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1. DCGI grants marketing authorization to SII's qHPV Vaccine (July 14, 2022)

The Drugs Controller General of India (DCGI) granted market authorisation to Serum Institute of India (SII) to manufacture India’s first Quadrivalent Human Papillomavirus vaccine (qHPV) which is indigenously developed against cervical cancer.

Important facts

- qHPV is the first indigenous vaccine developed in India against cervical cancer which is likely to be launched by the end of this year.
- It will be an Indian vaccine for the treatment of cervical cancer in women that is both affordable and accessible.

What is Cervical Cancer?

- Cervical cancer starts in the cells of the cervix, the lower part of the uterus.
- The cervix connects the body of the uterus to the vagina.
- Cancer starts when cells in the body grow out of control.
- Most cases of cervical cancer are caused by infection of the human papillomavirus (HPV), which is preventable with a vaccine.
- Cervical cancer grows slowly, so it usually has time to be detected and treated before it causes serious problems.
- Women between the ages of 35 and 44 are most likely to get this disease.

Drugs Controller General of India (DCGI)

- It comes under the Central Drugs Standard Control Organization (CDSCO).
- It is responsible for approval of licences of specified categories of drugs like blood and blood products, vaccines, IV fluids and sera in India.
- It sets the standards and quality of the manufacture, sale, import and distribution of drugs in India.

2. Indian scientists develop novel mechanism to inactivate SARS-CoV-2 (July 14, 2022)

Indian Scientists have developed an innovative system to inactivate the SARS-CoV-2 virus by preventing the entry of the SARS-CoV-2 virus into the cells of the body, reducing its infection capacity.

Important facts

- For this, the researchers have informed about the design of a new class of synthesized peptides.
- This peptide can not only inhibit the entry of SARS-CoV-2 virus into cells, but can also entangle virus particles together in a manner that reduces their ability to infect.
- This new effort provides an alternative mechanism to inactivate viruses such as SARS-CoV-2 and promises a new class of peptides as antivirals.
- The research was supported under the COVID-19 IRPHA call of the Science and Engineering Research Board (SERB), a statutory body of the Department of Science and Technology (DST).

What is the new innovative system?

- The developed peptides are helical and hairpin-like in shape.
- Each of these is able to associate with another of its kind, which is known as a dimmer.
- Each dimeric 'bundle' presents two surfaces for interaction with the two target molecules.
- Scientists from the Indian Institute of Science, in collaboration with researchers from the CSIR-Institute of Microbial Technology, have taken advantage of this approach to design these peptides.
- The team of researchers used a peptide called SIH-5 to target the interaction between the SARS-CoV-2 receptors of SARS-CoV-2's spike(S) protein and SARS-CoV-2's ACE2 protein in human cells.

What is the sars-cov-2 virus?

- It is responsible for causing the coronavirus disease (Covid-19).
- SARS means Severe Acute Respiratory Syndrome.
- For the first time in 2019, it was reported that SARS-CoV-2 can infect people as well.
- It is believed that the virus spreads from person to person through droplets released when an infected person coughs, sneezes or talks.
- Coronaviruses are a specific family of viruses, some of which cause less-severe damage, such as the common cold, while others cause respiratory and intestinal diseases.

3. Ola Electric Unveils Indigenous Lithium-Ion Cell (July 13, 2022)

Electric vehicle company Ola Electric has unveiled its indigenously developed lithium-ion cell, the NMC 2170.

Important facts

- The specialty of this cell of Ola is that it can store more energy than the ordinary lithium cell used in an e-vehicle.

- Apart from this, its life cycle is also long, due to which it can be used for a long time.
- Ola Electric claims that this new cell will help in increasing the range of electric vehicles.
- Ola will start mass production of SAIL from its Gigafactory by 2023.
- Ola is building the world's most advanced cell research centre that will enable us to rapidly expand and innovate and manufacture the most advanced and cost-effective EV products in the world.
- The company said it is committed to invest in research and development to create indigenous advanced SAIL technologies, strengthen manufacturing capabilities and create an integrated Ola electric vehicle hub.

About Ola Electric

- Ola Electric Mobility is an Indian electric two-wheeler manufacturer, based in Bangalore.
- Its manufacturing plant is located in Krishnagiri, Tamil Nadu, India.
- Ola Electric launched its first electric vehicle in August 2021 and has set up the world's largest 2W manufacturing facility in India.
- Founder & CEO - Bhavish Aggarwal

4. First images from James Webb Space Telescope released by NASA (July 13, 2022)

NASA on July 12 released the deepest and most accurate infrared image of the universe ever taken from NASA's James Webb Space Telescope.

What is the image about?

- Webb's first deep field galaxy cluster is SMAC 0723 which is filled with thousands of galaxies including the weakest objects seen in the infrared.
- The image of Webb is about the size of a grain of sand held on a hand, a tiny piece of the vast universe.
- The collection also includes fresh images of another galaxy cluster known as Stephen's Quintet, first discovered in 1877.

James Webb Space Telescope

- NASA’s James Webb Space Telescope was launched by rocket on 25 December 2021 from South America’s north-eastern coast.
- It is the most powerful infrared telescope ever launched by NASA.
- It has been built in collaboration with NASA, the European Space Agency (ESA) and the Canadian Space Agency.
- It has opened a new era of astronomy.

- Its goal is to search for the first galaxies that formed after the Big Bang.
- It will reveal new and unexpected discoveries, and help to understand the origins of the universe and the human position.
- It reached its destination in solar orbit about 1.6 million km from Earth after travelling 2 weeks in space.
- It is also considered a successor of the Hubble Telescope which was launched into low Earth orbit in 1990.

5. IIT Madras researchers develop AI tool to identify cancer-causing genes (July 12, 2022)

An Artificial Intelligence-based tool named 'PIVOT' has been developed by researchers from the Indian Institute of Technology Madras (IIT Madras).

- **PIVOT**
- PIVOT is designed to predict genes that are responsible for causing cancer.
- This AI-based tool will help in developing strategies for personalised cancer treatment.
- PIVOT is able to predict cancer-causing genes in patients.
- The PIVOT tool was developed based on the machine learning model, which categorises genes as tumour oncogenes, suppressor genes or neutral genes.
- It successfully predicted oncogenes as well as tumour-suppressor genes such as TP53, and PIK3CA.
- **How does this work?**
- PIVOT is a machine learning tool.
- It uses a variety of data, including mutations and gene expression, to predict cancer-causing genes.
- These genes are called driver genes.
- It helps in formulating personalised cancer treatment strategies.

6. Around 60 StartUps registered with ISRO (July 12, 2022)

Nearly 60 startups have registered with the Indian Space Research Organization (ISRO) since the recent opening of the Indian space sector to the private sector by Prime Minister Narendra Modi.

- **Important facts**
- Some of the registered start-ups are working on projects related to space debris management.

- This information was given by the Union Minister of State for Science and Technology, Dr Jitendra Singh after inaugurating the ISRO System for Safe and Sustainable Operation at ISRO Control Center in Bengaluru on July 11.
- Other startups have different offerings from nano-satellites, launch vehicles, ground systems, research, etc.
- Earlier on June 10, Prime Minister Narendra Modi had said during the inauguration of IN-SPACe that the space policy would be announced soon.
- The policy will define the role that private companies can play in space missions, providing access to infrastructure and services owned by ISRO.
- **Indian National Space Promotion and Authorization Centre (IN-SPACe)**
- IN-SPACe at Bopal in Ahmedabad, Gujarat, was inaugurated by PM Modi on June 10.
- It will be the nodal agency that will allow space activities and use of Department of Space-owned facilities by non-government private entities and ensure greater private participation in the sector.
- **Indian Space Research Organisation (ISRO)**
- ISRO was set up on 15 August 1969
- Chairman of ISRO: S Somnath
- Headquarters of ISRO : Bengaluru, Karnataka
- Space Station from where ISRO launches rockets - Satish Dhawan Space Centre (SDSC) SHAR, Sriharikota, Andhra Pradesh

7. ICMR-VCRC develops special female mosquitoes to control Dengue, Chikungunya (July 11, 2022)

ICMR-Vector Control Research Centre has developed special female mosquitoes to control Dengue and Chikungunya.

- **Important facts**
- These female mosquitoes will mate with males and produce larvae that do not contain the virus.
- Two colonies of Aedes aegypti have been developed by ICMR-VCRC, Puducherry. who are infected with wMel and wAlbB Wolbachia strains to reduce the spread of viral disease.
- These are called Aedes aegypti (Pud).
- After getting permission from the government, these female mosquitoes will be released outside so that they will form larvae that are free from the viruses of these diseases.
- **Mosquito-borne diseases**
- **Malaria -** This disease is caused by the bite of a female Anopheles mosquito.

Malaria fever is caused by a virus called Plasmodium vivax.

- **Dengue -** Dengue virus is transmitted to humans through the bite of an infected Aedes mosquito.
- According to the World Health Organisation (WHO), dengue is the most widely spread disease by mosquitoes worldwide.
- **Chikungunya -** Chikungunya, like dengue, is caused by the bite of the Aedes mosquito.
- **Yellow Fever -** This disease is caused by the bite of a human from the Aedes mosquito, especially Aedes aegypti.
- Yellow fever is caused by flavivirus.

8. India’s first Autonomous Navigation facility, TiHAN launched at the IIT Hyderabad (July 11, 2022)

The Union Minister of State for Science and Technology, Jitendra Singh inaugurated India's first autonomous navigation facility, called TIHAN, on the campus of IIT Hyderabad.

- **Important facts**
- The navigation facility has been developed by the Union Ministry of Science and Technology with an outlay of Rs 130 crore.
- **What is Tihan?**
- It is a multi-disciplinary initiative that aims to make India a global player in 'smart mobility' technology for the future and the next generation.
- The platform will facilitate high quality research between industry, academia and R&D laboratories locally and globally.
- TiHAN stands for "Technology Innovation Hub on Autonomous Navigation".
- **Importance**
- TiHAN Test Bed strives to make India a global leader in autonomous navigation technologies.
- TiHAN-IITH will help in precise testing of next generation autonomous navigation technologies.

9. IISc researchers develop an analog chipset named ARYABHAT-1 (July 9, 2022)

Researchers at IISc Bengaluru have recently developed a prototype of an analog chipset named "Aryabhata-1".

- **Important facts**

- The team has created a design framework for developing the next generation of analog computing chipsets.
- These chipsets can work fast. It will use less power than the digital processors used in various electronic gadgets.
- It has been designed by Prateek Kumar, a PhD student at IISc.
- **Aryabhata-1**
- Aryabhata-1 stands for "Analog Reconfigurable Technology and Bias-scalable Hardware for AI Tasks".
- These chipsets could be beneficial for applications based on artificial intelligence (AI) such as object or speech recognition apps, including Alexa.
- It is able to be configured with multiple machine learning architectures such that its ability to perform robustly over different temperature ranges enables it to work with digital CPUs.
- **About Indian Institute of Science (IISc)**
- IISc was established in the year 1909 at Bangalore, Karnataka State with the active support of Jamsetji Tata.
- Hence it is also known as 'Tata Institute'.
- It is a public research university for higher education and research in science, engineering, design and management.
- IISc was granted deemed university status in 1958 and Institute of Eminence in 2018.

10. Three new Exotic subatomic particles discovered with the Large Hadron Collider (July 6, 2022)

The Large Hadron Collider beauty (LHCb) experiment has discovered three never-before-seen particles.

- **What is the discovery?**
- CERN, (European Organization for Nuclear Research) was investigating the slight differences between matter and antimatter by studying a type of particle called the “beauty quark”, or “b quark”.
- The three “exotic” particles, a new kind of “pentaquark” and the first-ever pair of “tetraquarks” were found.
- These are a kind of new hadrons.
- The discovery will help physicists understand how quarks bind together in these composite particles.
- **What are Quarks?**
- Quark is a fundamental component of matter and is defined as an elementary particle.

- These quarks combine to produce composite particles called hadrons.
- They usually combine together in groups of twos and threes to form hadrons.
- The most stable of these are neutrons and protons which are components of the atomic nucleus.
- They can also combine into four-quark and five-quark particles, called tetraquarks and pentaquarks.
- These exotic hadrons were predicted by theorists nearly six decades ago.
- **Tetraquarks and Pentaquarks**
- Atoms contain smaller particles called neutrons and protons, which are made up of three quarks each.
- Most of the exotic hadrons discovered in the past two decades are tetraquarks or pentaquarks.
- They contain a charm quark and a charm antiquark.