by modifying a second gene — sox10. "They mentioned that they found more sox10 protein. So if the CHD7 mutation was producing more sox10 protein, we wanted to know if we can reduce the defects by reducing the amount of sox10 protein" they said.

**Nanoparticles bundles a giant medicinal punch in green tea:** It is well known that green tea has many superior medical benefits — antibacterial activity, offers protection against many types of cancer, has anti-diabetic, and anti-inflammatory properties, to name a few. But all these benefits have been based on studying the infusion that is got when the tea bags are dipped into hot water for about 3-4 minutes to allow the active components seep into the water. But a study published in January 2016 in the journal Scientific Reports has gone beyond studying the infusion and found the answers to what renders the green tea its medicinal properties. The researchers looked at the tiny particles suspended in the tea

infusion to understand if these particles played a positive or negative role in the well established bioactivity of green tea. "After seeping a bag of green tea we can always find fine particles suspended in the tea infusion. These fine particles are of three different sizes — macro, micro and nano. This raised the curiosity to probe the role of those particles in the green tea effect, and they studied the suspended particles by assessing its antibacterial activity against oral microflora. The reason for picking oral microflora to test the effectiveness of the suspended particles is because the oral microflora are the first to come in contact with green tea in the mouth. Also, green tea is known to prevent dental caries. The antibacterial activity seen in green tea comes from catechins, phenolics, flavonoids, with catechins playing a predominant role compared with the other two. The researchers studied the effect of all three sizes of suspended particles for their antibacterial properties and found that the higher the epigallocatechin gallate or EGCG (the major bioactive ingredient in green tea) content the better the antibacterial effect against the oral microflora.

**A kind of Culex mosquito can also spread Zika:**

The public Brazilian laboratory Fundacion Oswaldo Cruz (Fiocruz) announced that researchers found the presence of the Culex quinquefasciatus mosquito infected by the Zika virus in three out of 80 groups of mosquitoes analysed up until now. The 80 groups were from the metropolitan area of Recife, regional capital of Pernambuco in the northeast. In two samples it was detected that the mosquitoes were not fed which showed the virus was spread in the insect's organism without being transmitted in a feed recently infected by Zika. Up until now, transmission of the virus was only known through the Aedes aegypti mosquito, the same insect that spreads dengue and chikungunya. The Culex quinquefasciatus is known in Brazil as the domestic mosquito and in Recife, where the majority of Zika cases in the country have been registered, the population of this mosquito is estimated to be 20 times larger than that of the Aedes aegypti. "The current study is very relevant since the control measures of the vectors are different," according to researchers of Fiocruz laboratory while ensuring that the risk of contagion during the upcoming Olympic Games in Rio de Janeiro is very low.

**Novel cereal varieties to check green house gases developed by scientists:**

A team of researchers from India and the United Kingdom have come together to develop new cereal crop varieties that use nitrogen efficiently, thereby reducing greenhouse emissions and making agriculture more profitable and sustainable. The partnership will explore natural

variations of cereals and basic research in model plants to deliver new varieties of cereals with enhanced nitrogen use efficiency. With funding of £10 million (GBP) through the Newton Bhabha Fund, UK; Biotechnology and Biological Research Council (BBSRC), UK; and the Department of Biotechnology (DBT) of the Government of India, four new Virtual Joint Centers in Agricultural Nitrogen will be created. These are delivered in partnership with BBSRC, the Natural Environment Research Council (NERC) and the DBT. The Centers comprise of multiple research organizations in India and the UK, with each center receiving a co-investment of approximately £2.5M, said an official statement from International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). The Cambridge-India Network for Translational Research in Nitrogen (CINTRIN), one of the four centres, is led by the National Institute of Agricultural Botany (NIAB) in the UK and the ICRISAT in India. It also brings together the Department of Plant Sciences and Sainsbury laboratory, University of Cambridge, the Punjab Agricultural University (PAU), the National Institute of Plant Genome Research (NIPGR), India, ADAS UK Ltd. and agri-IT specialist KisanHub.

**'Guided chemotherapy missiles' as a novel way to fight cancer cells:**

Scientists have engineered novel proteins that work like 'guided missiles' which seek out cancer cells and deliver chemotherapy drugs to treat hard-to-reach tumours without harming healthy cells. Although chemotherapy drugs do often effectively kill cancer cells, they also damage other quickly dividing cells in the body, causing side effects ranging from cosmetic, like hair loss, to disabling. Sometimes, the drug dose needed to kill a tumour may be more than what a person's body can handle. This might happen if the tumour does not have much of a blood supply and very little of the drug, which is delivered through the bloodstream, can get in. A dose high enough to infiltrate the tumour could be deadly to other cells in the body. Some recently approved therapies get around this problem using antibodies to deliver a drug directly to tumours, bypassing healthy cells and possibly overcoming some of the uglier aspects of cancer chemotherapy.

Researchers at Stanford University has built on this antibody approach using an engineered protein rather than an antibody to direct the drug to the tumour. Although the two techniques are conceptually similar, the specialized protein has the potential advantage of being able to pass through the barrier that protects the brain, thereby being able to treat brain tumours. It is also smaller than the antibody and might be able to reach dense tumours with little blood supply.

### SCIENTIFIC INVENTIONS

#### **Digital information can be stored in DNA scientists**

**worked out:** The Scientists aim to help companies and institutions archive huge amounts of data for decades or centuries, at a time when the world is generating digital data faster than it can store it. Technology moves on, and data can't be retrieved if the means to read it is no longer available. So for that and other reasons, long-term archiving requires repeatedly copying the data to new technologies. The difference between DNA and digital devices into this world comes the notion of DNA storage. DNA is by its essence an information-storing molecule in the form of four-letter DNA code. That really refers to sequences of four building blocks abbreviated as A, C, T and G found in the DNA molecule. Specific sequences give the body directions for creating particular proteins. Digital devices, on the other hand, store information in a two-letter code that produces strings of ones and zeroes. A capital 'A', for example, is 01000001. How to convert from digital to DNA? Converting digital information to DNA involves translating between the two codes. In one lab, for example, a capital A can become ATATG. The idea is once that transformation is made, strings of DNA can be custom-made to carry the new code, and hence the information that code contains. Major advantage embodies is its durability. Scientists can recover and read DNA sequences from fossils of Neanderthals and even older life forms. So as a storage medium, "it could last thousands and thousands of years," the researchers from University of Washington, who works with Microsoft on DNA data storage, says accordingly.

### OPPORTUNITIES

**CSIR-Nehru Science Postdoctoral research Fellowship Scheme:** CSIR-Nehru Science Postdoctoral research Fellowship Scheme, has been instituted to identify promising young researchers with innovative ideas and provide them with training and research opportunities in niche areas of basic science, engineering, medicine and agriculture. Mode of selection: Eligible candidates can apply in the prescribed format, available on the website: [www.csirhrdg.res.in](http://www.csirhrdg.res.in), any time of the year. However, the selections will be made twice a year, in the months of June and December

**International Centre for Theoretical Science, Tata Institute of Fundamental Research (ICTS-TIFR) post doctoral fellowships:** Invites applications from

highly motivated candidates for postdoctoral positions. ICTS also has an active in-house research program. Current research spans the areas of astrophysical relativity, biophysics, statistical physics and turbulence, interdisciplinary and applied mathematics, condensed matter physics and string theory. Other areas under consideration are cosmology, multiscale and complex systems including interfaces with theoretical biology, mathematics, computer science and computational sciences with strong interface to other research areas at ICTS. Interested candidates apply online-[https://www.icts.res.in/postdoctoral\\_fellowships](https://www.icts.res.in/postdoctoral_fellowships). Applications will be normally reviewed twice every year, once in December (deadline for application: 15 December) and once in July (deadline for application: 15 June). Applications received after the deadline may also be considered

#### **ICMR CENTENARY -Post Doctoral Research Fellow (Scheme):**

ICMR Postdoctoral Research Fellowship Scheme is being instituted to foster high quality research opportunities to promising fresh PhD/MD/MS holders in the cutting edge areas of basic science, communicable and non communicable diseases, and reproductive health including nutrition at ICMR Institutes /Centers. Selection of the "ICMR Centenary Postdoctoral Research Fellows" will be made through interview of short listed candidates by specially constituted Committees by Director General based on their publications, citation and its impact factor. Selection will be made twice in a year and this will be 31st December and 30th June every year. All correspondence pertaining to "ICMR CENTENARY - Postdoctoral Research Fellowship" should be sent to Email: [drencejain@gmail.com](mailto:drencejain@gmail.com)

**SERB-National Post Doctoral Fellowship:** The SERB-National Post Doctoral Fellowship (N-PDF) is aimed to identify motivated young researchers and provide them support for doing research in frontier areas of science and engineering. The call for applications for SERB-N PDF will be notified twice a year through the websites [www.serbonline.in](http://www.serbonline.in) and [www.serb.gov.in](http://www.serb.gov.in). The application form along with a research proposal highlighting the objectives of the research work to be undertaken should be submitted online through the website [www.serbonline.in](http://www.serbonline.in). Call for proposal will be made open for NPFD during April and October months of every year. Candidates lapsing their eligibility by September 2016 are given with an extension of one-month period, applicable only for this year.

