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Nanoantenna

Researchers have developed a nanoantenna made of DNA and polyethylene glycol (PEG) to study changes in the structure of protein molecules.

- **Working** - The DNA-based nanoantenna works like a two-way radio that can both receive and transmit radio waves.
- It receives light in one wavelength.
- It transmits light in another colour depending upon the protein changes it senses, and this can be detected and studied.
- **Characteristics** - These fluorescent nanoantennae remained stable at higher temperatures.
- These nanoantenna offer a distinct advantage over the fluorescent dyes that are ubiquitously used in biotechnology.
- The latter 'display a low affinity for proteins', while these nanoantennae have an affinity to a specific region of a protein, which is contingent on the structure and chemistry of the protein.
- So, they are able to detect even the most minute of changes.
- The nanoantenna was able to pass muster even with respect to protein-protein interactions.
- This nanoantenna can be synthesised with different lengths and flexibilities to optimize their function.
- **Significance** - The antenna will help us understand how natural nanomachines function or malfunction, consequently leading to disease.
- Labs equipped with a conventional spectrofluorometer, could readily employ these nanoantenna[e] to study proteins.
- This study will in turn help us identify new drugs or to develop new nanotechnologies or nano-machines.
- The antenna performed well when used for examining enzyme kinetics i.e. the speed at which a reaction progresses in the presence of an enzyme.

Reference

1. https://indianexpress.com/article/technology/science/dna-worlds-tiniest-antenna-7746091/
2. https://www.siliconrepublic.com/innovation/worlds-smallest-nanoantenna-dna-nanotechnology

Bomb Cyclone

Major U.S. cities like New York bore the brunt of the blizzard, which their National Weather Service confirmed intensified into a "bomb cyclone".

- Bomb cyclones are sometimes called 'winter hurricanes,' but they are a different type of storm.
- Bomb Cyclone is a large, intense midlatitude storm that has low pressure at its center, weather fronts and an array of associated weather, from blizzards to severe thunderstorms to heavy precipitation.
- **Trigger** - Bomb Cyclone is characterized by the explosive power of rapid drops in atmospheric

pressure.
- It becomes a bomb when its central pressure decreases very quickly—by at least 24 millibars in 24 hours.
- **Conditions** - When a cyclone "bombs," or undergoes bombogenesis, this means that it has access to the optimal ingredients for strengthening, such as
    1. High amounts of moisture,
    2. Winds blowing at 150 miles per hour in the upper atmosphere,
    3. Very warm sea surface temperatures just offshore (2-4 degrees Fahrenheit warmer than average), and
    4. A highly unstable atmosphere.
- **Region** - The U.S. Eastern Seaboard is one of the regions where bombogenesis is most common.
- That's because storms in the midlatitudes (that includes the entire continental U.S.) draw their energy from large temperature contrasts.

Reference

1. https://www.thehindu.com/news/international/bomb-cyclone-hits-eastern-us-triggers-transport-chaos-outages/article38350533.ece
2. https://www.scientificamerican.com/article/what-is-a-bomb-cyclone/

Cotton Corporation of India

- Cotton Corporation of India (CCI) was established in 1970 under the administrative control of Ministry of Textiles, Government of India as a Public Sector Undertaking under the Companies Act 1956.
- It is engaged in diverse activities related to trade, procurement, and export of cotton.
- It is responsible for equitable distribution of cotton among the different constituents of the industry and aid imports of cotton.
- It undertakes price support operations, whenever the market prices of cotton fall below the Minimum Support Prices (MSP).
- Headquartered at CBD Belapur, Navi Mumbai, the CCI has more than 400 cotton procurement centres in all major cotton growing States.
- CCI Operations cover all the cotton growing states in the country:
    1. Punjab, Haryana and Rajasthan (Northern Zone),
    2. Gujarat, Maharashtra, Madhya Pradesh & Orissa (Central Zone),
    3. Andhra Pradesh, Telangana, Karnataka & Tamil Nadu (Southern Zone)

Reference

1. https://www.thehindu.com/business/agri-business/cabinet-approves-price-support-to-cotton-corporation-of-india/article37417136.ece
2. https://cotcorp.org.in/AboutUs.aspx

Digital Rupee

Union Finance Minister has announced the launch of the Digital Rupee 2022-2023 onwards.

- Digital Rupee is the **Central Bank Digital Currency** (CBDC) of India.
- This CBDC will be launched by the Reserve Bank of India.
- The underlying technology that will be powering the Digital Rupee will be **Blockchain**.

- To know more about the Central Bank Digital Currency, click here.

Reference

1. https://indianexpress.com/article/explained/explained-what-is-the-digital-rupee-announced-by-sitharaman-in-budget-7751109/
2. https://zeenews.india.com/economy/what-is-a-digital-rupee-and-how-it-will-fuel-india-s-growth-all-you-need-to-know-2432871.html

Greater Mekong Region

The World Wildlife Fund's report on the greater Mekong region highlights the need to protect the rich biodiversity and habitats in the region.

- The Greater Mekong Region spans six countries - China, Myanmar, Lao PDR, Thailand, Cambodia and Vietnam
- This region is a biodiversity hotspot and home to tigers, Asian elephants, saola and thousands of other species.
- [Saola is an extremely rare animal also called the Asian unicorn or spindlehorn.]
- This region is the 'rice bowl' of Asia and at its heart lays the Mekong River.

Popa Langur

- This monkey was the only new mammal reported among the 224 new species listed in the WWF's latest update on the greater Mekong region.
- It is called the Popa langur, for it lives on the steep hillsides of the extinct Mt. Popa volcano in Myanmar.
- It is also called Ghostly monkey, as it has ghostly white circles around its eyes.
- The monkey is a candidate to be listed as a critically endangered species on the Red List of the International Union for the Conservation of Nature, since only 200-250 are thought to survive in the wild.

Reference

1. https://indianexpress.com/article/technology/science/ghostly-monkey-new-mekong-region-species-wwf-report-7742431/
2. https://www.theguardian.com/world/2022/jan/26/ghostly-monkey-and-slug-snake-among-224-new-species-found-in-mekong-region
3. https://www.worldwildlife.org/places/greater-mekong#:~:text=The%20vast%20region%20spans%20six,heart%20lays%20the%20Mekong%20River.

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